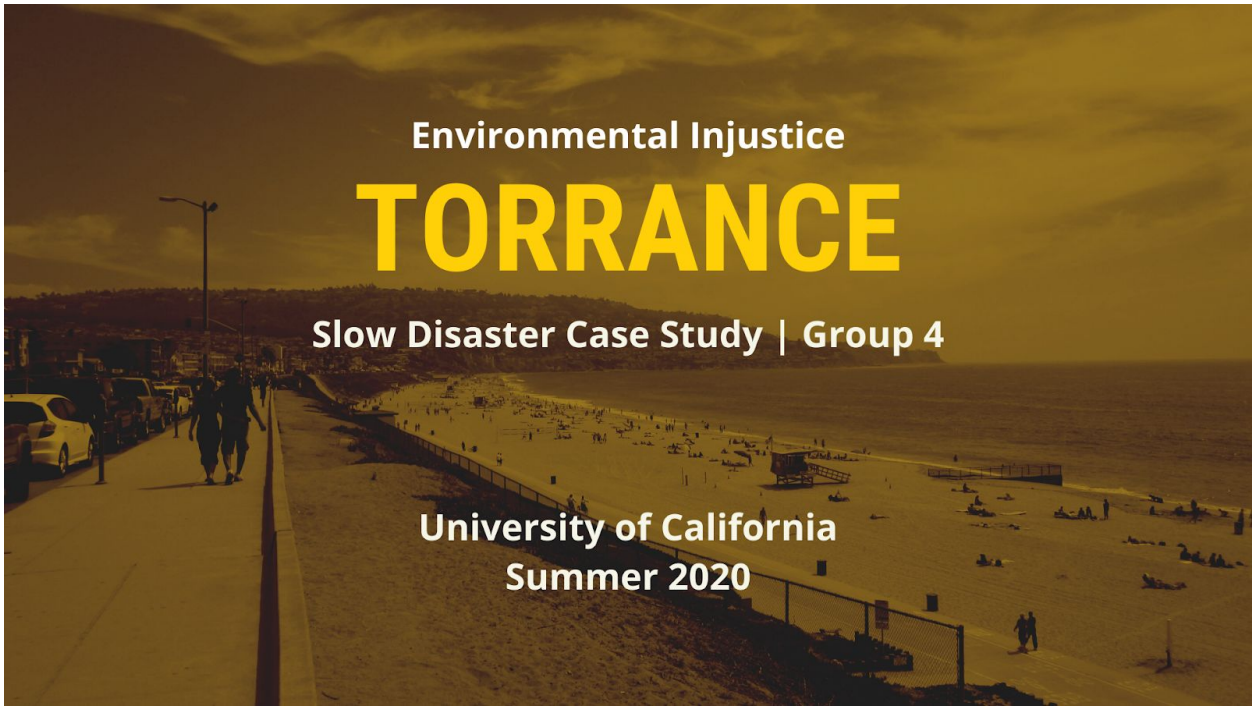

Authors

Jana, Srayan; Konishi, Rieko; Lu, Zongyue; Dang, Huy; Uy, Neath; Sampath, Ashwin; Dang, Vincent; Sehgal, Dhruv; Hossain, Omar; Lopez, Marissa; Rubalcava, Abraham

Teaching Team

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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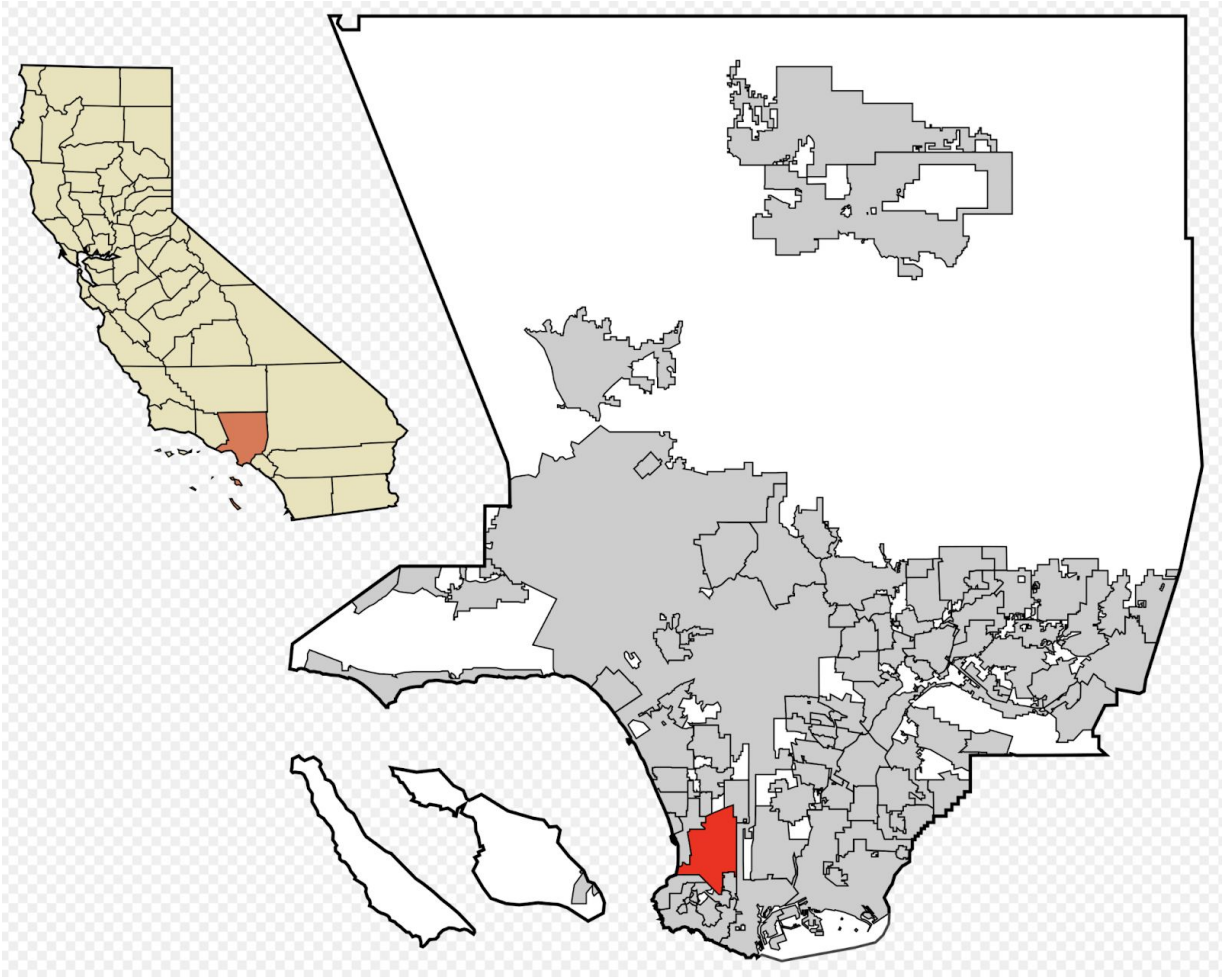


Figure 1. Location Map of Torrance, CA. (Screenshot by Marissa Lopez. Wikipedia, retrieved 7 July 2020). Torrance is a coastal city located in Southern Los Angeles County, surrounded by the Pacific Ocean, Lomita, Gardena, Lawndale, Redondo Beach, Rolling Hills, and Palo Verde Estates.

INTRODUCTION

This case study report focuses on everyday, cumulative pollution in Torrance, 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 [Neath Uy]

The Torrance neighborhood is primarily located in California along the state's West coast and approximately 8 miles south of Manhattan Beach (Figure 3). Notably a coastal urban neighborhood, Torrance is characterized by its proximity to many California beaches and relatively populated housing communities with a rising population of 143,592 residents, 7% of which live under the poverty line (U.S. Census). Median household income is approximately $88,860 with the highest occupation percentages in professional, scientific, and technical services (9.9%), health care (9.5%), education services (8.4%), and other management occupations (8.0%) (City Data, 2017). In terms of ethnicity and race makeup, the Torrance community is made up of mainly White (38.2%), Asian (36.6%), and Hispanic and Lationo (17.5%) populations (U.S. Census). Figure 4 further shows that population percentiles of minority and linguistically isolated populations that reside in Torrance, which highlights that approximately more than half of the Torrance population (54.10%) is made up of minority groups that are living under the unfair environmental setting caused mainly by the presence of oil refineries in the area.

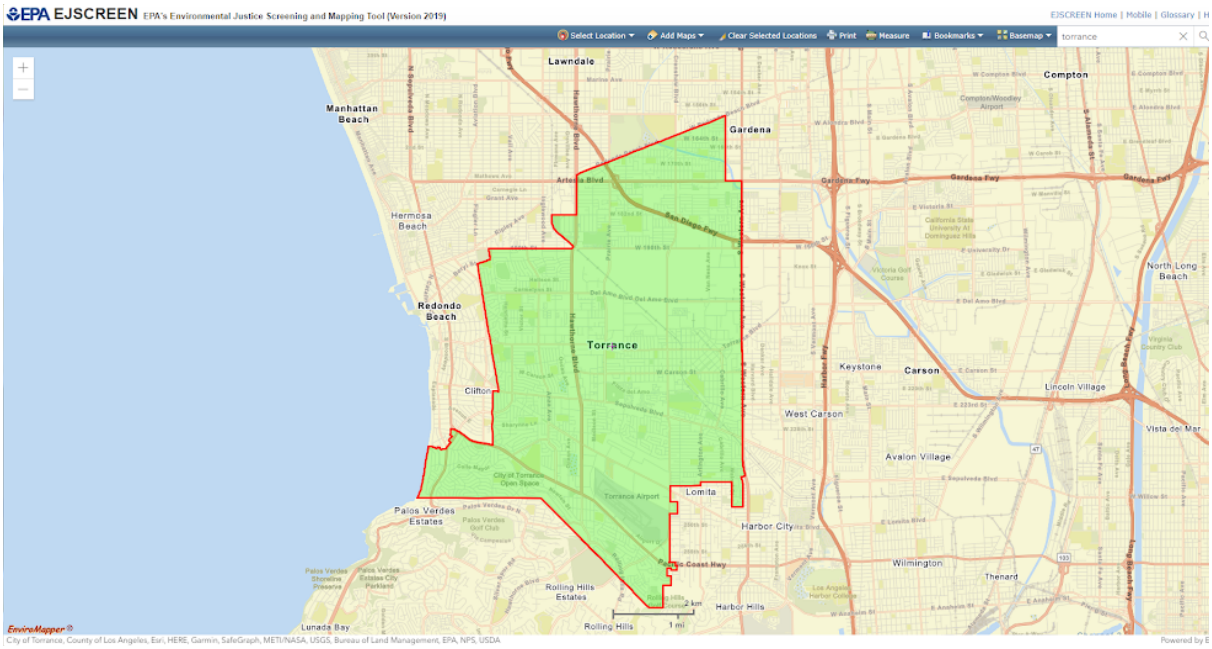


Figure 3. Selected area for Torrance, CA. (Screenshot by Rieko Konishi, July 2020. *EPA EJScreen Report,* retrieved July 7, 2020).

Residents of Torrance experience a low air quality that is caused mainly by oil refinery pollutants. With an Air Quality Index (AQI) level of 124, the residents of the neighborhood are breathing air that is in a significantly worse condition than average (City Data 2018).

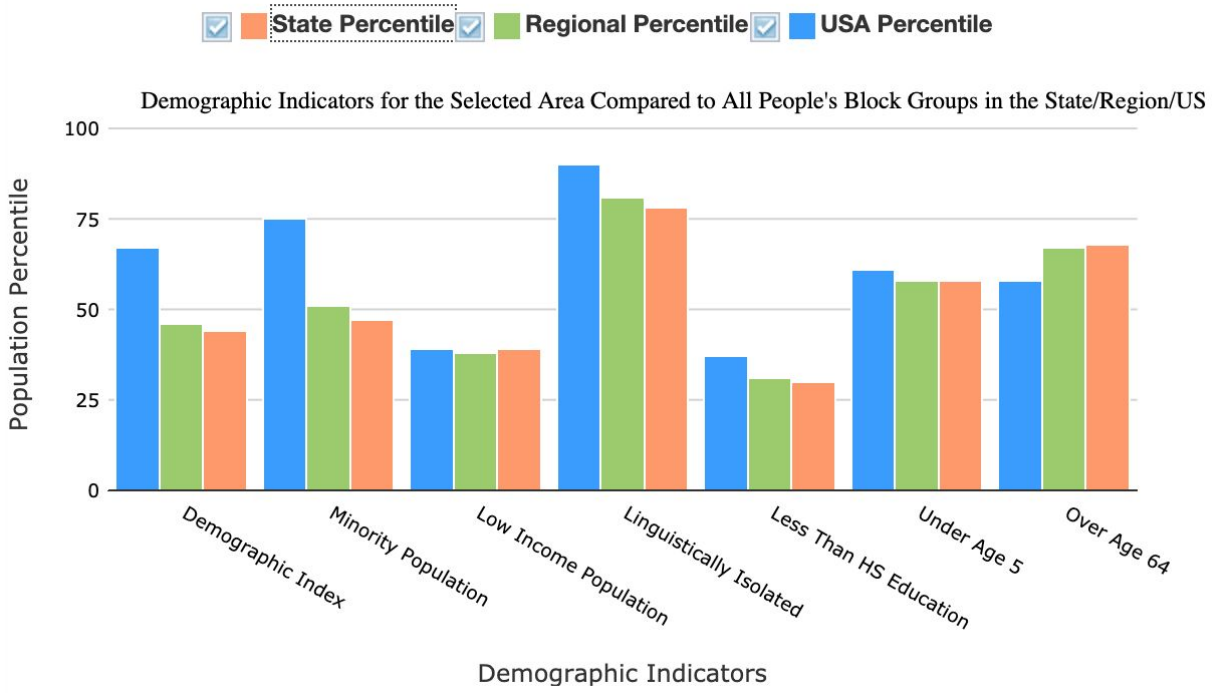


Figure 4. Demographic Indicators Generated for the community of Torrance, CA. Graph Shows Relatively High Percentile of Minority Populations that Indicates that the Community's Vulnerability in Consisting of Minority and Linguistically Challenged Populations. (Screenshot by Neath Uy, July 2020. From *EPA EJScreen Report*, retrieved July 08, 2020.)

Several community assets are available within the neighborhood of Torrance that can help solve problems or provide effective pathways to community development. Figure 5 highlights two gardens that are located in the neighborhood of Torrance; Columbia Park Community Garden and Torrance Community Garden.

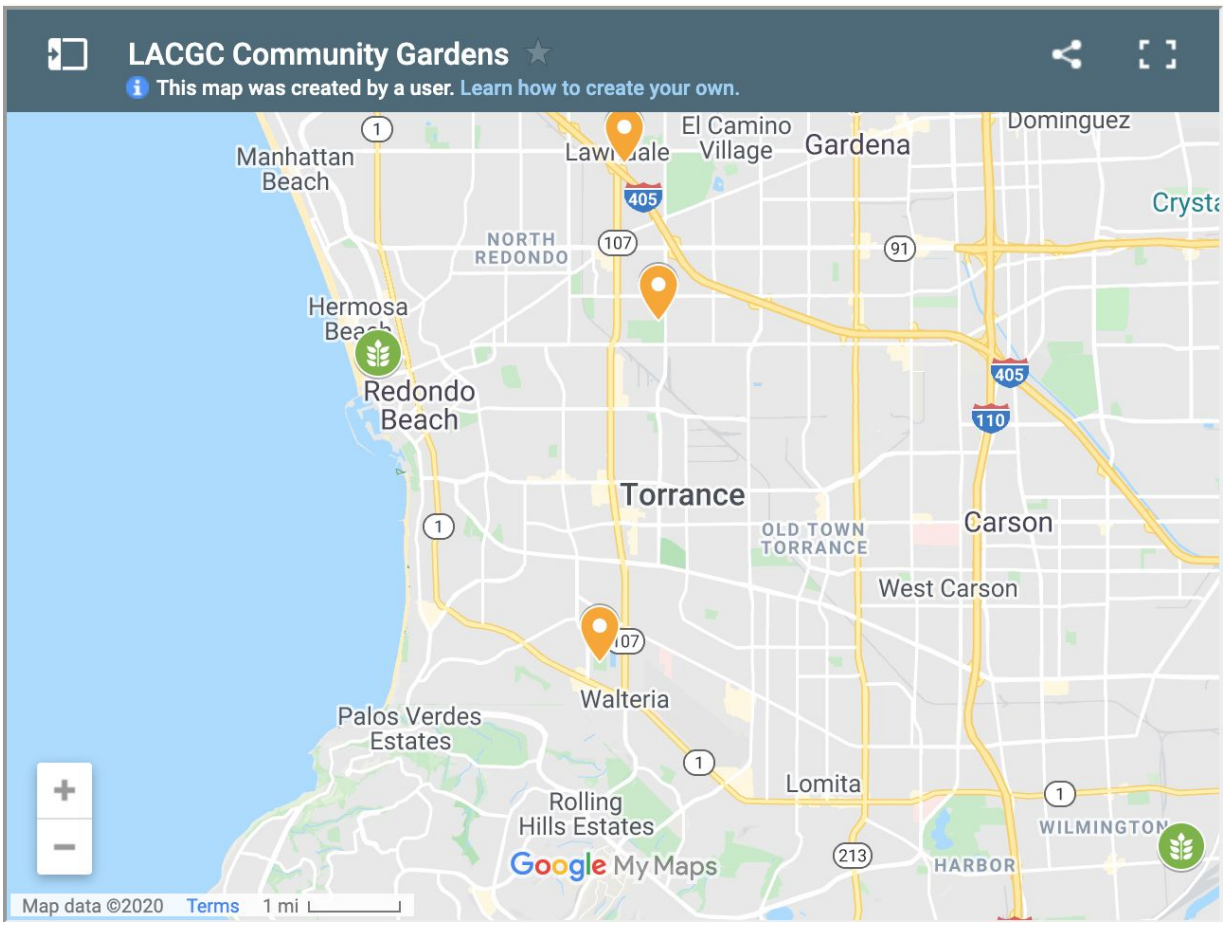


Figure 5. Map of Community Gardens in Torrance. With only Two Community Gardens Present in the City of Torrance, Residents Might Experience a Shortage in Healthy Greens Consumption that Contribute to Torrance's Overall Low Quality of Health. (Screenshot by Neath Uy, July 2020. *Los Angeles Community Garden Council*, retrieved July 08, 2020. http://lagardencouncil.org/find-a-garden)

With gardens being present in such proximity to the neighborhood, hazardous effects of pollutants from oil refineries can be minimized as the trees and plants provide clean air through the process of reuptake and photosynthesis. The lack of

such gardens would have caused the residents of Torrance to constantly breathe in dangerous chemicals that are constantly being circled throughout the neighborhood without the addition of new, clean air.

Another important asset that can help Torrance to improve its environmental problems is public internet access. Figure 6 highlights the availability of public internet in nearby neighborhoods of Torrance that can be easily accessed by Torrance residents.

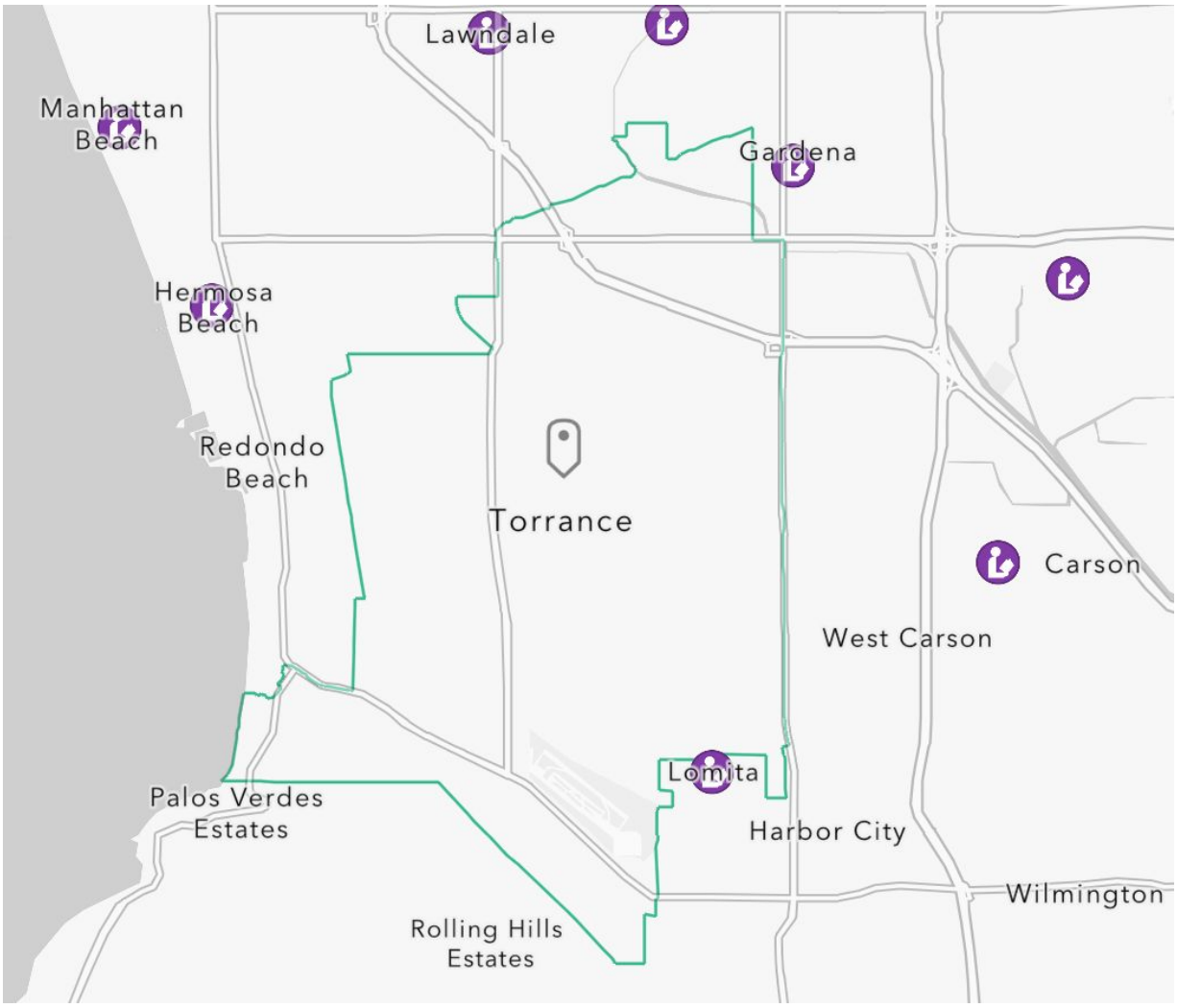


Figure 6. Map of Public Internet Access in Torrance. Living in Proximity to Accessible Internet Connection Enables for Easy Access to Information and Research Opportunities that can Elevate Community Development. (Screenshot by Neath Uy, July 2020. Internet Locator Map, *County of Los Angeles*, retrieved July 08, 2020. https://lacounty.maps.arcgis.com/apps/ZoneLookup/index.html?appid=e6fbcad3b92244cabcb7b2130e5ffae7)

The availability of these internet connections can provide a platform for families that cannot purchase the use of private internet to access important information that could help the community. Other assets such as libraries and Enrollment sites can also be helpful for residents to do research and gain access to important information. With enrollment sites, specifically, members of families that are of minority backgrounds are able to get help with enrollment or application processes that they may not be familiar with, thus improving the growth of education in the area.

SECTION 2: Everyday Pollution as Slow Disaster [Omar & Abraham]

Hazardous Waste Facilities, Military Sites, Lead Exposures

Torrance is a county affected by oil refineries that harm the communities that live near it. According to the IQAir, the city has a moderate 52 US AQI Air Quality rating. While this may seem as concerning on the outset as it does not do any substantial harm, it is important to note that relative to the areas around it, that number is unusually slightly higher (IQAir 2020). However, to give credit where credit is due, the air's content of chemicals is kept in check by the Torrance Air Monitor, a large-scale air-monitoring system that utilizes light sensors to measure pollutants in the Torrance Refinery and community (Green 2019). In fact, on taking a look at the monitor, the air quality has been relatively low to the REL (Reference Exposure Level) (Torrance Air Monitor 2020).

However, this does not exclude the fact that this only prevents a slow disaster. A fast disaster can very much occur like it did in 2015, in which an explosion at the oil refinery almost ruptured a vat of chemicals that would have intoxicated the whole community. If an event like this were to happen again and if faith were not to be in

the community's favor, the monitor would be rendered useless and we would have a Nepalian level of disaster occur (Zou 2017). It also does not help that the refinery in Torrance utilizes hydrofluoric acid, a chemical that can "quickly inflict severe health damage and death by burning the skin and lungs and penetrating deep tissues and bones" (Check Section 2A for more info). Within minutes, 1,000 gallons of this acid can make dense, lethal, low-hanging clouds that can spread up to two miles away. (Barboza 2019). This is by far the most concerning environmental threat in the area, and with recent progressions in monitoring it, hopefully steps will come to combat and eliminate it.

When it comes to potential environmental threats that come from military sites, that issue is a non-issue according to ProPublica's Bombs In Our Backyard. Taking a look at Figure 7, there is only one former military site that was once a Navy Material Redistribution Center, to a Naval Store House, then a Torrance Annex, then finally closing in 1973, to be given to the city of Torrance and the Torrance Unified School district in 1975. There were cited toxic and radioactive waste and hazardous materials, but they were supposedly taken care of in 2004 (ProPublica 2020). While there is very much a possibility that there are still environmental threats still present in that area, according to the map by the 2019 EPA EJScreen mapping (as seen in Figure 8), there were no recent reports of harmful waste in that area. Looking at the EJScreen mapping further, there are some toxic releases nearby school areas that should be attended to (EPA 2019).

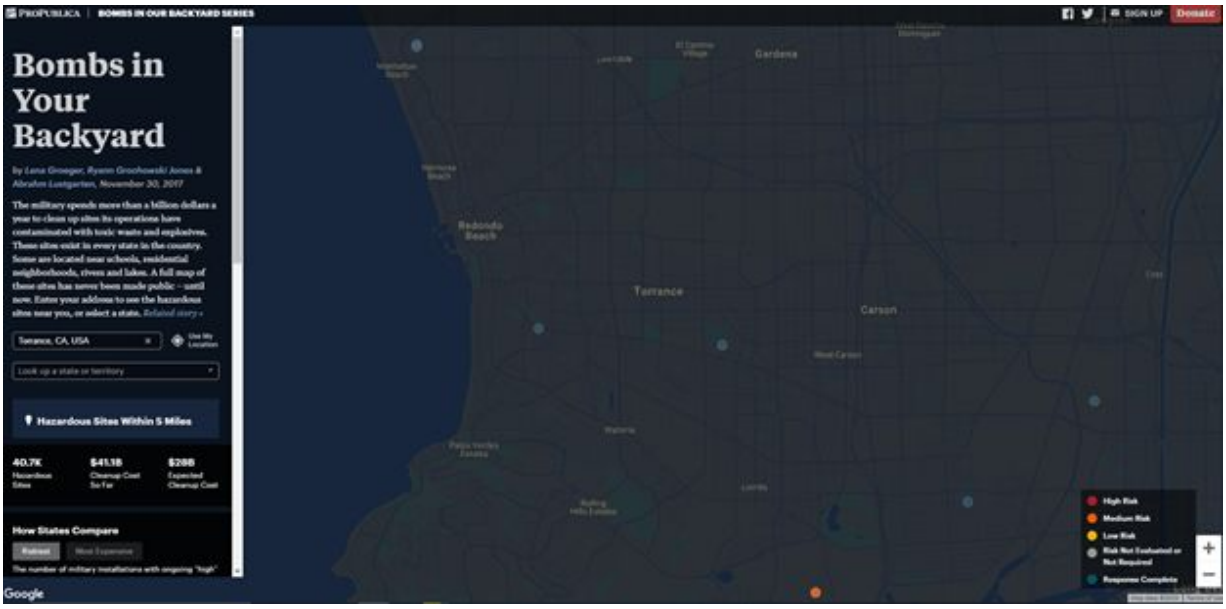


Figure 7. A map showing points in which military waste was removed or is still at risk at harming others. There was only one point in Torrance in which the military had a storage house, which was deprecated and given to the city of Torrance and the Unified Torrance School District. There was one report of there being chemical/nuclear waste/containers, but that was dealt with and taken care of in 2004. (Screenshot by Omar Hossain, July 2020. Bombs in Our Backyard Series, ProPublica, retrieved June 29, 2020. https://projects.propublica.org/bombs).

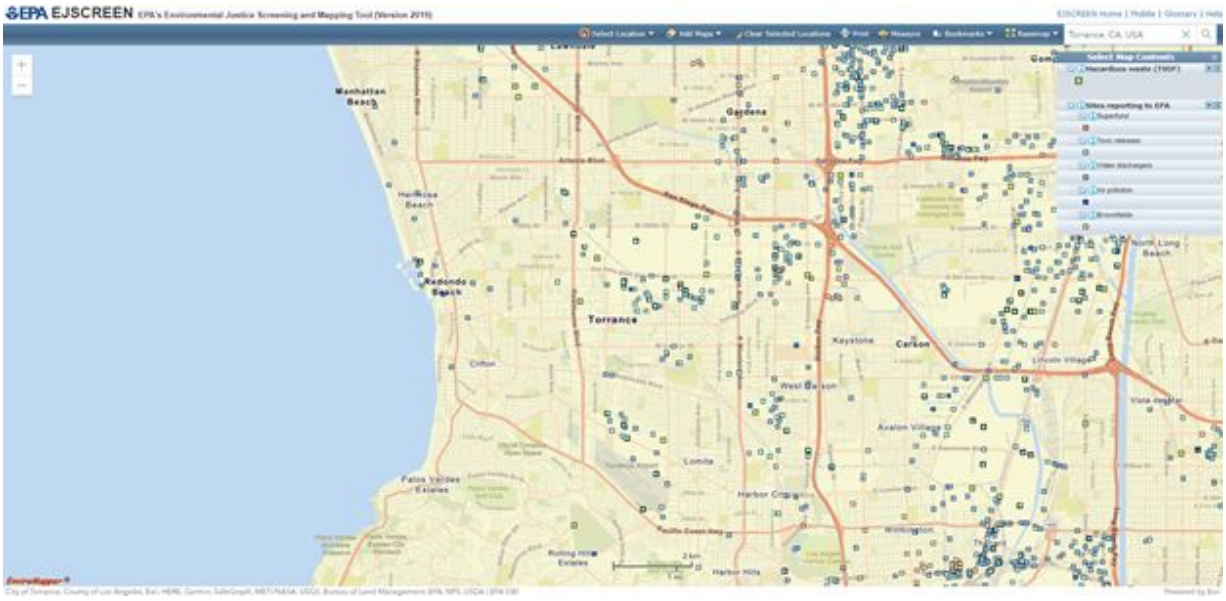


Figure 8. A general mapping overview of locations of hazardous wastes, and reports to the EPA including Superfund, Toxic Releases, Water Discharges, Air Pollution, and Brownfields. Key at the top right corner. There are numerous reports near the refinery, but for the most part, quite sparse compared to other communities suffering from industrialization. However, there are concerning reports near Sherry High School and Torrance Elementary School (Screenshot by Omar Hossain, July 2020. EPA EJScreen, retrieved July 7, 2020.).

Lead poisoning is a mixed bag when it comes to impact on the community. The only data readily available about lead in the water system is through EdSource, see Figure 9, that gives the amount of lead in school water systems. If there were many schools in the area, this would be a very source to dictate whether this is an

environmental issue, however there are only 3 schools near the edge of the Torrance, and all of them have either have a determined it is safe to drink or too law to be considered to have action required (EdSource, 2020). It is entirely possible however the rest of Torrance has a substantial amount of lead but there is no data or reports of lead poisoning so that is one area the county might want to gather data on.

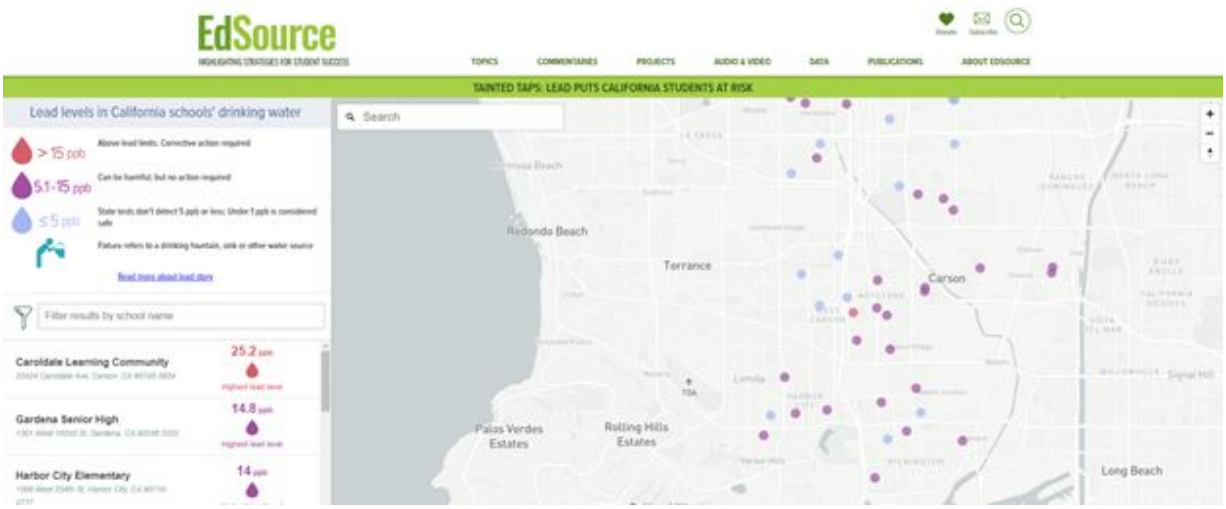


Figure 9.A map depicting the tested schools lead levels. Some of the schools in Torrance are not tested and the few that are are near the edge of the county. Much cannot be gleamed about the lead levels in the county if there aren't any schools at the heart of the county. If one were to go off those few schools, lead levels are at relatively safe levels; safe to be drank from (Screenshot by Omar Hossain, July 2020. EdSource, retrieved July 8, 2020. https://edsource.org/2018/interactive-map-lead-levels-found-in-california-schools

-drinking-water/602769).

Overall, the most environmental threat in the area is the refinery's chances of having a catastrophic event like they almost had in 2015, as well the refinery possibly spontaneously released large amounts of pollution in short bursts. There has been improvement in regulating pollution through large scale monitors but the next steps is actively ridding the possibility of a fast disaster as well as putting more research into whether the community is unknowingly suffering from lead poisoning within the heart of the county.

PM 2.5, Near-Roadway Exposures, and Cumulative Effects

Torrance is well known for its refinery operated by PBF Energy, this refinery was once in the national spotlight on February 18, 2015 (the one described in 2A) for an explosion that happened on site that sent debris flying in all directions. The hydrofluoric acid that was within the vat that was nearly fractured is known for its ability to form an aerosol cloud that hugs the ground and that can travel long distances, exposure to this toxic chemical can go as far as to corrode bone (Zou 2017). This could have been a massive tragedy, short of a "catastrophe" as put by the U.S. Chemical Safety Board. Even more so, when the plant was owned by ExxonMobil a couple of years back, they estimated that their worst case scenario

was that if just 2 percent of the plant's hydrofluoric acid was to leak it would endanger roughly 225,000 residents in a

radius 3.2 miles (Zou 2017).

The plant not only has its immediate dangers to the residents of Torrance, but it also has other negative externalities. The plant is a known polluter in the area. According to the data from the Air Quality Management District an estimated 487 tons of smog-causing chemicals were released by the plant in 2016 alone (Green 2017). This slow release of chemicals into the atmosphere is reflected by the quantity of PM 2.5 (small particulate matter), Figure 8, the California Office of Environmental Health Hazard Assessment reported that most of the city of Torrance is in the 90th to 100th percentile (OEHHA 2020). Even more worrisome is that PM 2.5 has been associated with increased visits to the emergency room for respiratory illnesses like asthma and COPD (Weichenthal et. al. 2016). The San Diego and Harbor freeways don't pose much of a pollution threat as they are on average 2.1 miles away from the center of the city, Figure 10. (LA Times 2020)

Climate change also has a role to play in the threats that the residents of Torrance have to face. As a consequence of climate change the coastal areas of California are at much higher risk of coastal flooding, as well as the potential of water-bird extinction(Mazza 2015). Another consequence of the changing environment is that as droughts become more prevalent the groundwater reserves are becoming more vulnerable. That is the potable water in aquifers will start to

diminish as rainwater is more scarce. This is quite relevant for Torrance as they draw from the local Torrance Madrona Marsh.(Mazza 2015) This may be compounded by the Del Amo Superfund site that contaminated groundwater chemicals like monochlorobenzene and benzene, which are known carcinogens (Peterson 2012).

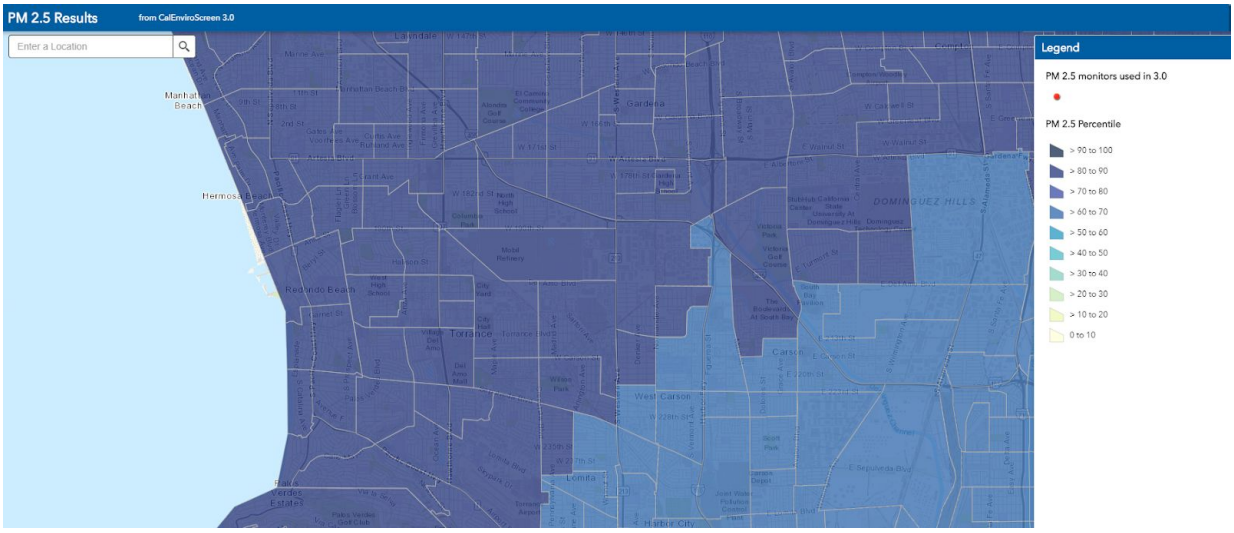


Figure 10. The map shown above is that of Torrance's PM 2.5 percentile distribution, as one can see most of the city of Torrance is highlighted in dark blue which corresponds to a percentile of 90 to 100 in comparison to the rest of California. The rest of the city is in a lighter blue which corresponds with a percentile of 80 to 90, in terms of PM2.5 concentration. (Screenshot by Abraham E. Rubalcava , July 2020. *CalEnviroScreen 3.0,* retrieved July 8, 2020).

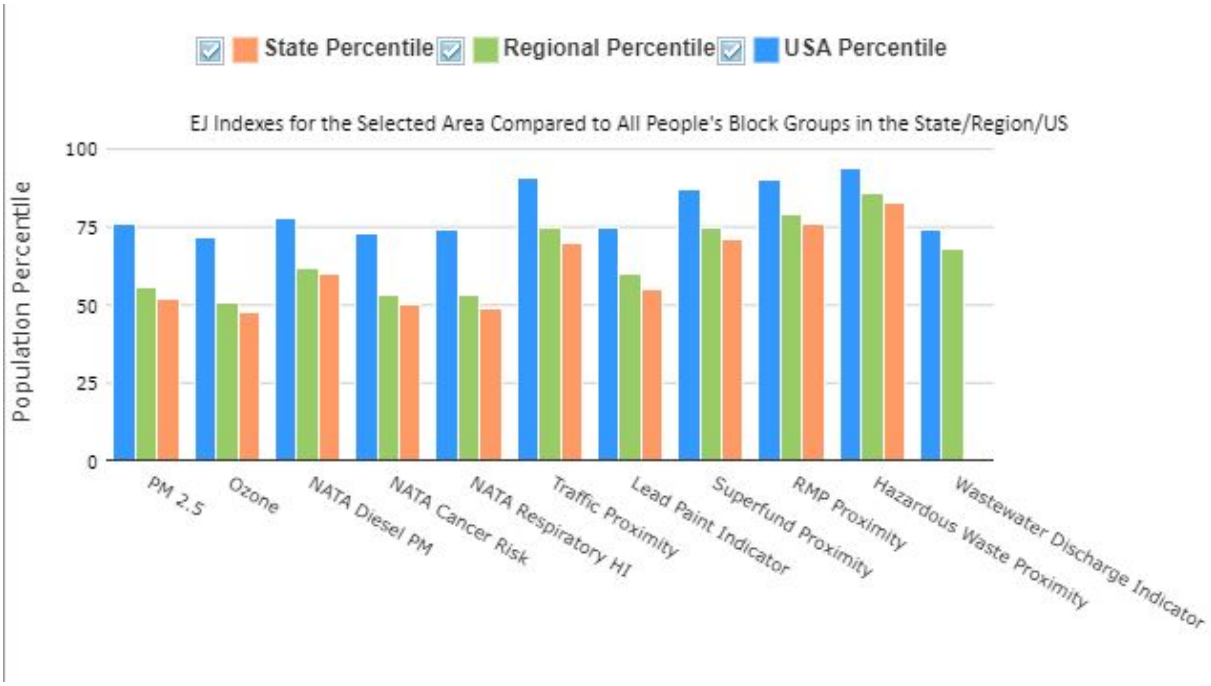


Figure 11. These are the indexes for the various percentiles of the pollutants in the city of Torrance. This is in comparison to the percentile concentrations of the USA, State (California) and Regional (LA County). (Screenshot by Abraham E. Rubalcava, July 2020. *EPA EJScreen,* retrieved July 8, 2020).

Figure 12. Freeway proximity for Torrance is about 2.1 miles. That is there is very little risk to the poukation. (Screenshot by Abraham E. Rubalcava, July 8 , 2020. From How close do you live to the freeway? Los Angeles Times, retrieved July 8, 2020 https://www.latimes.com/projects/la-me-freeway-how-close-map).

SECTION 3: Compound Vulnerabilities [Dhruv Sehgal]

There are many intersecting factors that increase the vulnerability of the residents of Torrance to environmental injustices. Furthermore, these factors disproportionately impact the least well off residents of Torrance. Some of these factors include, but are not limited to, COVID 19 cases, police brutality, access to health care, housing burden, linguistic isolation, and company influences.

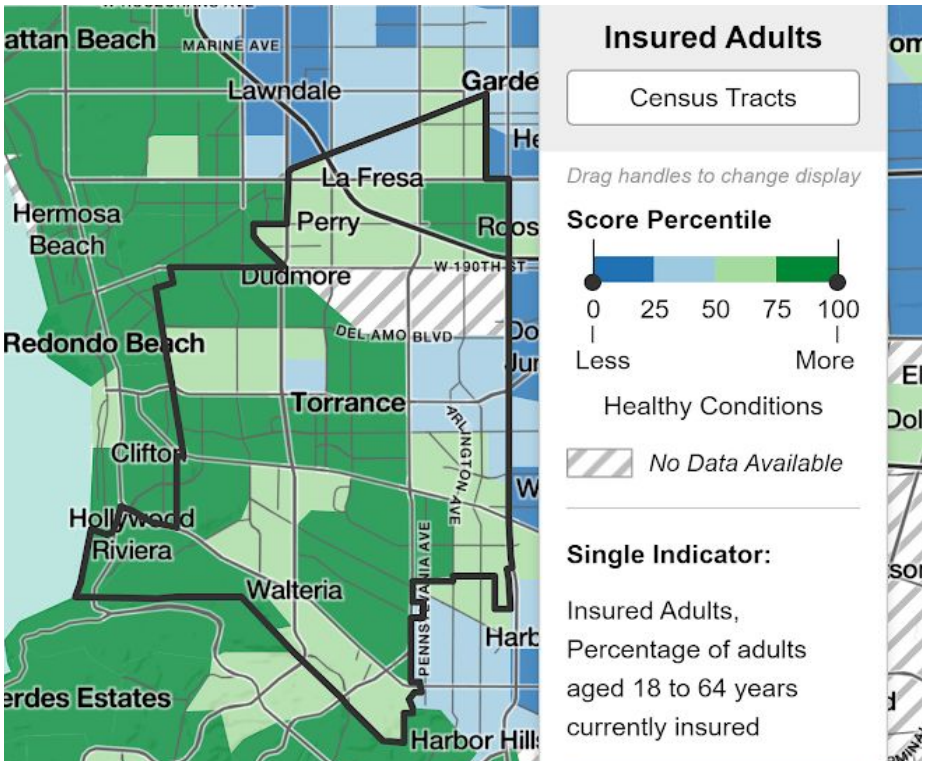


Figure 13. Healthcare Access Indicators for Torrance, CA. This is a map of Torrance showing the relative adults insured rate compared to the rest of California. The majority of Torrance is above average, but a few areas have many uninsured residents. (Screenshot by Dhruv Sehgal, July 2020. *The California Healthy Places Index*, retrieved July 8, 2020).

Under current events, the coronavirus pandemic has negatively impacted the lives of many of the residents of Torrance. The rate of cases in Torrance is even higher than in some surrounding cities. For example, the city of Redondo Beach which is just north of Torrance has only 375 cases per 100,000 people while Torrance has 448 cases per 100,000 people (County of LA 2020). This relatively high rate of cases may further hurt individuals with other underlying conditions such as asthma which is at higher rates from pollution. The impact of the pandemic is further increased by the lack of health insurance for many residents in Torrance. According to the California Healthy Places Index (see Fig 13), the number of insured adults is as low as 80% in some areas of Torrance which is below average for California. This lack of health insurance restricts residents' access to necessary healthcare and testing for the virus. Additionally, many residents may not have access to healthcare from other adverse effects caused by pollution.

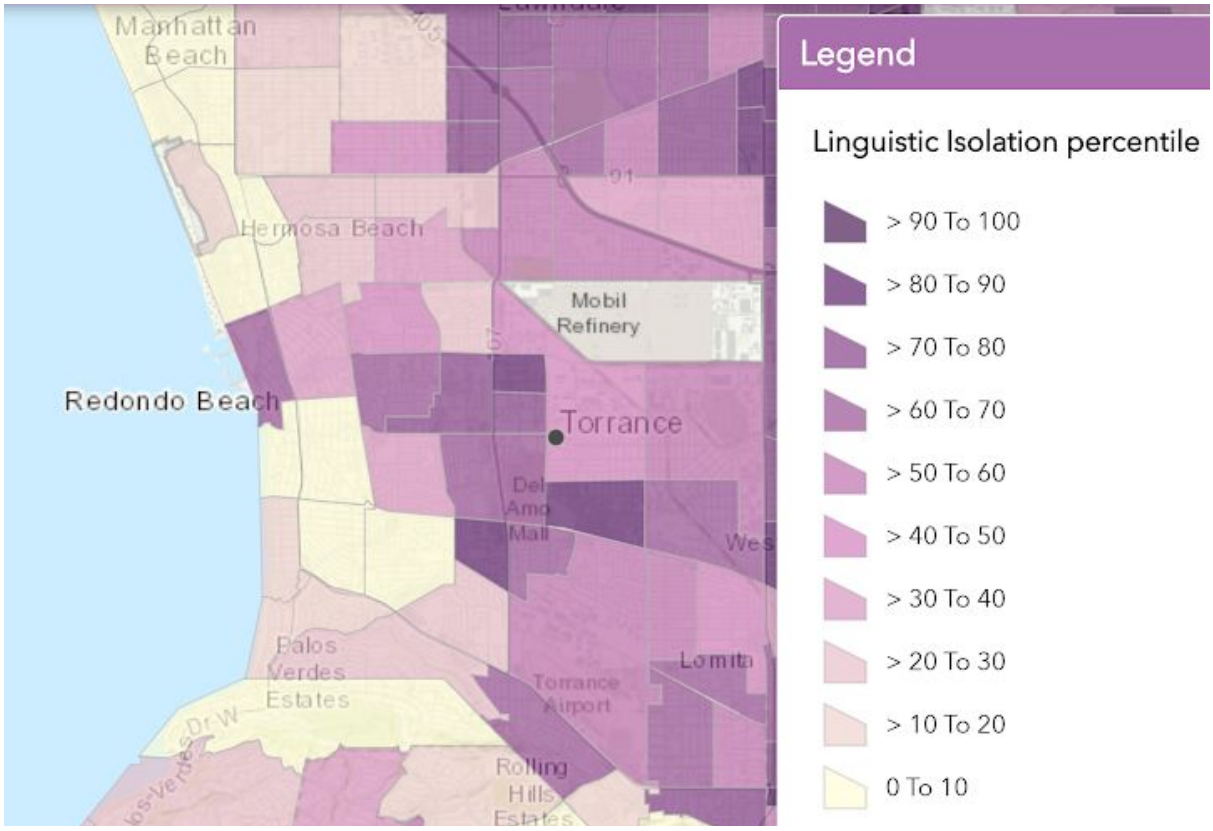


Figure 14. High Scoring Census Tracts for Linguistic Isolation in Torrance. Linguistic isolation is above the average of California in almost all of Torrance's area. This makes many residents more vulnerable due to possible unawareness of local environmental injustices. (Screenshot by Dhruv Sehgal, July 2020. *CalEnviroScreen 3.0*, retrieved July 8, 2020).

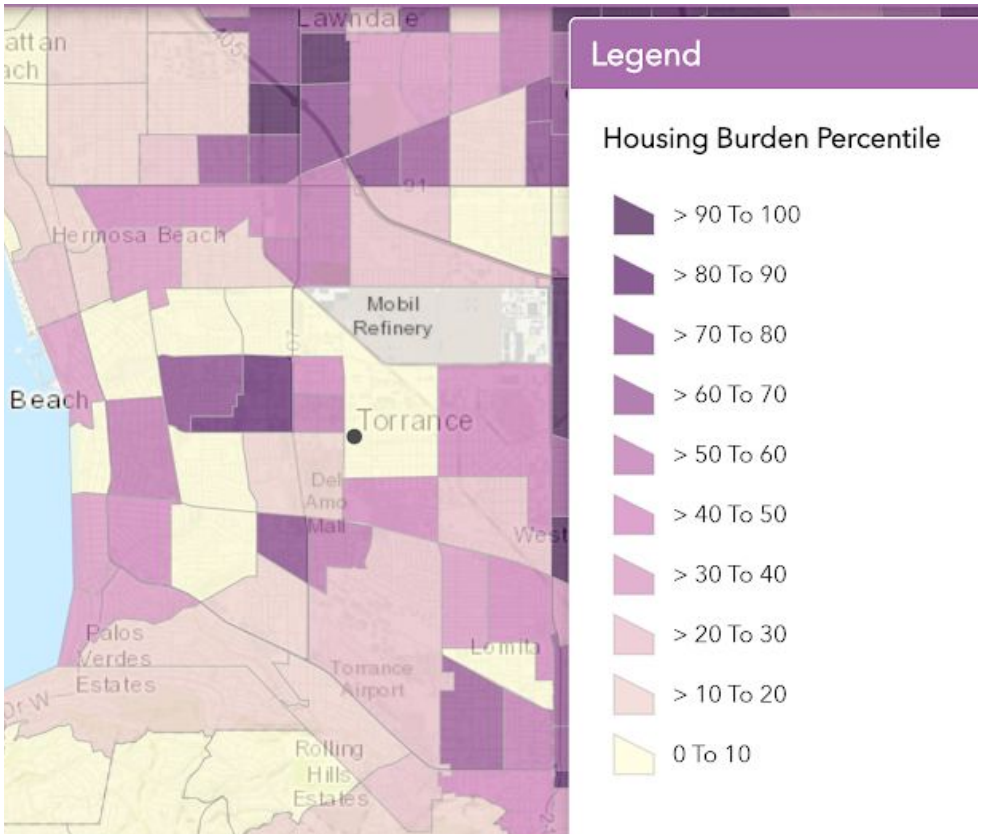


Figure 15. Housing burden in the city of Torrance varies drastically from area to area. Housing burden makes it difficult for residents to afford other items since a larger percentage of their income goes to housing. This makes these residents especially vulnerable to nearby pollution. (Screenshot by Dhruv Sehgal, July 2020. *CalEnviroScreen 3.0*, retrieved July 8, 2020).

Another compound vulnerability is the linguistic isolation of Torrance. According to CalEnviroScreen3.0 (see Fig 14), Torrance has above average linguistic isolation which reaches as high as 21 percent of households in an area not speaking English well. Linguistic isolation makes it difficult for residents to stay

aware of the state of the environment. In one area of Torrance, 21 percent of households do not speak English well. This is very problematic because many residents may struggle with awareness of the local environmental injustices due to the language barrier. Additionally, CalEnviroScreen3.0 reveals another vulnerability (see Fig 15) where one area of Torrance is in the 85th percentile of the housing burden. Since many residents must spend a large percentage of their income on housing, they have less money to spend elsewhere such as in healthcare to minimize environmental effects.

The government of Torrance is another large contributor to the increasing vulnerability of the residents. For example, police killings have been an issue in Torrance that disproportionately hurts minorities. In one case, Cristopher Deandre Mitchell, a 23-year-old, was shot and killed by police (Frere 2019). Instances like this one have caused unrest in the community which only adds on to the environmental injustices. The government has also allowed continued pollution from the Torrance Refinery due to its economic influence. This is demonstrated by city officials voting against a ban of hydrofluoric acid used in the refinery (Gregory 2017). This comes after the refinery warned that a ban would cause many residents to lose their jobs (Gregory 2017).

SECTION 4: Stakeholder Analysis [VINCENT DANG]

The largest industrial stakeholder in Torrance is the Torrance Refining Company. The company has gone through many changes in management and shareholders, however, continues to this day to not alter their manufacturing process. This local oil refinery is among the few who continues the utilization of modified hydrofluoric acid when processing petroleum-based products. This has raised concerns of neighboring communities, however, the company has produced largely bureaucratic responses to those worries. In their online, public message, providing information on modified hydrofluoric acid, avoids any mentions of the inherent dangers and further attacks activists by discrediting their arguments (Torrance Refining Company).

The largest stakeholder in Torrance are the residents themselves. According to the United States Census Bureau, the dominant racial profile in this city is white, making up approximately 47.2% of the local population (United States Census Bureau. Furthermore, there is a high percentage of members who possess some high school education or higher, averaging an estimate 94.5% for residents above the age of 25 (United States Census Bureau. Moreover, the median household income from 2014-2018, is $90,309 (United States Census Bureau). Despite all these

factors, recent incidents, as reported by Nick Green from the Daily Breeze, claims the local fire department has reported a total of 97 incidents since 2016 (Green 2018). This has caused outrage from the citizens of Torrance towards the local refinery, Torrance Refining Co., and has sparked efforts to enforce stricter regulations and promote environmental safety in their communities.

Among the many organizations seeking the prohibition and stricter regulations towards refineries in Torrance include the Torrance Refinery Action Alliance. This local environmental activist organization, composed of grassroot residents and business owners in Torrance, formed after the catastrophic incident on February 18, 2015 from PBF Energy Torrance Refining Company (TRAA). Their perception of the problem includes dissent and distrust towards the competency of the Torrance Refining Company and pushes for additional safety measures including the prohibition of modified hydrofluoric acid, commonly used when processing petroleum products. This organization has had many gatherings in demand that city regulators, particularly the South Coast Air Quality Management District, to implement regulations that will effectively ban companies from using modified hydrofluoric acid (Barreras 2018). One of the events, as covered by Amy Powell from ABC 7 news, organized a gathering of several hundred Torrance residents to voice their concerns over the utilization of MHF back in february 2018 (Powell 2018). Moreover, the organization has also passed out pamphlets to approximately 100,000 people the year prior to that (Lara 2017).

The South Coast Air Quality Management District is the primary local entity, whose sole responsibility is to enforce emission standards and protect standards of air quality in the city of Torrance. Historically, this local governmental organization has taken legal action towards the Torrance Refining Company, however, many cases were dismissed and no new regulations were instated. Their perception of the problem indicates that they view the utilization of modified hydrofluoric acid as a risk, but not enough to effectively institute a ban on the volatile chemical. As with many concerns, the AQMD has held community hearings and has been involved in multiple legal proceedings regarding the controversial chemical. Figure 16 shows a picture taken at one of such events. Attendees can range from common Torrance citizens, to petroleum industry professionals, both current and past, voicing their concerns over the continuous danger that lurks in city limits. In an article written by Los Angeles Times journalist Tony Barboza, he claims that the air quality management district failed to come to a unanimous decision to prohibit refineries from using the chemical despite appeals and hearings from local communities (Barboza 2019).

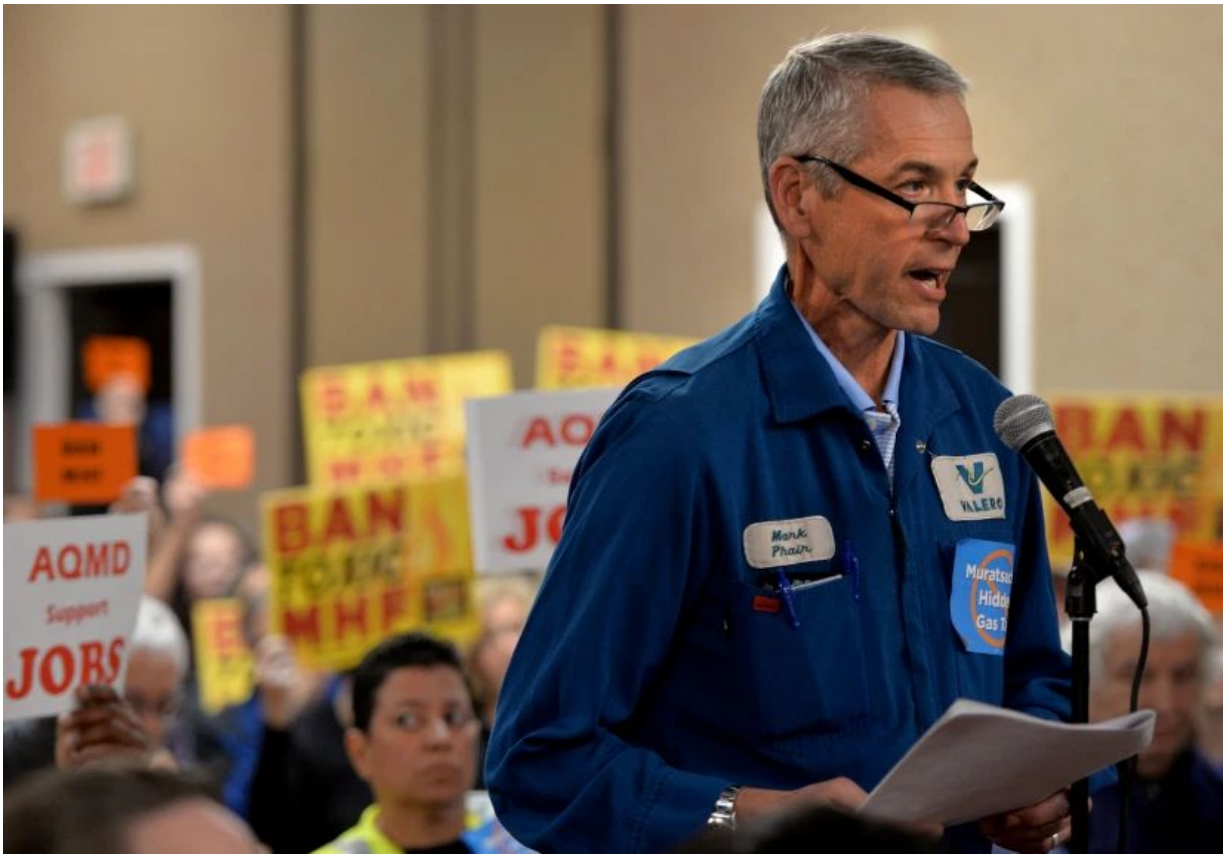


Figure 16. A photograph of Mark Phai speaking to the Air Quality Management District over new standards and regulations for petroleum companies utilizing modified hydrofluoric acid. (Photo by Brittany Murray, Daily Breeze/SCNG, 01/20/2018, retrieved by Vincent Dang on July 08 2020)

Alternatively, the governing entity decided on implementing air quality monitoring systems, which are in place today, primarily within strategic locations around the Torrance Refining Company (AQMD). However, the funding for this project came directly from the AQMD rather than the petroleum industry

contributions. This indicates a possible leniency towards Torrance Refining Company, and similarly related industries.

Lastly, among the most compelling stakeholders in Torrance are the on-site employees of the Torrance Oil Refinery. According to Torrance Refining Company's website, they employ "more than 600 employees, many of whom are unionized, who earn excellent salaries, wages and benefits." And additional 300-500 contractors (Torrance Refinery Co.). Despite the recent incidents and public legal hearings from local communities, labor unions have been reluctant to become embellished in activism against the local oil industries. Barboz argues that "businesses and labor groups have raised concerns that phasing out hydrofluoric acid would threaten refinery-related jobs." (Barboza 2019). Their perception is that the inherent risk by involving this chemical in manufacturing outweighs the possible consequences if it were to be abolished.

SECTION 5: Stakeholder Actions [Marissa Lopez]

What have different stakeholder groups done (or not done) in response to the problems in this case? Of the many parties involved in Torrance's environmental justice affairs, one of the key groups is the refineries themselves. Torrance Refinery has acted to distract from its negative pollutive consequences by being involved in community life. For example, it claims to be a philanthropic partner to Ambassador High School, the Marine Mammal Care Center, North Torrance Little League, Torrance Unified School District, and much more (City of Torrance 2020). By inserting itself as a contributive partner to community affairs, the refinery has managed to put out this image that it is actually beneficial, but all the while distracting residents from the bigger picture of pollution. It is especially interesting that the refinery chooses to partner with ecological organizations such as Marine Mammal Care Center and South Coast Botanic Garden Foundation considering the fact that they're polluting the very environment that they're supposedly advocating to preserve. For these reasons, Torrance Refinery is guilty of Greenwashing sin. The refineries' community involvement may seem like a good thing, but it is actually extremely detrimental to the environmental justice cause. Supporters of the refinery also have the potential to sway votes in office in disfavor of rules and regulations that could save the community's health.

Torrance Refinery and its neighboring Valero Wilmington Refinery have made a statement about how much they care about the surrounding neighborhoods

when in 2018, they argued to NOT phase out deadly Hydrofluoric Acid (Air Pollution Watchdog 2018). This is particularly concerning because less than two years later, Torrance Refinery was fined by the EPA for having a knowingly broken piece of equipment designed to contain none other than Hydrofluoric Acid (Green 2020). The equipment had been broken for weeks, so Torrance Refinery's decision to cover it up instead of fixing it immediately (and avoiding a $125,000 fine in the process) goes to show just how much they value the community's safety, so much more than their precious Hydrofluoric Acid that they deemed too precious to phase out.

Another important stakeholder is the city's administration. As evidenced by the city's official website, they are well aware of the threat of pollution. The website offers many resources for concerned citizens to get involved, including hotlines, access to a new air pollution monitoring system, and even an open invitation to the Environmental Quality Commission's weekly meetings (Environmental Quality and Energy Conservation Commision). In addition, the city has committed to strictly enforcing the National Pollutant Discharge Elimination System (see Figure 17), tasked by the Public Works, Community Development, and Fire Departments (City of Torrance). The NPDES enforcement prevents private companies from polluting the stormwater drains, which can drastically reduce harmful contaminants in the water and any other entity affected by the water.

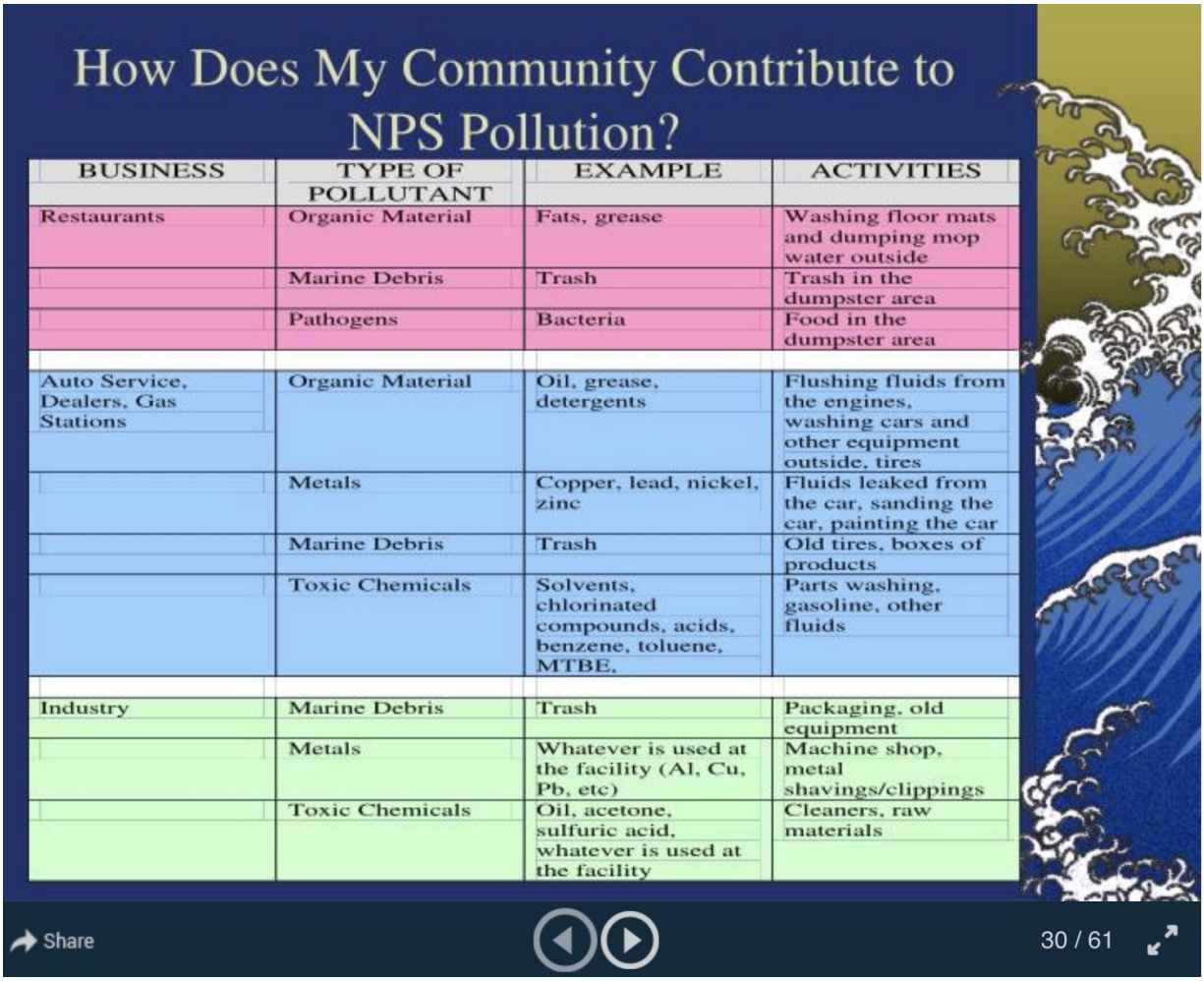


Figure 17. A representative of the Torrance Fire Department, a stakeholder of Torrance's Environmental Justice, educated her community about its pollution. Specifically, Scachetti covered what types of pollution, where it comes from – including industry, as seen in the image – as well as steps to prevent it (Scachetti). By acknowledging the sources of pollution, Torrance can take the necessary steps toward a healthier environment. (PowerPoint slide by Gina Scachetti, retrieved 8 July 2020).

SECTION 6: Role of Media and Big Environmental Organizations [Ashwin Sampath]

Ever since the explosion of a processing unit in the previously owned ExxonMobil refinery in 2015, Torrance has received coverage from many news outlets and environmental organizations, but the amount and depth of reporting varies depending on the group.

The Los Angeles Times have been at the forefront of reporting on environmental health problems stemming from the refinery in Torrance. Veronica Rocha from the LA Times wrote about how the explosion was so large, it caused a 1.7 magnitude tremor (Rocha 2015). As the years have gone by, the LA Times have dutifully reported on the actions that were taken by activists and environmentalist organizations to combat the use of modified hydrofluoric acid (MHF) by the Torrance and Wilmington refineries. In 2017, the Times reported on how the Torrance City Council went against the people's interests and voted against a ban of MHF (Penn 2017). Even in 2019, they have reported on how the South Coast Air Quality Management District Board voted against its citizens and supported the oil refineries' plan to install new safety measures instead of banning the usage of MHF (Barboza 2019). Throughout the years they have reported on this case, the LA Times have had relevant, accurate information and up-to-date sources on all their

articles, and they are a great source of information for readers looking to learn more about the fight for environmental justice in Torrance.

Many local media sources have spotty coverage on their reports, but the Daily Breeze is an exception to this. To this day, they have constantly reported on the newest environmental campaign in the South Bay or what the refineries have done to impede the efforts of activists and regulators. Nick Green from the Daily Breeze writes about how activists have called for local elected officials and government regulators to work on phasing out or banning MHF at the Wilmington and Torrance refineries (Green 2020).

Local environmental groups have made the issues affecting Torrance and other nearby communities one of their biggest priorities in terms of coverage and action. Communities for a Better Environment (CBE) has fought many times for stronger regulations on air quality and provides useful information to people so they better understand the problems facing them. They have reported on their Clean Up Green Up campaign to create green zones in cities nearby heavy industrial areas to reduce and prevent the effects of pollution (CBE 2015). Some national environmental groups like the National Resource Defense Council (NRDC) and the Sierra Club Angeles have many reports on the air pollution and the dangers of MHF in Torrance, but many others have a surprising lack of coverage.

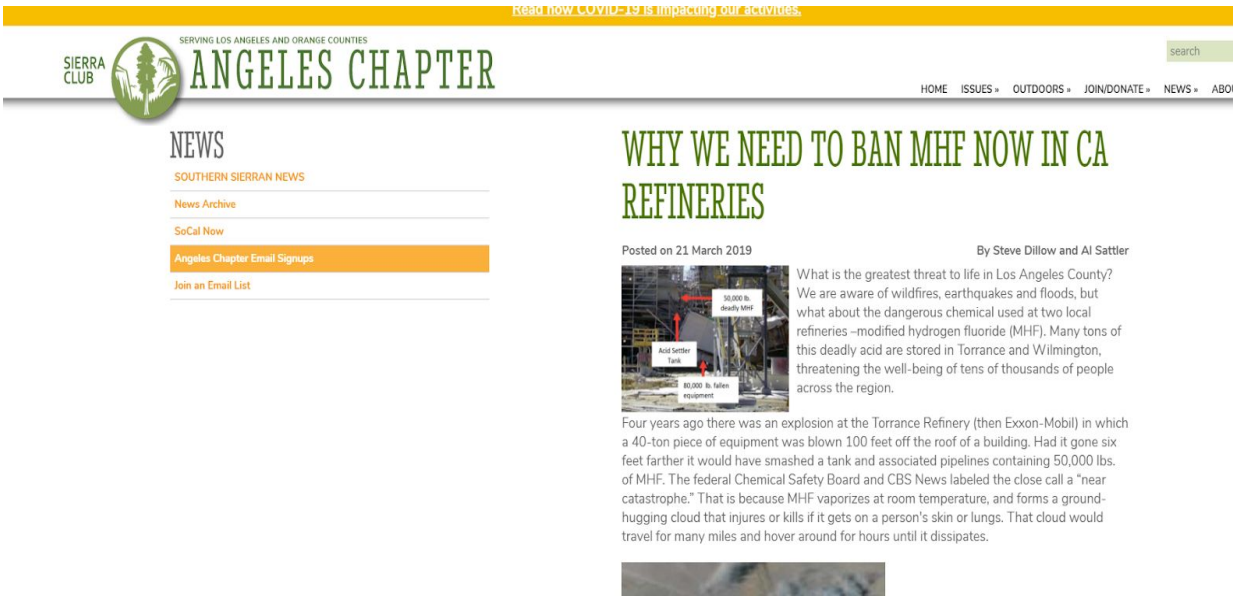


Figure 18. News Article Titled "Why We Need To Ban MHF Now in CA Refineries" Published by Sierra Club Angeles Chapter describing how dangerous MHF can be if leaked and how an alternative needs to be found instead, March 21, 2019 (Screenshot by Ashwin Sampath, retrieved July 8, 2020)

As seen in Figure 18, an article from the Sierra Club Angeles Chapter stresses the importance of banning the use of MHF in the Wilmington and Torrance refineries (Dillow and Sattler, 2019). It also talks about how tens of thousands of people live near those refineries and if even a handful of MHF were to leak, the damage would be immense (Dillow and Sattler, 2019). The NRDC also reported on the lawsuit that sought to find justice for the failure of the SCAQMD to protect Southern California's population from oil refinery pollution (NRDC 2016). On the other hand, organizations like Greenpeace USA have only written one article

directly referencing the injustices and movements in Torrance, choosing to write broader articles about environmental justice in Southern California or celebrities coming to protest.

SECTION 7: Recommended Local Actions [Huy Dang]

In order to stop and prevent further environmental justices inflicting upon the city of Torrance, the accord action to take is to protest peacefully in order to call the higher ups to the attention of the state Torrance is in. It is fair to say persistent, organized yet loud protests would help Torrance's citizens from suffering furthermore.

First of all, let's look at figure 19, there have been multiple protests on a small scale like the one in the picture. This would not work due to the obvious reason that the crowd in the picture don't have many people to begin with. The city of Torrance, while being part of the famous Los Angeles, is surrounded by multiple refineries while holding a large amount of up to "137,933 population in 2000, according to the US census"(LA Times, n.d). With this amount of people, it is safe to say in the worst case scenario that all of these people already have gotten some type of breathing problem or cancer already. On the bright side with this amount of people, the idea to peacefully protest and bring the public to attention will surely bear fruits at a quite fast pace in all due honesty.

Figure 19. A small protest by the people of Torrance against the use of a certain type of acid that is used by the oil refineries that can be highly volatile that could lead to deaths of many, taken by Brittany Murray on February 18, 2017, Retrieved by July 8, 2020)

The second reason why organized peaceful protests would work is because the Air Quality Management board for Torrance has been eyeing the oil refineries surrounding the city for a long time. According to Barboza, “Air quality regulators on Friday killed a years-long push for stronger regulation of a dangerous acid used at two South Bay refineries that has frightened many neighbors”(2019). This means that the Air regulators have put off the pressure on the oil refineries of Torrance. And, essentially, they choose to put off by hearing out the offering from the letters sent by these oil refineries promising to “improve safety systems in the coming

years if regulators ended their pursuit of a rule”(2019). We can see that the air regulators have not been looking at their citizens closely enough and, therefore, led to a hasty decision that ended all the effort that the community, and the air regulators themselves included, has put up against the oil refineries.

With this information, this further proves that all those efforts to fight against environmental justice was not enough. More precisely, not enough people, even the regulator, are informed. Once again, this proves that persistent and peaceful protest would work, for, with persistence, more people will come to attention about the issues. With more people, there will be more voices for the higher ups to hear which can persuade them to apply heavy regulations onto the refineries. Additionally, we’re going through a tough time right now and protests are being carefully watched due to recent incidents. If we do this right, attention will be gained from people from all over the country, or perhaps even the world.

Another action that would help Torrance gaining environmental justice again is to spread the words and look for help in nearby communities that suffered the same fate. A great example would be seeking support from the city of Wilmington for they suffered the same, or might be even worse, fate of living in the polluted area. It is said to have” one of the highest cancer rates in Southern California and some of the state’s highest rates of asthma” (Kirk, 2018). At the most basic level, it goes without saying that with unity comes power. More specifically, to bring the

community of Wilmington to the attention, people from Torrance can use all the types of social media, or just come and visit their community. With understanding and unity, their voice will surely bring the attention of the whole state and might even be the country. Furthermore, the community of Wilmington and Torrance used as much community resources such as town hall meetings, or meeting online through facebook, or they can even organize the protest and spread them around social pages to gain attention.

SECTION 8: Recommended Extra-Local Actions [Zongyue Lu]

To reduce the environmental vulnerability and injustice in Torrance, totally banning the refinery in the community seems to be unfeasible. The Torrance refinery is crucial to the whole oil field lying under Los Angeles County, abandoning the huge amount of profit to provide a better environment to the community seems impossible. Nevertheless, one solution people came up with is setting up a better air quality monitoring system. South Coast Air Quality Management District (AQMD) set up a series of air monitoring systems at the northern boundary of refinery and other stations in the city (NBC Los Angeles). Monitoring the pollutant released by the refinery is necessary. In 2014, the Torrance refinery used to be fined $8.1 million for releasing more toxic substances than it reported (Green 2017), hence, overseeing the amount of chemical being released into air can ensure that pollutant is kept at a safe level. Currently, people are able to real-time pollutant levels online, and they can choose to wear a mask if quality is bad, this is indeed a solution to long-term air pollution (Torrance Air).

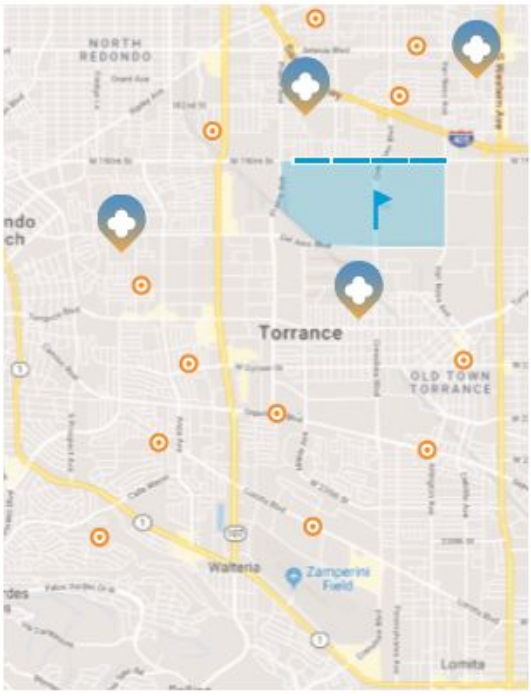
Also, the Environmental Protection Agency (EPA) has enough awareness on Torrance refinery both in short-term fast disasters and long-term air pollution. In Jan 13 2020, EPA levied $125,000 fine on Torrance refinery for risk-management

violation, and the refinery agreed to spend $219,000 to further enhance its safety measure. (Nick 2017)

While banning the refinery is not a good solution to balance the profits of every group, keeping monitoring of air quality must be the top priority. On one hand, the surrounding residents can acquire real-time air quality levels and choose to avoid the health problem by putting on masks or avoiding polluted regions. On the other hand, AQMD and EPA will be able to oversee whether the refinery kept their pollutant release at a safe level, once they exceed the safe level, punishment needs to be conducted and alert needs to be sent out.

Air Monitoring Locations

- North Torrance High School
- West Torrance High School
- 1001 Elm Avenue
- Guenser Park (Site Subject to Approval)



The image to the right includes four Torrance Air Monitoring locations as well as Fenceline Monitors that border the north of the Torrance Refinery, and possible locations for smaller sensors.

Figure 19. The air quality monitoring station in Torrance. (Screenshot taken by Zongyue Lu on “Torrance Air.” Torrance Air | City of Torrance www.torranceca.gov/government/city-manager/refinery-information/torrance-air. Retrieved July 8, 2020)

SECTION 9: Recommendations for Future Research [Rieko Konishi]

In the fight against environmental injustice, it's important to have credible (which in this case would refer to non-industry affiliated research) data to ensure that pollution levels are kept at a minimum for those who live in the communities near oil refineries. Fortunately, Torrance is a community that benefits from organizations that actively fight for the well-being of its residents. In November of 2019, the city launched a near-real-time air quality monitoring system that reports the levels of the dozens of chemicals that result from refining oil. The information is made available to the public via their website, https://www.torranceair.org/index.html, and residents may also subscribe to an email notification system for consistent updates (Green 2019). This is a large step in the right direction, as people have the right to know what pollutants are in the air that they breathe.

South Coast Air Quality Management District, or the AQMD for short, is responsible for sponsoring and running Torrance Air and has used the fines it has accumulated from refinement companies to fund its project. It's important to be wary that the air board has made some questionable decisions in favor of corporations rather than community members, so it's not for certain that the data collected is entirely credible (Barboza 2019). It would be beneficial if citizens could

implement a system on their own, in addition to the air board's project to ensure data from sources from varying perspectives and self-interests.

Furthermore, as much the air monitoring system is effective for keeping surveillance of daily / cumulative pollution, it does not serve to protect citizens from more catastrophic disasters. One concern that many residents have is the refinery's use of modified hydrofluoric acid. Following the large explosion of the Exxon Mobil refinery in February of 2015, there was a small leak in the plant pipes in October. People have since then frequently discussed their apprehension with the use of MHF. While MHF is supposedly "modified" enough to prevent a toxic cloud from forming when released (unlike its unmodified counterpart), there is not enough data to support this claim (Green 2017). Having thorough research done on this topic would serve to ease the public's minds by proving that MHF used by the refinery does indeed do what it promises. Alternatively, it could also prove that MHF fails to meet safety standards that protect the community and the findings could be used to pressure the oil refinery to eradicate the use of MHF entirely. In either case, having more research done on this chemical would benefit the residents of Torrance. In conjunction, it would also benefit the people to research green chemistry alternatives, in pursuit of convincing the oil companies to make changes to their practices.

In terms of qualitative research it may be beneficial to do an analysis of the

activists in surrounding communities that face these environmental health threats. We know that there are multiple factors that come into play to either lessen or compound the negative effects of environmental threats. Taking these factors into account, it would be interesting to look at the types of people who are actively involved in speaking out about these issues and seeing what the difference is between those who are successful versus those who are not. Figure 21 displays one of many climate marches that has taken place all around the world. Surveying what motivates these people to come out and protest is one way to gain understanding of political movements. A focus group could be arranged with activists with varying levels of involvement and a discussion about what forces drive, challenge, or inhibit individuals in their work could highlight obstacles and tactics that are present in being an activist.. Appendix 9 outlines this research proposal in further detail. Understanding the challenges of communities that struggle to organize would be the first step to helping them successfully improve their environmental health.

Figure 21. A group of young climate activists holding a large banner that reads: “Climate Justice.” A crowd of people follow them, many of which are holding signs relating to climate justice. There has been a growth in the climate movement in recent years around the world. This photo was taken in Maastricht, Netherlands. (Photo taken by Vincent M.A. Janssen, May 2019, retrieved July 8, 2020)

SECTION 10: Injustice Analysis [Srayan Jana]

We would like to preface this statement by saying that while the Torrance

community definitely faces injustices related to their environment, the case pales in comparison to the community our group studied for the Fast Disaster Case Study , which was Wilmington, CA. Both regions face some similar concerns which are that they are homes to oil refineries that use hazardous chemicals—mainly modified hydrofluoric acid—and yet the context surrounding their communities is so different that the negative impacts on Torrance are far less devastating. The people of Torrance have a voice (they are already gathering and organizing and actively speaking out) because they do not have the same inhibiting circumstances that the residents of Wilmington do.

Figure 22. A rally of approximately 400 concerned citizens gathered at Columbia

Park in Torrance then marched to the Torrance Refinery calling for a ban of hydrofluoric acid. Torrance February 18, 2017 (Photo by Brittany Murray, Daily Breeze/SCNG).

With that being said, there are some clear cases of injustice seen here as well, such as Data Injustice. Following the refinery explosion in February of 2015, a leak occurred at the site in October. While the incident did not cause much damage, residents were concerned about how they were not notified immediately (Green 2015). In communities that are at risk of exposure to hazardous chemicals, it's only fair that there are strict safety policies that protect the people in case of any emergency, regardless of the size of the incident. Corporations are known to play down the harmful effects of their operations and the people of Torrance also express the desire to ban MHF, one of the more deadly chemicals that the refinery handles. The corporations in the area also are allowed to produce hydrofluoric acid, which can "quickly inflict severe health damage and death by burning the skin and lungs and penetrating deep tissues and bones". Within minutes, 1,000 gallons of this acid can make dense, lethal, low-hanging clouds that can spread up to two miles away. (Barboza 2019). This is an example of Data Injustice as the data to understand what was happening at the time wasn't available to the residents - intentionally so, as it made it easier for the local refineries to cover it up.

Additionally, this situation is a form of Economic Injustice, since the people are entitled to feel safe in their community and it is up to governing authorities to protect those rights. Yet, we see corporations having great leverage in these issues and often the people's voices are weighed at a lesser value. It is unjust to leave the responsibility of enhanced safety measures up to the voluntary acts of corporations (Barboza 2019) when they clearly have a corrupt agenda focused on their own economic benefits.

However, it is not all negative, as there have been some attempts at combating the Data Injustice that Torrance residents face. As of November of 2019, Torrance has received a large-scale air-monitoring system that measures pollutants in the Torrance community. It allows citizens to get real-time updates on locations that have the most pollutants and if the chemical levels are below the Reference Exposure Level (Green 2019). While the monitoring does help in slow disasters since it keeps the oil refinery constantly in check and it allows the citizens to be informed about pollutants in the area, this does not prevent lethal mistakes that could be done within the facilities. Regardless, it is still a good first step towards rectifying injustices in the community.

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FIGURES

APPENDIX

Appendix 1: SKETCH: Community Assets

EiJ COMMUNITY ASSETS SKETCH		
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.		
Asset	**Data source**	**How is this a community asset?**
Community Gardens	LA Garden Council	The two community gardens (Torrance Community Garden and Columbia Park Community Garden) located in the neighborhood of Torrance provide a healthy source of oxygen production as well as

		clean air recycling that can help fight small levels of pollutants from the refineries.
Public Internet	LA County Public Wifi Map	Public internet access is very scarce in the community of Torrance, with the closest one located in Lomita, CA. Public Wifi can help deliver information and give access to those families who cannot afford to purchase private internet to receive news and valuable information.
Planned Parenthood Clinics	Planned Parenthood Clinics in Torrance	No clinics were found to be located directly in Torrance, however, there are clinics within close proximity that might be accessible for residents. These clinics are located in Lawndale, Carson, and Long Beach. Planned Parenthood clinics can be a safe haven for families that are harboring children and might be in need of parenthood guidance, especially for minority families that may not have access to labor care and higher levels of pregnancy education.
PrEp Assistance	California State	There is only one PrEP support site located

Program: Clinical Providers and Enrollment Sites	Geoportal PrEP support	in the city of Torrance. The site can be a valuable asset in providing assistance for families of minority backgrounds to seek educational assistance and enrollment help.
Bookshops & Union Halls	Indie Map Book Web	The closest bookstore near the Torrance area is located in Redondo Beach, CA. The bookstore can be an asset for those trying to do research under the limitations of a public or a private internet access.
Local Libraries	LA County Library	There are many libraries located in the area with the closest one located in the city of Lomita. Local libraries can be an educational and research source for many of those looking to gain information without the restraint of having internet access.
Torrance Air Quality Monitoring and Notification project	torranceair.com	The project allows for residents of Torrance to monitor and get notified of the levels of pollutants in the air that are caused by oil refineries.

Appendix 2: SKETCH: Environmental Hazards

2A Sketch:

EIJ 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 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).		
Hazard type	**Data source**	**Community data**
worst-case scenarios	https://rtk.rjifuture.org/ https://www.latimes.com/environment/story/2019-09-06/oil-refinery-acid-pollution-regulation https://publicintegrity.org/environment/the-exxonmobil-near-disaster-you-probably-havent-heard-of/	In 2015 there was near catastrophic incident in which a vat of chemicals almost ruptured from an explosion. This would have intoxicated the whole community. Plus the plant near Torrance uses hydrofluoric acid that is extremely lethal.

(legal) toxic releases	**Toxic Release Inventory (available here: https://rtk.rjifuture.org/) https://www.torranceair.org/**	Toxic releases from plants are being monitored by the site Torrance Air. From a quick glance it appears to be at safe levels. But this may not accommodate for spontaneous random bursts of pollution.
lead in drinking water	**Lead Levels for California Schools**	There aren't many concerns when it comes to led poisoning in drinking water. According to California Lead Poisoning in School water sources, they tend to be either too low to be of any concern or not high enough to call for action. However, there are not many schools in Torrance, and the schools that are there are near the edges of the county, it is likely that there are great lead levels in Torrance.
Military waste	**Bombs in your backward**	When it comes to military waste, according to ProbPublica.org, Torrance California only had one instance of a Navy Material Redistribution Center then changed to Naval Store House. Eventually it became the Torrance Annex, then it was reported to be closed in 1973. It was given to the city of

		Torrance and Torrance Unified School District in 1975. There was hazardous materialized toxic, radioactive waste, but that was cleared out in September 2004.
Air Quality	**American Lung Association**	Torrance has a dangerously high ozone level, but has seen a progressive decrease in daily and annual particle pollution since reporting began in the year 2000.
How close do you live to a freeway?	**LA Times Freeway Maps**	Torrance's 90504 zip code is reported to be a mere 2,160 feet from the nearest freeway, which LA Times reveals is not the highest threat of danger, but pollution can still drift from freeways.
Hazardous Wastes	**https://ejscreen.epa.gov/mapper/**	There are not many hazardous wastes that are of too much concern. There is quite a few hazardous wastes around the facility but many of those are from place that don't have anything to do some over arcing environmental problem. For example, the oil refinery and it's side buildings do have sources of hazardous wastes, though seemingly from the map

		nothing that's more of a concern than the other hazardous wastes at other locations.

EIJ 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 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).

Hazard type	**Data source**	**Community data**
worst-case scenarios	https://rtk.rjifuture.org/ https://publicintegrity.org/environment/the-exxonmobil-near-disaster-you-probably-havent-heard-of/	The worst case scenarios that are described are the local oil refineries leaking hydrogen fluoride. A leak of two percent of the hydrogen fluoride could risk the lives of about two-hundred thousand residents of Torrance if a

		leak was to occur.
(legal) toxic releases	Toxic Release Inventory (available here: Enviro.epa.gov https://rtk.rjifuture.org/ (currently unavailable) https://www.torranceair.org/	In the In Torrance's 90501 zip code area, there were reported 3,125 toxic releases, 2,850 being methanol and the rest being acetonitrile, nitric acid, and toluene.
vehicle pollution (air pollution)	Torrance Transit Regional Park Air Quality % Climate Change Assessment	The City of Torrance reports mobile sources as its main contributor of ROG, NOx, CO, SO2, PM10, and PM2.5.
ground-level ozone (air pollution)	http://www.stateoftheair.org/city-rankings/states/california/los-angeles.html	Los Angeles (including Torrance) ranks an F on an A-F scale. It has an average of 111 high ozone days per year, compared to 3.2 as the "safe" number of ozone days.
particulate matter (PM 2.5) (air pollution)	https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30.	The City of Torrance ranks in the 90th to 100th percentile for California,

		concentration of PM 2.5, this may be cause for concern as there may be negative health effects from constant exposure to PM 2.5.
lead in drinking water	Lead Levels for California Schools	There is virtually no threat from lead in the city of torrance that has been reported, the three instances where lead was detected the concentrations were less than 5 part per billion, which are hard to test for.
Military waste	Bombs in your backward	There is not much of a risk from military waste in the city of torrance, there is one site of waste that was under the Navy but has been cleaned up in 2004.
Air Quality	American Lung Association	The air quality in the

		Torrance and larger Los Angeles metropolitan area is not that great that the American Lung association noted that the area has failed in the categories of ozone, particle pollution and annual particle pollution.
How close do you live to a freeway?	LA Times Freeway Maps	The city of Torrance is rather far away from the freeways with an average distance of 2.1 miles from the center of the city, therefore there is not much risk to the people.

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	LA County COVID Dashboard	COVID cases are at 448 people per 100,000 people which is higher than some surrounding cities such as city of Redondo Beach which has a rate of only 375 people per 100,000.
Police Killings	https://abc7.com/family-holds-vigil-1-year-after-fatal-torrance-police-shooting/5743650/	Police Killings threaten the people of Torrance and cause unrest among the community. For example, Cristopher Deandre Mitchell was shot by police at just 23

		years old.
Linguistic Isolation	CalEnviroScreen	Linguistic isolation makes it difficult for residents to stay aware of the state of the environment. In one area of Torrance, 21 percent of households do not speak english well.
Housing Burden	CalEnviroScreen	Housing burden increases the financial stress on many residents of Torrance. In one area of Torrance, 28% of people are housing burdened which is in the 85th percentile.
Health Insurance Access	Healthy Places Index	Lack of health insurance increases the risks for residents to face adverse effects from pollution as they can not get necessary healthcare. Some areas of Torrance are below average

		in percent of residents who are insured.
Oil Refinery Influence	https://abc7.com/health/torrance-city-council-votes-against-phasing-out-refinery-chemical/1824084/	The oil refinery has political influence because of its economic impact on the city. This has allowed them to continue to use dangerous chemicals that pollute the city.

Appendix 4: SKETCH: Stakeholder Analysis

Stakeholder Analysis Sketch 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).		
"catalysts"	**stakeholders**	**"corrosions"**

- Growing numbers of membership. - Historical evidence to use in court.	Torrance Refinery Action Alliance	- Relatively new organization. - Efforts revolve primarily around local actions. - Lacks full community support
- Legal authority - Funding from city - Money from organizations	AQMD	
- Sufficient amounts of revenue. - Large lobbying capability. - Direct involvement into local communities.	Torrance Refinery Co.	- Historical data providing incompetence - Pressure from governmental entities
- Large population numbers. - Most citizens possess higher education.	Residents of Torrance	- Voice gets dismissed - Communities were established after refinery.

- Median income per household higher than most		
- Stable employment.	Oil Industry Workers	- Largely unionized labor (lack of voice) - High risk occupation

Appendix 5: SKETCH: Stakeholder Actions

EiJ Stakeholder Action Sketch		
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.

South Coast Air Quality Management District NBC Los Angeles	Torrance Air Quality Monitoring and Notification project designed to monitor pollution surrounding refinery	N/A
Torrance Refinery Company and Valero Wilmington Refinery CBS Local	N/A	Didn't phase of Hydrofluoric acid when asked because "not commercially available and proven, and diminished investment"
Environmental Division of City of Torrance torranceca.gov	• "Zoning Enforcement • Land Use Codes • Property Maintenance • Noise Codes (Community and Airport) • Sign Permits • Plan Checks • Final Inspections (Residential And Commercial Developments)"	N/A

Public Works, Community Development and Fire Departments torranceca.gov	Enforce National Pollutant Discharge Elimination System (NPDES) that bars pollutants in stormwater drains	N/A
Local Residents torranceca.gov	Join advocacy groups, participate in cleanups and formed neighborhood watch	N/A
California Government torranceca.gov	Passed laws to regulate refineries • AB1646: Alert and Notification System • AB1647: Air Monitoring Systems • AB1649: Public Safety	No laws passed to make refineries abide by the most ecological methods available ie) renewable steam generation, Carbon capture sequestration, renewable feedstocks nrdc.org

Appendix 6: SKETCH: Media & Enviro Org Coverage

EiJ MEDIA & ENVIRO-ORG COVERAGE SKETCH
MEDIA OR ENVIRO-ORG: Los Angeles Times **Url: https://latimes.com**
• **YEAR: 2017 ARTICLE or ACTION:** **Torrance City Council votes against banning toxic hydrofluoric acid at refinery** The article discusses how the Torrance City Council voted against the usage of HF despite the urging of community activists and regulators. • **YEAR: 2017 ARTICLE or ACTION:** **Exxon Mobil's outdated equipment and procedures led to Torrance explosion, agency says** The article discusses exactly what went wrong at the ExxonMobil refinery that led to the explosion of a 40-ton piece of equipment. • **YEAR: 2020 ARTICLE or ACTION:** **Activists marking Torrance refinery explosion anniversary call for investigation** The article talks about how on the fifth anniversary of the ExxonMobil refinery explosion, the TRAA announced a campaign urging Governor Newsom to investigate the use of MHF.
MEDIA OR ENVIRO-ORG: Sierra Club

url: https::/angeles.sierraclub.org

- **YEAR: 2015 ARTICLE or ACTION:**

LEARN ABOUT DANGEROUS RELEASES FROM TORRANCE REFINERY -- AND WHAT YOU CAN DO ABOUT IT

This article talks about the explosion of the Torrance refinery and provides resources and information for the readers.

- **YEAR: 2017 ARTICLE or ACTION:**

TAKE ACTION TO BAN DANGEROUS CHEMICALS AND SOCAL REFINERIES

This article talks about how the Sierra Club partnered up with the Torrance Refinery Action Alliance to campaign against the usage of MHF.

- **YEAR: 2019 ARTICLE or ACTION:**

Why We Need to Ban MHF Now in CA Refineries

The article discusses the danger of using MHF and how stronger regulations need to be instituted to protect the nearby residents from a potential worst-case scenario.

MEDIA OR ENVIRO-ORG: National Resources Defense Council

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

- **YEAR: 2016 ARTICLE or ACTION:**

Lawsuit Challenges Air Board's Failure to Protect Southern California from Oil Refinery Pollution

The article talks about a lawsuit brought by several environmental justice groups to challenge the AQMD's decision to vote for the oil refineries' plan instead of banning MHF.

- **YEAR: 2016 ARTICLE or ACTION:**

A Chemical Reaction

The article talks about the refinery explosion in Torrance and shows how it was unfortunately just one of many spills, explosions, and other accidental releases that occur in the US.

- **YEAR: 2020 ARTICLE or ACTION:**

California's Oil Addiction Is Increasing its COVID-19 Risk

The article describes how the pollution spewing from oil refineries are affecting the people and putting them at increased risk of catching COVID-19.

MEDIA OR ENVIRO-ORG: Greenpeace USA

url: https://www.greenpeace.org/usa/

- **YEAR: 2015 ARTICLE or ACTION:**

EPA Should Heed Chemical Safety Experts on CA Oil Refinery Rules

The article discusses how the government's originally strict regulations on oil refineries have been watered down after years of pressure from the oil industry, and should follow the advice of chemical safety experts.

- **YEAR: 2018 ARTICLE or ACTION:**

Environmental Injustice is Alive and Well in California — And So is the Resistance

The article talks about the various environmental health vulnerabilities that Southern California communities face and how they are dealing with it.

- **YEAR: 2020 ARTICLE or ACTION:**

Greenpeace, Jane Fonda, Joaquin Phoenix, Nalleli Cobo, and Others Bring Fire Drill Fridays to Los Angeles

This article discusses how many celebrities and influential people came together to rally the people and protest against various environmental issues

MEDIA OR ENVIRO-ORG: Friends of the Earth

url:

https://foe.org/home/?utm_expid=.6fSJoPYdROG2fabo8V1UAQ.1&utm_referrer=http%3A%2F%2Fwww.startguide.org%2Forgs%2Forgs08.html

- **YEAR: 2018 ARTICLE or ACTION:**

Friends of the Earth and allies petition EPA to reject refinery's secret tar sands expansion permit

The article describes how Friends of the Earth and other environmental justice organizations have been fighting to stop permits being granted for new oil refineries.

MEDIA OR ENVIRO-ORG: Communities for a Better Environment

Url: http://www.cbecal.org/

- **YEAR: 2019 ARTICLE or ACTION:**

Letter to Governing Members of SCAQMD This letter, written by members of CBE, asks the SCAQMD to think about phasing out the MHF chemical used in the oil refinement process. • **YEAR: 2020 ARTICLE or ACTION:** **DO YOU LIVE IN A DEATH OR DISASTER ZONE?** This information sheet lists facts about the Torrance and Wilmington refineries, as well as the dangers they pose to the communities located around them.
Wikipedia: Torrance, CA

How are environmental problems mentioned (or not mentioned) in the community's Wikipedia article?	**Are environmental problems discussed on the talk page of your community's Wikipedia article? If yes, which issues do users discuss?**
Environmental problems are not mentioned in the Wikipedia article; the oil refineries are discussed but there is no mention about any harmful effects caused by the refineries.	No

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: Torrance, CA

Highlighted Hazard: slow-disaster

Identify a problem.	**Identify ways this problem is being addressed in different places -- through**	**Tailor these solutions to your community.**

	educational programs, legal actions, land use policies, media campaigns, etc.	
Residents live very near high risk industrial facilities.	Buy-outs (Implementing a Partial Buy-Out of an Environmental Justice Community).	Are the residents aware of their disadvantages in their living place? Are there any Communities nearby that is suffering the same condition as Torrance
Community members think that environmental health hazards can't be reduced.	Youth and young adult environmental education programs. (NAACP, Teaching Intersectionality and Environmental Justice in our Classrooms).	Are there local schools to partner with? Any with prior work along these lines that could be built on?
Hazards of local oil and gas production and processing facilities. LOCAL DETAILS (see FracTracker)	The CBS Los Angeles has written an article to address the most dangerous hazard in Torrance(Feds: 2015 Torrance Oil Refinery Blast Could Have Been	What would happen in the explosion? How does knowing this will help with creating regulations to prevent the use of dangerous chemicals in

	Catastrophic, Blames ExxonMobil)	refineries?
There is a special habitat that is in danger of being damaged by pollution. (Madrona Marsh in Torrance, which is one of the remaining freshwater marshes in the country)	A community organization has been set up where they have taken up protection of the park. (Link to the Friends of Madrona Marsh)	More resources should go to existing organizations if they already exist. If they don't, then
Information about pollutants in the community are hidden and hard to find.	Local newspapers and community members report on local pollution data (Link to a online news article talking about pollution in Torrance)	Support local newspapers or create new newspapers of your own.

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 <u>both</u> 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: Torrance, CA

Highlighted Hazard: Slow Disaster

Identify a Problem	**Identify ways this problem is being addressed through state,**	**Tailor these solutions to your community.**

	national and international initiatives -- laws and regulations, curriculum requirements, federally supported job, federal investment in research or news capacity, etc.	
High hazard industrial production processes when there are known alternatives.	In many other refineries, the deadly chemical Hydrofluoric Acid upon leak is switched to Sulfuric acid which will remain liquid form under a leak, and thus will not generate toxic clouds.	Currently Torrance refinery refused to switch to safer material instead of adopting a modified hydrofluoric acid. Switching to Sulfuric acid may totally prevent major leaks from happening.
Hazards of local oil and gas production and processing facilities.	Oil and gas production facilities can not be banned or removed since the petroleum industry will provide the state with a significant amount of profits. However, to control	It is impossible to ban the Torrance refinery. However, AQMD set up an air quality monitor system to oversee real-time pollutant levels in the air. This is also open to local residents, they can

	the local pollution level, the government has to keep monitoring the air quality and announce warnings to residents when the level is high.	choose to wear face masks when the pollution level is high.
Refineries will sometimes report lower pollutant release to avoid penalties	EPA has been overseeing the violation to safety measures and pollution treatment for years. Harsh penalty will be issued upon violation by refineries.	Torrance Refinery was fined for reporting less release of toxic substances and violation to safety-measure for many times. This may somehow improve the safety measure of the refineries, and harsher penalties may be conducted upon future violation.

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?	Research is needed for measuring the levels of pollutants in the air around. This research is already underway, with the Torrance Air Quality Monitoring Project, which reports near-real-time measurements of Benzene present in the areas surrounding the refinery. As this project collects data, it may provide us with insight useful to refute claims made by the refinery if they were to downplay levels of pollution they cause.

What kinds of health research are needed in this community?	Research is needed to better understand the safety of modified hydrofluoric acid (MHF) and it's adverse health effects. The residents are concerned that the switch to "modified" hydrofluoric is not full-proof in terms of safety and there must be research done by researchers who are not affiliated with the industry to either prove or disprove the refinery's claims. With enough evidence, the people can strengthen their stance against MHF, or they may discover that they are safer than they imagined.
What kind of quantitative social survey data is needed in this community?	It may be useful to quantify the levels of satisfaction and trust that community members have towards AQMD and the refinery. The government should earn the trust of the people, and gauge how well they are doing their job to protect the citizens.
RECOMMENDED QUALITATIVE STUDY	
• What is your research question? ○ What are the perceived factors of social determinants of health aid in the	

success of local activism in Torrance compared to that in Wilmington, CA? In other words, in the opinions of respective residents what has allowed the people of Torrance to have a more active community that fights against environmental injustice in their community?

- What social groups will you study and interact with?
    - We would survey the members of the activist groups of each community.

- How will you gain access to the social groups you'll focus on? What privacy protections will be needed?
    - We would reach out to the groups directly and I'm sure they'd be happy to participate, heed advice if they wish to do so. Participants will have the option to stay anonymous.

- How could you use participant observation to answer your research question?
    - Speaking to activists in the community will help answer our questions about how they perceive their power and ability to change and to what extent (i.e. measuring self-efficacy).

- How could you use in-depth interviewing to answer your research question? What questions would you ask?
    - We would ask about how they got involved in the organization, what motivates them to do their work, what responsibilities they handle, and what privileges individuals have that allow them to do their work in the

organization. Asking these questions will help make a profile of the types of people who take part in community activism and what skills are necessary for the organization to be successful.

- How could you use focus groups to answer your research questions? What discussion prompts could you use?
    - We would use a focus group with a mix of people who are at differing levels of involvement in the organization, ranging from no involvement at all to the president(s) / administrator(s) / founder(s) of the organization. We could ask about their perceived weight of the issues at hand, and how much impact they believe they can make.

- Who would find this research useful?
    - This research would be particularly helpful for those who are trying to organize environmental activist groups in their community, but have difficulty identifying possible challenges/obstacles that are in their way and need insight on how to get around those.

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?	Students doing a report on a local refinery can't seem to find the resources to write about it in any great detail.	More databases should be created, like the Right-to-Know network and the EJScreen. Additionally, students and other researches should be aware that these resources exist in the first place.
ECONOMIC INJUSTICE: Does poverty or uneven wealth exacerbate environmental hazards in this setting?	Someone works at the facility or buys gas from the facility despite the fact that they know that the product is unhealthy for the environment.	Make it easier for that person to wean off of their job or that product, such as providing subsidies to buying healthier products.

EPISTEMIC INJUSTICE: Are some ways of understanding environmental hazards and harms discounted or silenced? Is environmental sense-making actively undermined?	Most people don't understand what is greenwashing and what isn't, which leads to a lot of people getting misled and supporting the wrong products and services.	Educate people on what exactly are all of the sins of greenwashing so that they do not get misled by misinformation.
GENDER INJUSTICE: How do gender hierarchies shape both exposure to environmental hazards and capacity to address them?	In the material we saw for class, babies born in toxic environments are often female instead of male, leading to a gender imbalance. Additionally, the women that are left often have lots of issues.	Awareness of this situation and making sure that there are more resources given to supporting male babies is paramount.
HEALTH INJUSTICE: Are there health disparities or uneven access to health care in this setting?	Health disparities are difficult to correlate with the environment.	Do quantitative studies that compare environmentally vulnerable groups with control groups from not as vulnerable cities.

Check out the asthma hospitalization rate for your community.		
INTERGENERATIONAL INJUSTICE: Will future generations be impacted by environmental hazards and exposures in this setting today?	Families who relocate to other cities make tracking health disparities inaccurate/ incomplete.	Keep in touch with relocated families and make note of the illnesses that each generation has.
MEDIA INJUSTICE: Is there adequate news coverage of the environmental hazards in the setting? Does news convey the perspectives and vulnerabilities of all stakeholders?	News and other sources are almost entirely in English, making it impossible for nonnative speakers to stay informed.	Offer media in other languages, or a translating service.
PROCEDURAL INJUSTICE: Have all stakeholders had fair access to government support and law to address environmental hazards in	Refineries' participation in community affairs offers them the support from local government, leading to a lack of rules and regulations	Local government could limit the amount of monetary support to therefore limit the amount of influence in government, just as how politicians aren't

this setting?	against pollutive refineries.	allowed to receive over a certain amount in gifts because it can be viewed as bribery.
RACIAL INJUSTICE: Do environmental hazards in this setting disproportionately impact particular social groups, especially communities of color?	This city is home to a large immigrant population who have historically less access to education, high income, and housing.	Torrance could offer integration programs that educate immigrant populations about how to be involved in government, as well as education pathways. Quality low income housing should also be made available.
REPRODUCTIVE INJUSTICE: Do environmental hazards in this setting undermine possibilities for safely parenting children?	Residents burdened with medical bills from respiratory illnesses likely cannot afford having and parenting as many children compared to other neighborhoods.	1

Do you consent to having your name listed as an author on the published case study?	
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5. Dhruv Sehgal	**Y**
6. Omar Hossain	**Y**
7. Zongyue Lu	**Y**
8. Srayan Jana	**Y**
9. Huy Dang	**Y**
10. Abraham Rubalcava	**Y**