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The Inequitable Placement of Hazardous Waste Facilities: How Underserved Communities are Disproportionately Impacted

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Hazardous waste facilities in New Jersey have raised significant concerns about the short and long-term consequences for local communities. In 2020, the New Jersey Department of Environmental Protection (NJDEP) revealed that New Jersey generated almost 9.5 million tons of municipal solid waste (MSW), with just 39% of MSW being recycled, while the remainder was disposed of in landfills (Department of Environmental Protection, 2023). Hazardous waste sites are typically constructed in overburdened communities that lack an effective local government to take action against these sites. Such facilities accept and handle hazardous waste through treatment, storage, or disposal methods (USDEP, 2023). This paper aims to provide a comprehensive overview of the existing research on hazardous waste sites, particularly the socioeconomic and racial disparities in the communities where the facilities are located, as well as the negative effects on the residents of these communities.

Defining Hazardous Waste

Hazardous waste facilities accept and handle hazardous waste through processing, storage, and disposal methods (USEPA, 2023). Incinerators, landfills, and containers are essential infrastructures for waste management and are each efficient in disposing and storing waste. As of April 2023, New Jersey hosts the highest number of hazardous waste sites within its borders, totaling 115 locations (Alves, 2023). Hazardous waste is simply defined as waste that has qualities that make it unsafe or capable of harming human health or the environment (USEPA, 2023). This type of waste is produced from several sources ranging from industrial waste to batteries (USEPA, 2023). To understand the consequences of hazardous waste facilities, it is crucial to outline the types of hazardous waste as they all have different properties.

There are four classifications of hazardous waste: (1) listed waste, (2) characteristic waste, (3) universal waste and (5) mixed waste (EHS Laboratories, n.d.). Listed waste is categorized into subgroups, each listing chemicals commonly found in paints and organic compounds. Characteristic waste is categorized based on which characteristics it displays. This includes (1) ignitability, (2) corrosivity, (3) reactivity and (4) toxicity (EHS Laboratories, n.d.).

Universal waste includes widely produced objects such as lightbulbs, batteries, and pesticides. There are 9 classes within universal waste, and they are often classified as “dangerous goods”, parallel to those they ban on aircraft (EHS Laboratories, n.d.). Finally, mixed waste is waste that has both hazardous and radioactive elements (EHS Laboratories, n.d.). These classifications of hazardous waste are imperative to properly manage waste and reduce the impact on nearby communities as much as possible.

Siting of Hazardous Waste Facilities

Permits are required by the Environmental Protection Agency (EPA) for a hazardous waste facility to be established. The general requirements for permit-holding facilities include (1) the duty to comply with regulations, (2) the duty to reapply for a permit after its expiration date, (3) the need to mitigate the negative effects of hazardous wastes on the local environment, (4) duty to provide information and record-keeping, (5) compliance with inspections and (6) 24-hour reporting. Before the EPA grants a permit, the facility must be transparent and provide all of the relevant information such as the type of hazardous waste being processed, the location of the facility and the potential negative impacts on the environment and local communities. A plan must be developed by the facility to best mitigate the negative impacts. The EPA requires permit handlers to produce reports on their waste activities and provide detailed records of past activities. Being prepared for sudden release of hazardous materials in the air, soil or water is essential for a facility to operate in New Jersey, as they must comply with their duty to protect the local environment. However, the EPA does not provide any clear criteria for the placement of hazardous waste sites, which could allow for communities of low-income minorities to be targeted areas for the location of such facilities.

The United Church of Christ Commission (UCC) for Racial Justice's 1987 publication, *Toxic Wastes and Race in the United States*, was one of the first national studies that focused on the prevalence of hazardous waste in minority areas. The study concluded that race was the strongest predictor of the locations of hazardous waste sites in the United States compared to

other variables such as household income, property value and the production of waste by facilities (Mascarenhas et al., 2021). The findings of this study supported claims made by environmental justice advocates and contributed to the creation of the Office of Environmental Justice in the EPA (Mascarenhas et al., 2021). This UCC research revealed environmental justice concerns with hazardous waste and race, and its conclusions have served as the foundation for later investigations.

Environmental justice researchers and advocates have brought attention to the inequitable placement of hazardous waste sites in communities that are low-income and minority based. A study conducted by researchers from the University of Michigan and the University of Montana analyzed 30 years of demographic data as well as the location of hazardous waste sites in the United States. Including 319 hazardous waste sites from 1966 to 1995, this study identified decades-long patterns of racial and socioeconomic disparities in neighborhoods with waste facilities across the United States (Mohai and Saha, 2015). It revealed that hazardous waste sites are commonly located in nonwhite and impoverished communities.

Most notably though, the study determined that hazardous waste facilities were sited in neighborhoods where demographic changes were already occurring for up to two decades, with white residents moving out and minority residents moving in. An alternate theory at the time was that hazardous sites cause demographic changes due to property devaluation, leading to higher concentrations of low-income residents or people of color in these communities, but their study found little evidence to suggest that. Their research indicated that poor minority communities attract waste facilities, rather than the other way around. (Mohai and Saha, 2015). In support of previous research, Mohai and Saha found that “the racial composition of geographic areas tends to be a stronger independent predictor of which areas are destined to receive hazardous waste facilities than any other socioeconomic characteristics of the area,” though those variables were also significant (2015).

Another report published by the Shriver Center on Poverty Law in 2020 revealed that 70% of hazardous waste sites are located within one mile of public housing. This report contained a case study of Carteret, New Jersey, where it was concluded that nearly 700 federally assisted housing units are located within or near a contaminated site generated by the U.S. Metals Refining Company (Shriver Center on Poverty Law, 2020, 72). Although researchers and policymakers are aware that this issue exists, the long-term socio-economic impacts on the affected communities are not widely known.

Socio-Economic Impacts

What is known about the socioeconomic effects on communities that live in proximity to hazardous waste sites is limited. How a community is affected economically by the presence of the waste facility is determined by how revenue is proportioned (National Research Council, 2000, 221). These facilities can provide dozens of jobs to residents, cheaper waste removal and energy generation. However, they may harm local economic development in the community, if businesses decide to leave the affected area and avoid locating there (National Research Council, 2000, 224). The lack of businesses within a community can significantly decrease the availability of job opportunities and require residents to search outside of the community for necessities. A study conducted by Greenberg et. al. in 1995 found that the incinerator in Rahway, New Jersey, would result in a rapid decline of the community, as private investors are not interested in investing in properties near hazardous waste sites (Greenberg et. al., 1995, as cited in National Research Council, 2000, 224). While this may be the case for the incinerator in Rahway, the economic transformation following the placement of hazardous waste facilities is contingent on public opinion and the community’s condition before the facility opened in the area.

The presence of hazardous waste facilities has the potential to negatively affect property values, with the extent of the impact primarily dependent on the neighborhood's pre-existing qualities before the facility's entrance (National Research Council, 2000, 225). Large landfills

are estimated to devalue a property by 12.9%, due to the stench and health impacts associated with living near a landfill (Vasarhelyi, 2021). Ultimately, public opinion shapes the perception of the affected area and may make the issue more serious (National Research Council, 2000, 224).

Health Impacts

Hazardous waste sites also pose serious health risks to the residents living in proximity to such facilities, with studies finding higher percentages of cancer and fetal abnormalities within these areas. A multi-site study in the United Kingdom by the European Collaborative Study of Residence near Hazardous Waste Landfill Sites and Risk of Congenital Malformations (EUROHAZCON) concluded that there is a relationship between Socioeconomic Status (SES) and non-chromosomal birth anomalies in populations neighboring landfill facilities (Martuzzi et al., 2010). Other studies have similar conclusions, where a lower SES increases the likelihood of toxic waste exposure and cancer mortality (Martuzzi et al., 2010).

The risk of groundwater contamination from hazardous waste sites is a tangible and ongoing issue for communities nearby. The USEPA announced that eventually all landfills will tear and release leachates into the environment, which poses a significant threat to the groundwater and soil (Christenson & Cozzarelli, 2003). A study from the EPA published in 1996 revealed that 80 percent of the existing hazardous waste sites in the U.S. have adverse impacts on the local groundwater source (USEPA, 1996, 2). Poor water quality and contamination are primarily found in low-income and minority communities that are located near pollution sources, such as hazardous waste sites (University of Rhode Island, 2019). Although proper waste management practices exist to protect the nearby environment, hazardous waste sites can still release toxic pollutants into the environment, negatively impacting the community’s access to clean drinking water and a pollution-free environment. With increased awareness of the consequences that hazardous waste sites have on their surrounding environments, appropriate action can be taken by policymakers to officially introduce these topics as a legal issue and find

solutions to mitigate the effects of hazardous waste sites on the communities most affected by them.

Policy Response

In 2020, Governor Murphy issued a new Environmental Justice (EJ) Law that would protect vulnerable communities from hazardous and polluting facilities in New Jersey. The law was finalized and adopted in April 2023. The law requires the Department of Environmental Protection to evaluate the environmental and public health impacts of certain facilities on overburdened communities (OBCs) when reviewing certain applications for waste facilities. This new law provides a clear definition of OBCs which is defined as “any census block group, as determined in accordance with the most recent U.S. Census, in which: (1) at least 35 percent of the households qualify as low-income households; (2) at least 40 percent of the residents identify as minority or as members of a state recognized tribal community; or (3) at least 40 percent of the households have limited English proficiency” (NJDEP, 2023, 2). Figure A is a map depicting the OBCs in New Jersey, where the blue areas represent the minority and low-income communities and are mostly concentrated in the New York metropolitan area, which includes Newark and Jersey City, Trenton, and southern New Jersey areas like Camden, Bridgeton, and Atlantic City.

Overburdened Community Criteria	Number of Block Groups	Population
Adjacent	51	0
Limited English	2	771
Low Income	211	296,378
Low Income & Limited English	1	1,570
Low Income & Minority	1,112	1,604,345
Low Income, Minority, & Limited English	115	165,951
Minority	1,981	2,877,020
Minority & Limited English	23	30,126
Total	3,496	4,976,161

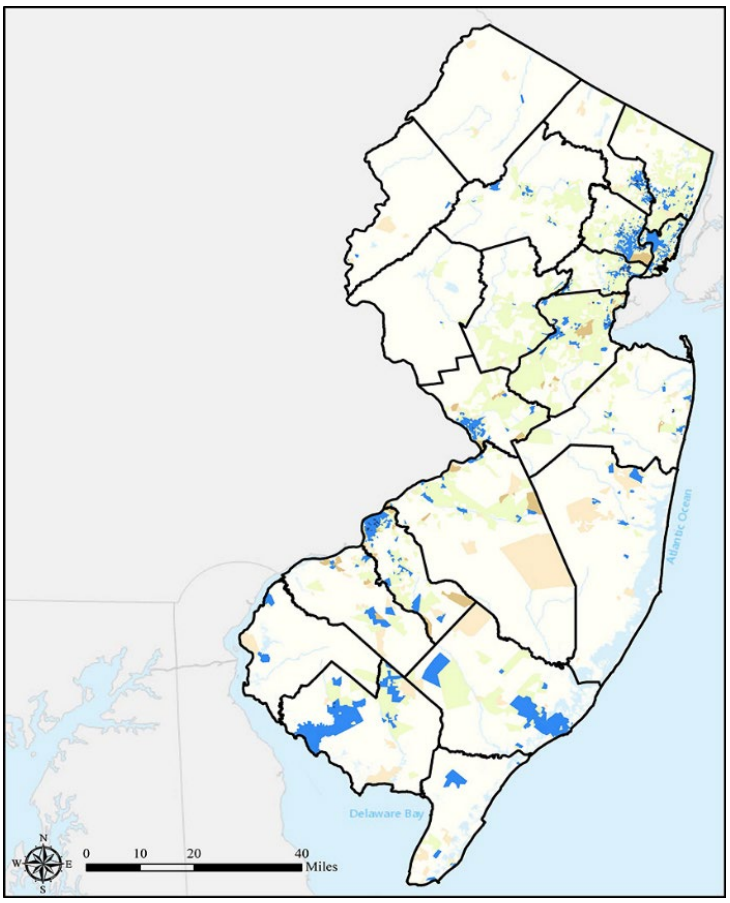

Figure A: Map of OBCs in New Jersey. Data from the 5 Year American Community Survey (2017 to 2021).
Source: NJDEP

The primary aim of this law is to address the disproportionate placement of waste facilities and mitigate the toxic health risks on communities of color and of low SES. The EJ law grants the DEP increased authority over approving permits for facilities, as well as establishing conditions that will allow for facilities to stay in compliance with environmental laws and minimize the impact of harmful pollutants. It requires facilities applying for permits to submit an environmental justice impact statement (EJIS) (Rauer, n.d.). The EJIS evaluates the potential and present environmental and public health stressors in connection with the proposed area and facility. The NJDEP will then assess the EJIS and determine whether the facility would create disproportionate environmental and public health stressors within the community where

the facility is located (Rauer, n.d.). While it is too early to say whether the new law has had a beneficial effect, it is surely a step in the right direction towards environmental equality.

Conclusion

The placement of hazardous waste sites across the United States has disproportionately affected minority and low-income communities for several decades. The majority of these facilities have been deliberately constructed in communities that lack an effective local government, allowing them to operate with little to no impunity for the damage caused to the local communities. Concerns about the implications of these facilities have been raised by those subjected to unfavorable conditions. However, legislators and lawmakers have not been able to effectively address these issues for several decades. Although plenty of research has focused on the adverse effects of hazardous waste facilities on human health, little is known about the socioeconomic effects and the future of such communities. The lack of knowledge concerning the socioeconomic consequences is a major deficiency in the movement towards environmental justice. Understanding how hazardous waste sites affect impacted communities' social and economic prospects will strengthen environmental legislation and optimize its outcomes. Although the New Jersey Environmental Law prevents facilities from being placed in overburdened communities, there is a lack of legislation that aims to mitigate the consequences of hazardous waste disposal in nearby communities. Several research gaps must be closed to effectively manage the implications of hazardous waste sites and to protect vulnerable communities that are subject to such dangerous conditions. A clear strategy acknowledging the adverse effects of hazardous waste facilities must be implemented to achieve environmental justice among afflicted minority communities.

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