# The Filthy Truth: An Environmental Justice Analysis of Public Beaches in Cleveland, Ohio




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Submitted to the Environmental Science and Sustainability Department, Allegheny College

in partial fulfillment of the requirements for the degree of

BACHELOR OF SCIENCE

March, 2023

# The Filthy Truth: An Environmental Justice Analysis of Public Beaches in Cleveland, Ohio

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**March, 2023**

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**Acknowledgements**

I'd like to thank my parents, without whom my college education would not have been possible. To my sisters Ali and Audra, who have been at my side throughout the entire research process. To Eric, for the guidance and support provided as my comp advisor. To Rich, for being a beacon of optimism, a voice of wisdom, and a reliable listener for four years as my academic advisor. To Rachael, for being my companion, confidant, and closest friend at Allegheny. I

wouldn't choose to finish my degree with anyone else and I truly could not have done this without you. To Nola, for the endless support, phone calls, college visits, and laughs. Your love and light have carried me through high school and college, and for that I am so grateful. To Sarah and London, for providing laughs, study breaks, and listening ears as my lovely roommates. To Shira, Hannah, Jasmin, Favour, and Lauren, for rooting for me, for being my friends, and for the times being together eased my stress. To Jovi, for the emotional support and unconditional love you have provided me with over the past two years.

**Abstract**

This research takes an environmental justice perspective to analyze three public beaches in Cleveland, Ohio–Euclid Villa Angela Beach, Mentor Headlands, and Edgewater– to determine if beach quality is lower in Black and low socioeconomic communities than in majority white and upper class neighborhoods. To measure beach quality, trash from each beach was collected along a known distance, and an infrastructure analysis was performed to assess the recreational infrastructure present at each location. Data on each of the surrounding communities' socioeconomic status was collected and measured the average home value, percentage of population without health insurance, rate of car ownership, percentage of renting residents, Black population, and percent of population living below the poverty line. Data produced in this study revealed that the beach with the highest density of trash had the highest Black population of the communities examined, indicating potential environmental injustice along the Cleveland coastline.

**Introduction**

Grassroots environmental justice efforts led by Black, Indigenous, and marginalized communities in the early 1980s were founded upon the belief that each citizen has the right to live in an unpolluted environment, and were usually organized in response to a direct environmental injustice (Cole, 2001; Myron, 2002). The environmental issues of pollution and waste have been long approached with an 'out of sight, out of mind' attitude in the US, but the issue of environmental injustice is characterized by the fact that "out of sight and out of mind is where the poor and powerless live and work" (United States Commission on Civil Rights, 2003). In addition, race and class are the strongest indicators of proximity to environmental degradation

(Cushing et al., 2015; Kiniyalocts, 2000; Mohai, et al., 2009). Living near or in an area of high pollution and environmental degradation also has long-term effects on physical health, life expectancy, access to recreational outdoor space, mental health, and overall decreased quality of life (Colquette. 1991; Gelobter, 2019). However, coastline districts with higher levels of democracy in the form of political participation were found to have lower levels of point source pollution, indicating the effectiveness of environmental justice efforts to advocate for the environment (Cushing et al., 2015). The same study also found that access to clean water decreases as income inequality increases, demonstrating the relationship between socioeconomic status and access to environmental benefits. Historically, Black and low-income communities have been disproportionately exposed to environmental hazards such as proximity to toxic waste and landfill facilities, lower water quality, and industrial pollution (Stewart et al., 2015; Grineski et al., 2015). The movement for environmental justice seeks to distribute environmental benefits and burdens equitably, which is underscored by the premise of social equality through meaningful representation and involvement in environmental decision-making (Hill, et.al, 2018; US EPA, 2020; Stewart et al., 2015).

The question of who owns the coastline in the U.S. and why is embedded into the larger issue of systemic racism, which played a major role in the early development of beaches that has since shaped their modern layout (King, 2020). As a result of the suburbanization trend in the U.S. throughout the 1950s and 60s, recreational beach-going gained mainstream popularity in the 1970s subsequent to the Civil Rights Movement, which bore legal and ethical questions over who should have access to the prized coastline. Most beaches were owned by upper middle class homeowners with fences that extended into the water, demonstrating beaches' long history with environmental racism (Kahrl, 2015). Race and class exclusion through coastline privatization, segregation laws, and redlining limited quality beach access for Black and low-income communities throughout the twentieth century (Owens, 1976, Cazessus et al., 2007).

Although modern pollution plagues coastlines in a variety of alarming ways, as Owens & Brower (1976) noted, "an equally serious problem is the exclusionary nature of many locally owned beaches" (4). This literature, though 45 years old, describes the longstanding challenge that lies at the intersection of social and environmental management. The concept of environmental privilege is deeply embedded in beach access inequality, which describes the

position of those who benefit from environmental injustice (Montgomery et al., 2015). It's like two sides of a coin; those who experience environmental injustice and those who experience environmental privilege. Those with private property or membership access hold the environmental privilege that allows consistent access to a high-quality unpolluted beach. This idea demonstrates how the benefits and burdens of living in a coastal environment are unequally distributed across race and class lines.

Proximity to industrial urban pollution can, in turn, indicate beach quality, and more urban beaches tend to be closer to factories and sewage systems that may degrade the coastline and inhibit BIPOC residents from meaningfully enjoying the coastline. Urban beaches with higher BIPOC populations also hold a historical reputation for being lower quality due to their proximity to point pollution sources such as toxic factory dumping or sewage systems (Owens, 1976, Cazessus et al., 2007). In particular, water treatment plants and their larger counterparts, wastewater treatment plants, can pollute surface waters of adjacent beaches. Seyfried, et al. (1984) argues that these facilities can have a "detrimental impact on the water quality of recreational beaches", while Funck (2021) asserts that the release of microplastics into adjacent aquatic environments is a byproduct of wastewater treatment processes. Additionally, water quality has been found to be inextricably linked to sand quality and the terrestrial ecology of a beach (Torres-Bejarano, 2018), which is why another consideration for beach quality must be a beach's proximity to waste/water treatment plants. Historical redlining practices have also allowed industrial sources of pollution to be disproportionately placed in low income and BIPOC communities, which is another major technique used in the political disenfranchisement of BIPOC and low-income communities (Van Slyke, 2020). Overall, coastlines with close proximity to these different types of industrial pollution are significantly less accessible as recreational areas, which consequently limits the equity and quality of life for Black and low-income residents (Kim, et al., 2019).

Public beaches in Cleveland are no exception; Northeast Ohio's coastline management has direct impacts on when (or even if) the beach is in commission. Algal blooms, which occur from an excess of phosphorus and nitrogen in the water, can render a beach completely unswimmable. The excess phosphorus and nitrogen comes from farm fertilizer and enters the watershed through rainwater runoff, demonstrating just one environmental challenge to high

beach quality (Smith Hopkins, 2020). Although many surrounding farms use synthetic fertilizers to guarantee an economical season and maintain their livelihoods in rural areas, the process of eutrophication poses a serious risk to water quality for coastline residents. The Lake Erie watershed is far from immune to ecological problems, from algal blooms to zebra mussels, and there is no shortage of environmental mishaps along the coastline (Allinger, 2013). Previous legislation in Ohio has targeted farm runoff as a major source of phosphorus and nitrogen pollution, though enforcement and monitoring remain weak and leave Lake Erie vulnerable to harmful aquatic pollution (Isaac, 2020). Cleveland also gained a reputation for polluted water when the Cuyahoga River caught on fire due to unregulated toxic dumping, further exemplifying the extent to which pollution and management issues have challenged Lake Erie's coastline.

Water quality contributes to overall beach quality and an unhealthy aquatic ecosystem can render a beach unswimmable and unfit for recreation. Sustainable and ecologically-sound water management is essential for maintaining beach quality, especially in urban areas. As defined by the United Nations, the 17 Sustainable Development Goals aim to create a "shared blueprint for peace and prosperity for people and the planet now and into the future" (United Nations Sustainable Development Goals, 2016). In providing a framework for other countries to follow, the UN SDGs outline specific areas for improvement including reduced inequalities, life on land, and sustainable communities and cities. Managing public beaches both equitably and sustainably is central to preserving both terrestrial and aquatic biodiversity, while also reducing the disparities of access to unpolluted outdoor space which occur along racial and economic divides. Identifying the disparity of beach quality in low-income and Black communities is required to mitigate environmental injustice that may limit access to high-quality beaches, which is why this research would contribute to the UN SDG of reducing inequalities. Public beaches in Cleveland (or any urban environment) are a potential site of environmental injustice, which is another way that this research relates to the SDGs of sustainable communities and cities and preserving biodiversity as described by the life on land goal.

However, beaches in Cleveland have not been quantitatively studied through the lens of environmental justice. Water quality in urban areas has been found to be lower across the Cleveland coastline than in suburban or rural neighborhoods, which is consistent with the indication that race and class are determinants of environmental quality ( Kim, et al., 2019; Lee,

et al., 2012). Beach litter also significantly reduces the recreational quality of a beach, and certain types of trash can cause health hazards to humans and wildlife, as well as contribute to the aesthetic deterioration of a coastline (Williams, et al., 2013). Since research has shown that low-income and BIPOC are more likely to live in polluted and potentially hazardous environments, an analysis of the quality of Cleveland's beaches is expected to also have a strong correlation between lower beach quality and higher Black and low-income populations. Beach access and quality relates to the United Nations Sustainable Development Goals (UNSDGs) of clean water and sanitation, reduced inequalities, and sustainable cities and communities (United Nations Sustainable Development Goals, 2016). Sustainable development of cities and communities is a central goal for this research because achieving both unpolluted coastal space and equal beach access requires both social and environmental awareness in coastline planning and management. Because the goal of environmental justice seeks to relieve the burden of environmental health hazards on a single community, I performed a quantitative study to identify if terrestrial beach quality is lower in Black and low-income communities in Cleveland according to the litter collected.

**Methods**

To measure beach quality, I walked a pre-established distance in which I collected any visible litter I saw in my path. I collected trash from three beaches on three separate occasions from the June-August season of 2022 (with Villa Angela Euclid Beach as Beach 1, Mentor Headlands as Beach 2, Edgewater as Beach 3) and compared the quantity of litter across beaches using nine total samples. These nine samples were collected; three samples from each beach were collected on nine separate days during the summer of 2022. I also created a checklist to compare infrastructure on each beach which included public restrooms and their quality, presence of trash cans and recycling bins, a food/drink shack or concession area, the presence of lifeguards, and any other accommodations for guests to recreate, such as boat rentals. The presence of these features along a public beach would indicate a better recreational experience and therefore indicate higher overall beach quality. Beaches were sorted into urban, semi-urban, or rural categories according to parameters outlined by Ariza et al. (2010) to contextualize both their setting and exposure to different types of pollution (industrial urban pollution, farm runoff, etc). The beach quality data collected was also analyzed within the context of previous water

quality assessments and historical literature on coastline quality in Cleveland as water quality is another major indicator of recreational potential and beach quality. This included recording water condition flags at each beach on the first sampling day at each location, researching adjacent sources of pollution, as well as gathering information on the presence of known toxins in the water to gauge water quality.

To identify the socioeconomic status of the area that each beach sits in, I gathered US census data on the Northeast Ohio residents in each surrounding community according to average income level and racial demographics. Beach 1 is situated in Euclid, beach 2 in Mentor, and beach 3 on the west side of downtown Cleveland in Edgewater Park. This information was accessed using both local and federal census data from 2021 (U.S. Census Bureau, 2021) in order to gain a broader sense of who lives and interacts with each environment. Data collected included average household income, rate of car ownership, population density per one square mile, Black population, average home value, percentage of population without health insurance, percentage of households with broadband internet, rate of residents living below the poverty line, rate of car ownership, and percentage of renting residents in each community. Comparing the social and economic conditions across coastline communities works contextualize beach quality in terms of social and environmental justice. The project's goal is to identify environmental injustice by comparing beach quality across communities with varying socioeconomic and racial demographics.

**Results**

Beach 2 has both the wealthiest community according to average home value ($183,600) and percent of population living below the poverty line (5%) and highest white population (94%). Although beach 3's surrounding community has a lower average home value ($73,400) than beach 1's ($84,500), beach 1's surrounding community has the highest Black population (62%) (See Table 1).

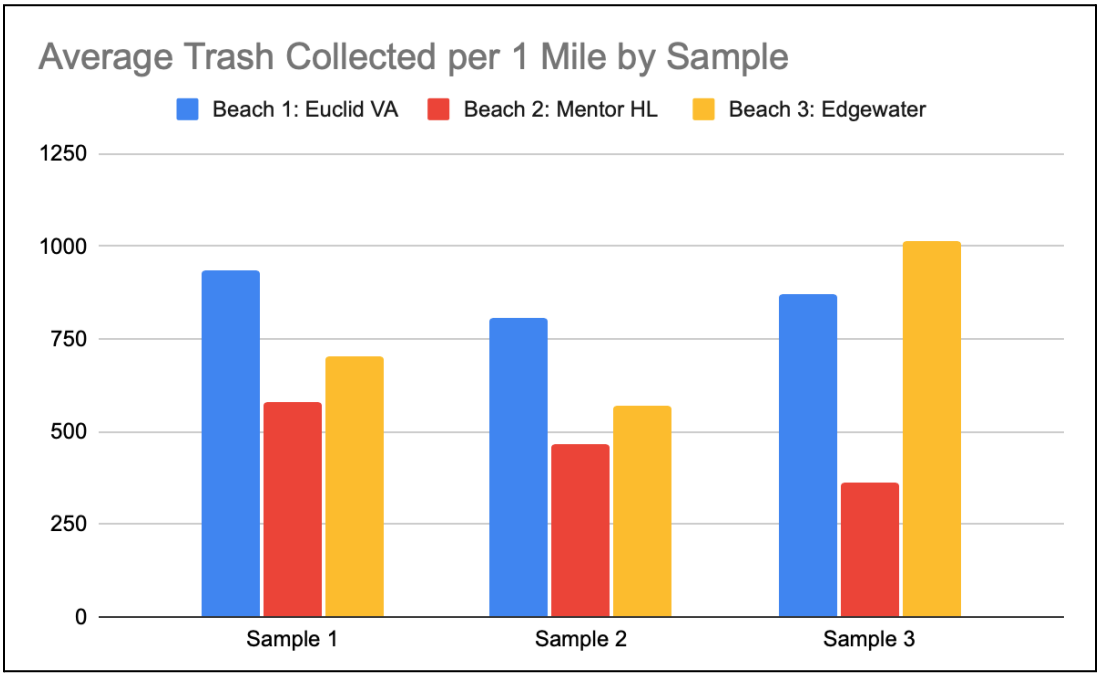
| Socioeconomic Data | Beach 1: Euclid/VA | Beach 2: Mentor HL | Beach 3: Edgewater |
|---|---|---|---|
| **Black Population** | 62% | 1% | 47.6% |
| **White Population** | 33.8% | 94.2% | 39.7% |
| **Average Household Income** | $40,342 | $73,208 | $31,838 |
| **Rate of Car Ownership (2017)** | 95.7% | 82.9% | 74.5% |
| **% of Renting Residents** | 57% | 16% | 58.1% |
| **Population per Square Mile** | 4,663.7 | 1,707 | 4,793 |
| **% of Households with Internet Access** | 75.2% | 91.1% | 72.7% |
| **% of Population w/o Health Insurance** | 8.8% | 4.8% | 8.4% |
| **% of Population Living Below Poverty Line** | 20.5% | 4.8% | 32% |
| **Average Home Value** | $84,000 | $183,000 | $73,400 |

Table 1

Because the community with the highest Black population does not have the lowest average home value, identifying the community with the lowest socioeconomic status was immediately unclear. Beach 3's surrounding community has the lowest socioeconomic status according to the chosen census criteria, taking the lowest position for six out of eleven categories examined: Beach 3 has the lowest average household income, lowest rate of car ownership, highest percentage of renting residents, highest percentage of households without broadband internet access, highest number of residents living below the poverty line, and lowest average home value. Beach 2 has a particularly low Black population, high average household income, high average home value, low percent of population living below the poverty line, and high average home value. Much of the census data collected on beach 1 and beach 3's surrounding communities is somewhat similar and indicates no statistically significant difference in socioeconomic status; the difference between percent of renting residents, percentage of

residents living below the poverty line, and percent of population without health insurance does not vary greatly between beach 1 and beach 3.

Figure 1



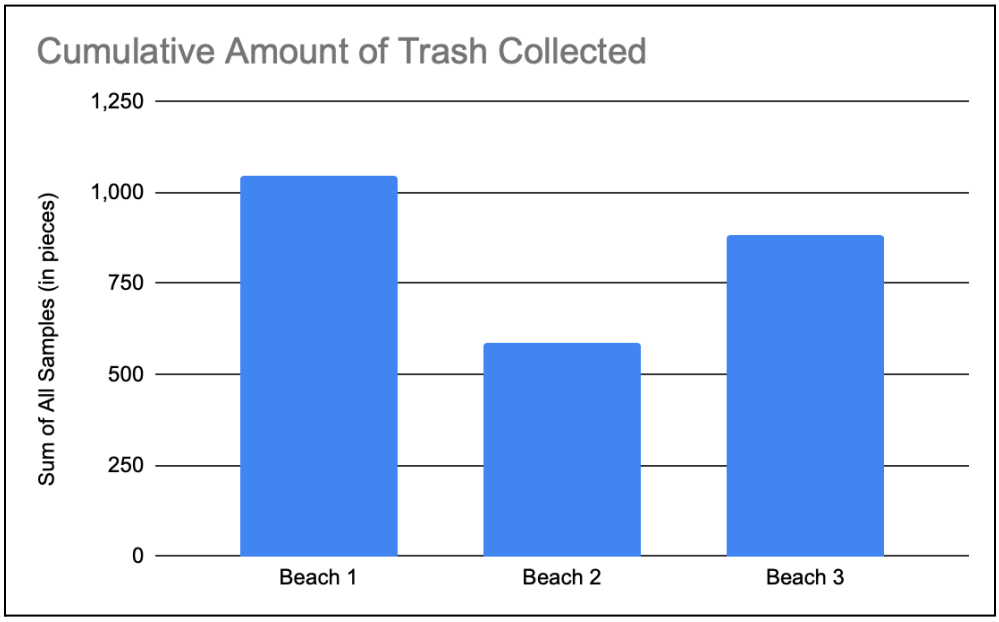




Figure 2

Beach 1 Results: Euclid Villa Angela Beach

Sample 1 of beach 1 contained a total of 542 pieces of trash collected over a distance of .58 miles. Sample 2 of beach 1 contained a total of 242 pieces of trash collected over a distance of .3 miles. Sample 3 of beach 1 contained a total of 261 pieces of trash collected over a distance of .3 miles. Sample 1 of beach 1 was found to average 934 pieces of trash per one mile. Sample 2 of beach 1 was found to average 806 pieces of trash per one mile. Sample 3 of beach 1 was found to average 870 pieces of trash per one mile. Beach 1 was found to average 870 pieces of trash per one mile across all three samples (Figure 6). The most commonly collected item from all three samples at beach 1 were small hard plastic pieces, with a cumulative total of 493 collected across three samples. 62 cigarette butts were collected in total across three samples from beach 1, with an average of 52.77 cigarettes per one mile (Figure 7). Beach 1 is located 1.2 miles away from Easterly Wastewater Treatment Plant. Previous water quality analysis revealed dangerous levels of toxins and bacteria in the swimming sections of Lake Erie at beach 1 (Lee, et al., 2012). It was also observed that trash cans and recycling bins are placed frequently throughout the beach area at beach 1. It was observed that beach 1 had lifeguards on duty to monitor swimmers and enforce beach rules. The water quality flag observed on June 14, 2022 was yellow, indicating moderate water quality conditions for swimming on the day beach 1 sample 1 was collected. The makeup of trash collected across all three is listed in Figure 3 below.

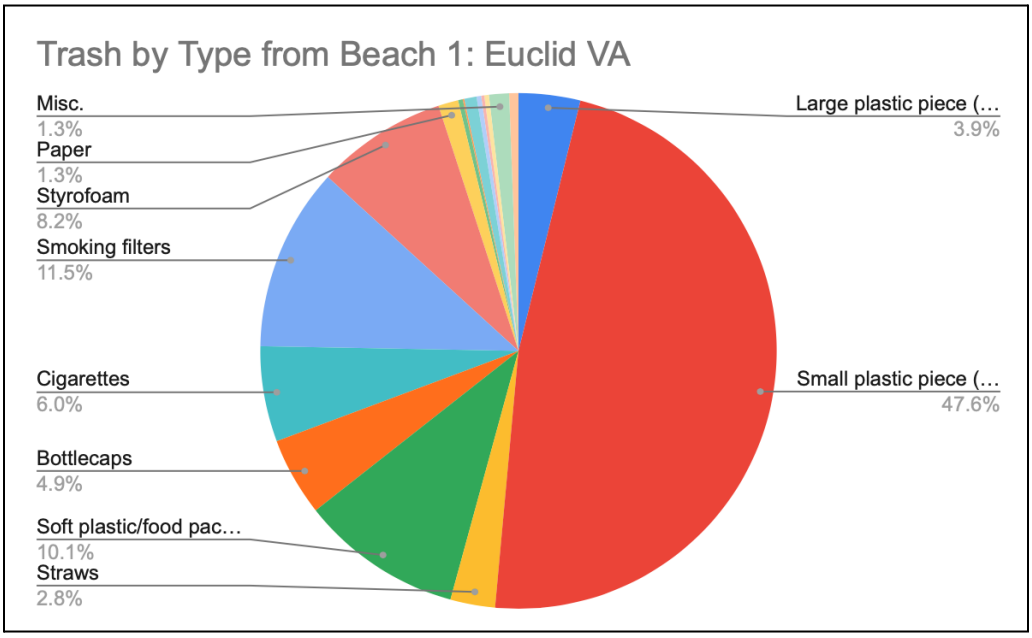


Figure 3

Beach 1 is located in a community which is made up of 33.8% white households and is 62% Black. The average home value in beach 1's surrounding community is $84,500. Beach 1 is located in a community in which 95.7% of residents own a car and 75.2% of households have broadband internet access. Beach 1 is located in a community in which average household income is $40,342 and 20.5% of residents live below the poverty line. Beach 1 is located in a community in which 8.8% of residents do not have health insurance and 57% of residents rent their home (Table 1).

Beach 2 Results: Mentor Headlands

Sample 1 of beach 2 contained a total of 338 pieces of trash collected over a distance of .58 miles. Sample 2 of beach 2 contained a total of 140 pieces of trash collected over a distance of .3 miles. Sample 3 of beach 2 contained a total of 109 pieces of trash collected over a distance of .3 miles. Sample 1 of beach 2 was found to average 582 pieces of trash per one mile. Sample 2 of beach 2 was found to average 466 pieces of trash per one mile. Sample 3 of beach 2 was found to average 363 pieces of trash per one mile. Beach 2 was found to average 470 pieces of trash per one mile across all three samples (Figure 6). The most commonly collected item from all three samples at beach 2 were small hard plastic pieces, with a cumulative total of 289 collected across three samples. 70 cigarette butts were collected in total across three samples from beach 2, with an average of 61.7 cigarettes per one mile (Figure 7). Beach 2 is located 0.2 miles away from the Painesville Water Treatment Plant, though no previous literature is available about water quality at beach 2. It was observed that there were no trash cans or recycling bins placed throughout the beach area at beach 2. The only observed trash receptacle were dumpsters placed throughout the parking lot at beach 2. No lifeguards were observed at beach 2. The water quality flag observed on June 15, 2022 was green, indicating good water quality conditions for swimming on the day beach 2 sample 1 was collected. The makeup of trash collected across all three samples is listed in Figure 4 below.

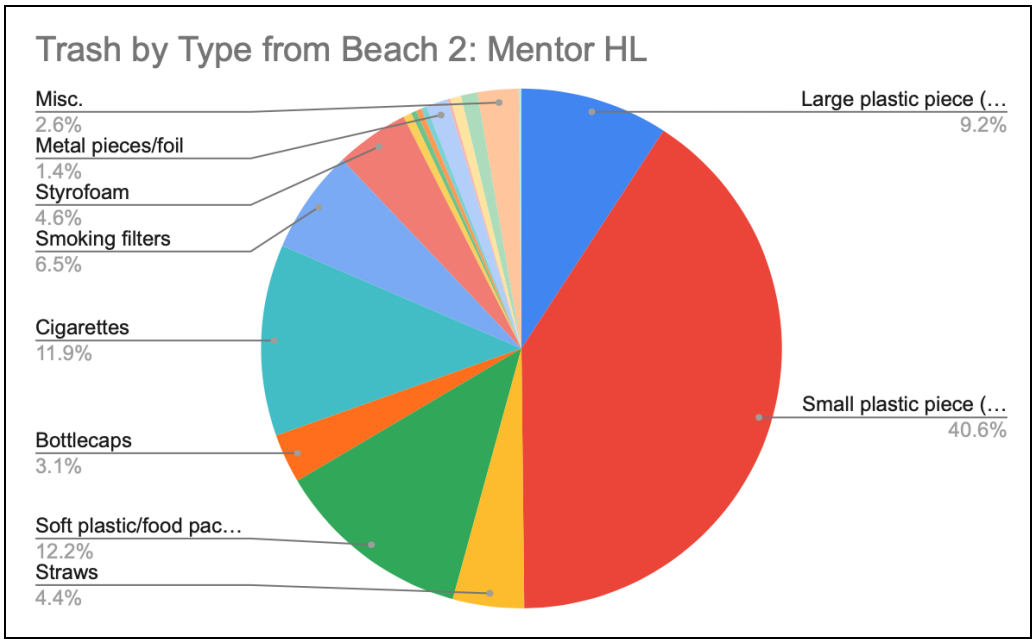


Figure 4

Beach 2 is located in a community which is made up of 94.2% white households and is 1% Black. The average home value in beach 2's surrounding community is $183,600. Beach 2 is the only beach that did not have accessible trash cans for visitors. Beach 2 is located in a community in which 82.9% of residents own a car and 91.1% of households have broadband internet access. Beach 2 is located in a community in which average household income is $73,208 and 4.8% of residents live below the poverty line. Beach 2 is located in a community in which 4.8% of residents do not have health insurance and 16% of residents rent their home (Table 1).

Beach 3 Results: Edgewater Beach

Sample 1 of beach 3 contained a total of 407 pieces of trash collected over a distance of .58 miles. Sample 2 of beach 3 contained a total of 171 pieces of trash collected over a distance of .3 miles. Sample 3 of beach 3 contained a total of 305 pieces of trash collected over a distance of .3 miles. Sample 1 of beach 3 was found to average 701 pieces of trash per one mile. Sample 2 of beach 3 was found to average 570 pieces of trash per one mile. Sample 3 of beach 3 was found to average 1016 pieces of trash per one mile. Beach 3 was found to average 762 pieces of trash per one mile across all three samples (Figure 6). The most commonly collected item from all three samples at beach 3 were small hard plastic pieces, with a cumulative total of 497

collected across three samples. 40 cigarette butts were collected in total across three samples from beach 3, with an average of 41.21 cigarettes per one mile (Figure 7). Beach 3 is located 0.7 miles away from NEORSD Westerly Wastewater Treatment Plant, though no previous literature is available about water quality at beach 3. It was observed that trash cans and recycling bins are placed frequently throughout the beach area at beach 3. It was observed that beach 3 had lifeguards on duty to monitor swimmers and enforce beach rules. The water quality flag observed on June 16, 2022 was red, indicating poor water quality and potentially ecologically unsafe conditions for swimming on the day beach 3 sample 1 was collected. The makeup of trash collected across all three samples is listed in Figure 5 below.

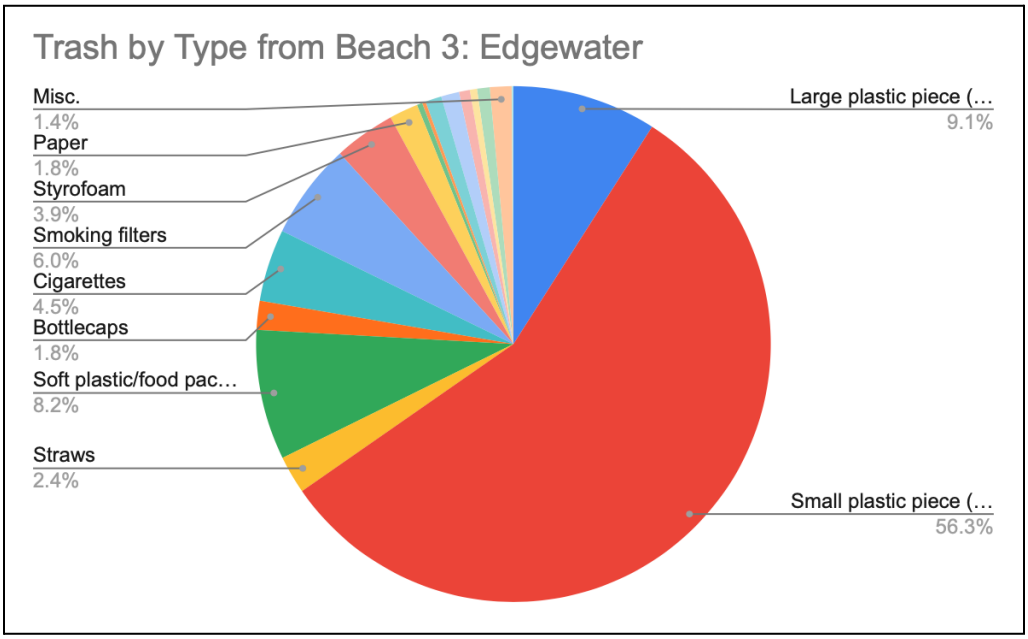


Figure 5

Beach 3 is located in a community which is made up of 39.7% white households and is 47.6% Black. The average home value in beach 3's surrounding community is $73,400. Beach 3 is located in a community in which 74.5% of residents own a car and 72.7% of households have broadband internet access. Beach 3 is located in a community in which average household income is $31,838 and 32% of residents live below the poverty line. Beach 3 is located in a community in which 8.4% of residents do not have health insurance and 58.1% of residents rent their home (Table 1).

## Discussion

The aim of this research is to identify potential environmental injustice along the Cleveland coastline, so the beach quality data collected was analyzed alongside socioeconomic data from each beach's surrounding community. Since race and class status are inextricably linked and shape environmental injustice in a collusive way (Heiman 1996; Mohai, et al., 2009), neither factor alone can determine a community's overall socioeconomic status in the context of this study. Because an intersectional approach is critical to environmental justice research (Montgomery et al., 2015), eleven factors were considered as potential indicators of socioeconomic status and work together to provide a holistic image of each coastline community. These factors are outlined by Kim, et al., (2019) and include: Black population, white population, average household income, rate of car ownership, percentage of renting residents, population per square mile, percentage of residents with broadband internet access, percentage of residents without health insurance, percentage of residents living below the federal poverty line, and average home value.

Beach 2 has the highest average home value and lowest number of people living below the poverty line, indicating a higher socioeconomic status than beach 1 and beach 3. Beach 2 has the highest white population and also has the lowest average trash collected per one mile. Because beach 2 is located in the community with the highest socioeconomic status and has the lowest average trash collected per one mile (See Figure 6), residents at beach 2 experience environmental privilege in relation to the other beaches examined.

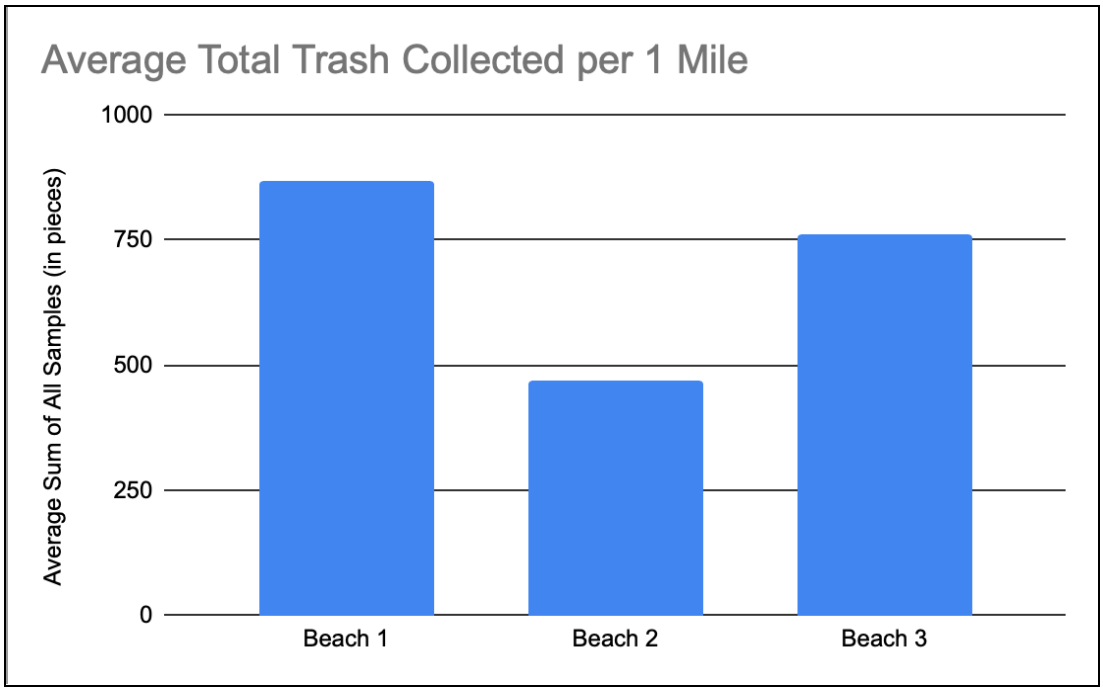


Figure 6

This finding is consistent with a similar environmental justice study done in Miami in 2015 which found that "beaches are more accessible to neighborhoods with a higher proportion of non-Hispanic Whites" (Montgomery et al., 2015). Unimpeded access to a high-quality beach is an environmental privilege explored in both studies along different coastlines, and Montgomery et al. (2015)'s findings mirror the environmental justice data produced by this research.

Small hard plastic pieces of trash were the most commonly collected item in every sample from every beach (Figure 3, Figure 4, Figure 5), which is consistent with data from volunteer cleanups across the Great Lakes that indicates over 80% of trash collected is plastic pollution (Driedger, et al., 2015). To determine the general water quality at each beach, proximity to waste/water treatment plants was contextualized by previous data on surface water pollution. Though beach 1 has the lowest recorded water quality and was previously found to have bacterial toxins present, it is the beach furthest from a waste/water treatment plant (1.2 miles). Because beach 1 and beach 3 are both located less than a mile away from their respective waste/water treatment plants, one would expect to find similarly degraded water quality. However, this data has not yet been gathered and beach 1 was the only location found to have a previously published water quality analysis available. The water quality flags observed during

the first sampling session at each beach indicate that beach 2 had the highest quality water and safest swimming conditions free from bacteria or dangerous pollutants on the sampling day only. Because beach 2 was found to have the lowest amount of trash, the green water quality flag observed on a single sampling day is consistent with the finding that beach 2 is the highest quality beach.

Beach 2 has the lowest average trash collected per one mile and is the only beach without accessible trash cans for visitors. Although this may seem like a contradictory trash management practice at beach 2, the Environmental Kuznets Curve states that environmental impact increases as wealth increases (to a certain level) and then begins to decrease as wealth continues to grow (Stern, 2017), which is reflected on a microeconomic level by increased access to sustainable practices such as reusable water bottles and cutlery. Residents of higher affluence in beach 2's surrounding community may be more likely to bring sustainable alternatives to items that are often left as litter, as well as more time and energy to allocate toward reducing one's environmental impact. The economic theory of the Environmental Kuznets Curve may explain why beach 2 has the highest socioeconomic status, lowest average trash collected per one mile, and is the only beach without accessible trash and recycling receptacles for visitors. Interestingly, beach 2 has the highest average number of cigarette butts collected per one mile (61.7) of the three beaches observed (Figure 7) and is located in the community with the highest socioeconomic status, which contradicts the data on common practices of tobacco advertising.

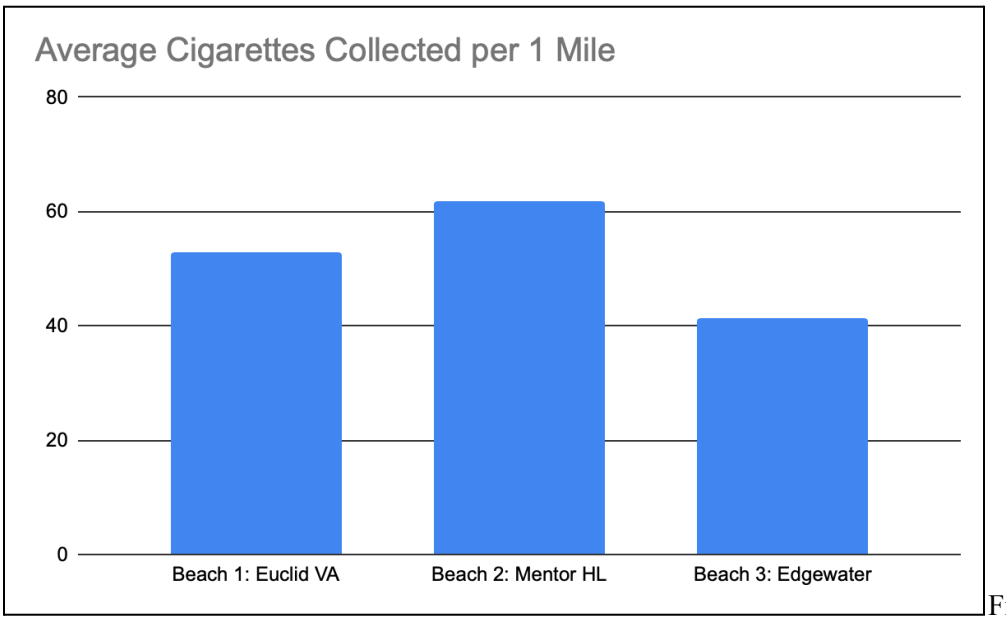


Figure 7

Although the highest average of cigarettes collected was collected at the beach with the highest socioeconomic status (beach 1), tobacco advertising is known to be higher in areas with higher BIPOC populations and communities with a lower socioeconomic status (Lee, at al., 2015; Truth Initiative, 2020).

**Conclusion**

Most prominent findings include that beach 1's surrounding community has the highest Black population and has the highest recorded average of trash collected per one mile. Notably, beach 2 was found to have the lowest average trash collected per one mile and is located in the community with the highest socioeconomic status. Beach 1 has the poorest recorded water quality (Lee, et al., 2012), indicating that both aquatic and terrestrial pollution impedes residents' ability to access high quality recreational outdoor space in Euclid, Ohio. Although beach 1 has the poorest recorded water quality, it must be noted that beach 2 and 3 do not have published water quality data available for analysis and therefore a comparison of water quality across Cleveland's public beaches cannot be performed. However, the water quality flags observed during the first sampling session at each beach indicate that beach 2 had the highest quality water and safest swimming conditions free from bacteria or dangerous pollutants. Because beach 2 was found to have the lowest amount of trash, the green water quality flag observed is consistent with the finding that beach 2 is the highest quality beach. The wealthiest community with the highest white population has the highest quality beach, which indicates residents at beach 1 hold environmental privilege through their access to unpolluted outdoor recreational spaces along the coastline.

Areas for further research related to this study include water quality testing at each beach in relation to environmental justice, as well as research on how each adjacent waste/water treatment plants impacts the recreational potential at each beach. Although the limits of this study extend only to terrestrial trash, a similar framework could be applied to performing continued water quality testing at each location to determine beach quality. Further questions raised in this study relate to effective environmental management and if, and to what extent, does the placement (or lack thereof) of trash cans at public beaches influence the amount of trash at each beach? The data collected in this study showed that the only beach (2/Mentor HL) without any trash cans for visitors also had the lowest average trash collected per one mile, which is a

seemingly contradictory finding. Further research is necessary to discover if visitors are more likely to dispose of their trash when more trash cans are available, or if the lack of trash cans encourages visitors to take their waste home with them instead. An investigation of the normative practices of visitors could be insightful into learning how effective environmental management methods apply to the field of psychology, and how trash can placement can be strategically placed in a way that minimizes beach pollution. Another intriguing question presented by this research is if increased tobacco advertising in low socioeconomic and BIPOC neighborhoods is responsible for a higher amount of cigarette pollution at public beaches. Interestingly, this study found that the beach with the highest socioeconomic status and highest white population (beach 2) also had the highest average amount of cigarette butts collected per one mile (at 61.7 cigarette butts per mile). Further research is needed to contextualize this study's findings on cigarette pollution and find a potential link between degraded beach quality and increased tobacco advertising.

Because there has been no previous quantitative assessment of environmental justice at Cleveland beaches, this study contributes to the identification of this problem. This research could be replicated to continue to clean up Cleveland's coastline, and even brought to city hall in hopes of creating more systemic change when it comes to beach quality. If expanded, this study would be essential to opening up dialogue about environmental justice within Cleveland's government and could even be used to create meaningful policy that addresses these inequities. Investigating and addressing environmental inequality through research and political action in this way would both empower residents and increase beach quality in low socioeconomic status and BIPOC neighborhoods. This study is significant because it would allow for Cleveland's public servants to make equitable budgeting decisions, optimize environmental management to reduce pollution, and create socially just policy decisions; all of which would be informed by environmental justice research. Furthermore, this study is replicable and has the potential to allow coastline residents to organize beach clean-up groups that both strengthen community ties and contribute to the advancement of environmental justice research in Cleveland.

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