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The University of Vermont

Thesis submitted in partial fulfillment of the requirements
for the University of Vermont Honors College
and Bachelor of Arts in Environmental Studies

The (In)Equity of Revitalization: A Mixed-Methods Analysis of Green Gentrification in Rust Belt Cities

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May 2023

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The (In)Equity of Revitalization: A Mixed-Methods Analysis of Green Gentrification in Rust Belt Cities

Abstract

In this research I explore the complex relationship between urban greening projects in revitalizing cities and gentrification trends. The research is focused on two mid-size post-industrial 'Rust-Belt' cities: Buffalo, New York and Cleveland, Ohio. Both of these cities were deeply divided by racist housing practices and disinvestments in their urban centers, along with significant economic and material decline in the late twentieth Century. Now, both cities are engaged in ongoing revitalization projects, or increased municipal attention toward capital reinvestment. *Urban greening* has become a major component of these efforts, with well-publicized benefits of trees and green space for residents, property values, and business growth. However, the expansion of green space may have negative — and inequitable — consequences for economically and racially marginalized communities by sparking rising rents, displacement, and the loss of Black and Latinx community ties. Though this project, I will attempt to understand the impact urban greening in Rust Belt cities has on neighborhoods, specifically regarding the phenomenon of *green gentrification*.

This research is based on a mixed-methods approach, starting with US Census data from two timespans (2000 to 2010, and 2010 to 2020) to identify census tracts in each city that are at greater risk for gentrification. I then used qualitative analysis to explore the urban greening processes occurring during each time frame in and near these neighborhoods. My aim is to discover narratives related to urban greening in each city that can help provide a deeper understanding of the social-spatial-racial interactions causing green gentrification.

Keywords: urban greening, environmental gentrification, revitalization, social justice, 'Rust Belt'

Chapter 1: Introduction

Given its many documented health and community benefits, the introduction of urban green space, or *urban greening*, represents just one dimension of the state-led 'revitalization' process occurring in Rust Belt cities. Here, the state (in the institutional sense of the word) has attempted to restore capital investment in the name of economic strength and desirable urban environments in these post-industrial cities, which for decades have dealt with long term disinvestment and economic decline (Bowen & Kinahan, 2014). Combined with suburbanization through 'white flight', these conditions have created deeply segregated cities, exemplified in my case study locations of Buffalo, New York and Cleveland, Ohio. Across both of these cities, majority Black and Latinx communities have suffered from continued disinvestment, creating worsened living conditions manifested in vacant properties, poor public infrastructure, inadequate green space, and other factors. As Buffalo and Cleveland turn their focus to capital reinvestment in their infrastructure and economies, these communities are being left behind and hurt even more as inequitable capital flows driving displacement compounds their suffering, putting the racial divide in these deeply segregated cities on full display. Even further exacerbating the inequities created by this divide is the documented link between racial segregation and gun violence attributed to increased poverty rates (Frederick, 2018). Both of these cities have recently been centers of discussion in a nationwide confrontation with the racism connected to these inequities, notably in instances of racially-motivated shootings — in Cleveland with the police killings of Tanisha Anderson (2014) and Tamir Rice (2014), and in Buffalo with the May 2022 mass-shooting in an East Side supermarket motivated by white supremacy.

Rust Belt cities are employing a range of strategies praised by academics and news sources alike to strengthen their long-suffering economies as jobs and investment returns to these urban centers, with environmental revitalization as a major piece of this. This will be the focus of my paper as I attempt to answer the question: is there evidence that environmental revitalization (and more broadly, capital reinvestment) is associated with gentrification in these cities? Informed by existing research and critical

social justice literature, I contend the importance of examining this question through an equity lens, drawing on social justice theories such as environmental racism to highlight the nuanced and varied effects environmental revitalization can have. Asserting a causal relationship between environmental revitalization and gentrification is not possible in this paper, but using these urban justice theories can help to create an informed assessment of potential links. The trajectories of revitalization I examine have been informed by the information gathered largely from local news, documents, and research sources, but unlike many of the news sources cited, I wish to make clear the nuance with which revitalization will be explored. Overall, the Rust Belt's trajectory of revitalization is not a clear story of decline versus rebirth, and the complications with revitalization have largely been lost in public discourse. With increased attention focused on jobs, luxury housing, and infrastructure projects in Buffalo and Cleveland have also come rising rent and eviction rates, both of which are putting intense economic pressure on historically lower socioeconomic households and neighborhoods. Here is where we see the inequity and displacement associated with gentrification beginning to occur, yet with all of the benefits of revitalization, where is the middle ground?

This paradoxical nature of revitalization — whether it is in the form of urban greening or other initiatives — posits that those communities most in need of reinvestment are the ones being hurt the most by it. In tracing a narrative of greening and its effects, the sources used in this paper are largely associated with their respective city — many of my sources include newspaper articles and planning reports — and it can be assumed their writers hold stake in boosting the city's narrative of "recovery". Thus my usage throughout this paper of the term 'revitalization' (used by many of these sources) is intended to be a nuanced one — although revitalization is usually seen with the connotation of good changes being made to a strengthening city, it simultaneously carries a potential for disruptive and destructive patterns of policies and investments that damage local communities when increases in costs of living follow. Also evidenced in both of my case studies, and in urban areas across the United States, is the concept of capital following capital, meaning reinvestment made to communities results in continued reinvestment, while

places deemed by governments or developers as too expensive to "rehabilitate" (Cooper-McCann, 2013) see continued inattention. Recognizing the often-negative effects it can have on longtime residents and communities experiencing this disinvestment, I will attempt to use the term revitalization only in cases where it is appropriate — either in reference to academic theory (e.g. "environmental revitalization") or when the usage makes sense given the context of the source material. Otherwise, in contexts where more nuance is required, I will instead use descriptors such as "increased municipal attention towards capital reinvestment."

Chapter 2: Reviewing the Literature

Conceptual Frameworks

In framing an increased focus on capital investment and profit as "urban revitalization," Rust Belt cities have played an important role in maintaining the existence of racial segregation and continued capital disinvestment in largely Black and Latinx communities. State and city institutions have taken advantage of this status quo, representing a strong example of racial capitalism — referring to the exploitation of race representing a fundamental element of the capitalist system (Robinson, 1983). My investigation into the unjust nature of capital reinvestment in the Rust Belt rests on this assumption, acknowledging the importance of racist policy and segregation to capitalism, while going further to examine explicitly the connection between racial capitalism and environmental racism. "Persistent inequality between white and nonwhite communities," as stated by Laura Pulido (p. 525; 2017), is the defining element of environmental racism, highlighting the ongoing disparities between white and nonwhite urban residents in the concentrations of environmental toxins, access to environmental amenities, and benefits felt from these amenities. Here too we see the state's involvement in perpetuating this inequality; Pulido argues that "the state is deeply invested in *not* solving the environmental racism gap because it would be too costly and disruptive to industry, the larger political system, and the state itself." (p. 529). Pulido's work on the unevenness of the Environmental Justice movement — arguing that the movement, though successful in many realms, has not adequately improved the lived-in environments of vulnerable communities — and the state's role in such inequalities will help to inform this paper. I will draw on these arguments from both Pulido (2017) and Robinson (1983) in critiquing the inequity of environmental revitalization — as well as revitalization as a whole — in the case study cities and how this has, in some instances, worsened the Rust Belt's inequities.

Urban Greening and Gentrification

Over the past few decades, "smart growth" of cities has become a primary focus of urban planners, prioritizing strategies such as mixed-use development, expansion of public transit, and "walkability"

initiatives which aim to “foster efficient development… in the process of creating more livable communities” (Scott, p. 15, 2007). The ‘greening’ of urban space to create accessible nature for urban residents has become an important part of each of these strategies. In this paper I refer to the process of either introducing new or remediating existing green space as *urban greening*[1], and the term *environmental revitalization* to refer to when the project is part of a larger city- or state-funded initiative. The growing focus on urban greening projects is backed largely by the number of benefits provided by increased access to green space. First, recent research has stressed the importance of natural green space for the physical and mental health improvements it can provide (Anguluri & Narayanan, 2017; Cole et al., 2019; Wolch et al., 2014). A higher prevalence of green space tends to encourage active lifestyles, and in mitigating noise and air pollution as well as removing dangerous heat islands, it can also help reduce associated disease risk in surrounding areas (Anguelovski et al., 2018). Second, green space can help to foster community by creating communal areas to recreate and gather (Connolly et al., 2013). Finally, simple exposure to green space for urban residents can improve mental health conditions (Triguero-Mas et al., 2015). In addition to health benefits, green space provides general improvements for cities such as income growth and more attractive neighborhoods, supporting both local quality of life and the economy (Anguelovski et al., 2018; Wolch et al., 2014).

Of course, these benefits have often resulted in rises in property values, and when combined with raised taxes, this can become a jeopardizing situation for longtime residents who may not be able to afford these shifting living environments. Generally, these ideas will inform my phrasing of gentrification, a process defined by the convergence of factors such as suburbanization, segregation worsened by racially targeted disinvestment, and the role of institutions and actors, such as governments, developers, landlords, and real estate agencies (Smith, 1996). As I will expand on, these factors occurring together in Rust Belt cities

[1] Rigolon et al., 2020 uses the phrase “greening and cleaning” to refer to the environmental remediation of vacant lots specifically — this provides another useful way of conceptualizing the strategy shown by cities with environmental revitalization in disinvested cities and communities.

have created prime locations for intense investment and profit opportunities, opening the door to resulting demographic change. Of course, reinvestment (and more specifically, environmental revitalization) creates varying effects over time, across different communities, and between separate instances of greening, which displays the difficulty of studying such a process.

While the introduction or remediation of urban green space has been identified by many researchers as a crucial health need for city residents who lack exposure to the natural environment, it is apparent that historically disadvantaged racial and class groups who have experienced longtime limited access to urban parks due to segregation and violence (or the *association* with violence, see Cole et al., 2019) are especially in need of such efforts. This has especially been true in Rust Belt cities where the historical practice of redlining — and its long-term legacies — has concentrated people of color and lower-income groups in poorer, less serviced areas of the city (Draus et al., 2020). These communities have consequently seen detrimental health effects connected not just to minimal green space access, but also to lower amounts of tree canopy cover: the intense urban heat increasing rates of cardiac arrest, asthma, and heatstroke represent a major example (Plumer & Popovich, 2020). Additionally, families living in poverty and communities of color routinely have had to travel farther to find suitable green space (Rigolon & Flohr, 2014). When they do have access to urban green space, these groups often do not experience equal health benefits, as the parks are routinely designed to serve the wants and needs of affluent residents — the same people who create the parks (Byrne et al., 2009; Cole et al., 2019; Rice et al., 2020). A history of bad experiences with inadequate and unjust placement of green space or tree canopy has created resistance to the top-down installment of green space in communities of color, notably evidenced in Detroit where residents have submitted “no-tree requests” due to uncertainty around assumed responsibilities and decision making (Carmichael & McDonough, 2019).

Numerous recent studies have explored a phenomenon called *green gentrification*, referring to patterns of dramatic rises in perceived (and actual) property values in places where urban greening has occurred,

indicating a change in tenancy due to gentrification trends (Anguelovski, 2016; Anguelovski et al., 2019; Maantay & Maroko, 2020; Rice et al., 2020). Simply put, when new or improved urban green space is introduced in a neighborhood with vulnerable populations, property values rise, and affluent (often white) homeowners move in, forcing out longtime (often Black or Latinx) residents as property taxes and rents rise precipitously. As explained by Rigolon and Collins (2022), the paradoxical issue of greening arises when vulnerable communities that stand to benefit the most from greening initiatives are the same populations being displaced in instances of green gentrification. While most studies of green gentrification have yielded this pattern of urban greening acting as a catalyst of gentrification, Rigolon and Collins also point to a few recent studies showing environmental revitalization projects have disproportionately occurred in vulnerable communities that are *already* beginning to show signs of gentrification, as opposed to low-income areas that are continuing to experience disinvestment in their communities (Ferenchak and Marshall, 2021; Reibel et al., 2021; Rigolon et al., 2020; Sharifi et al., 2021).

As I will explore later in this paper, this pattern is certainly the trend in Rust Belt cities such as Buffalo and Cleveland where ongoing racial residential segregation reinforces continuous disinvestment in disadvantaged neighborhoods, while capital investment in other neighborhoods only increases. Rigolon and Collins thus propose conceptualizing green gentrification as a *cycle* in which gentrification or urban greening can cause the other — or both processes can occur in tandem. I will address similar patterns occurring in Buffalo and Cleveland. In both cities, significant capital investment and municipal attention is being framed as initiatives meant to increase quality of life and provide important health, recreational, and environmental benefits, as well as spur capital investment in strengthening economies and developing urban cores. While some of these contributions are being realized, and in many cases welcomed, this focus on investment has also led to demographic shifts in nearby neighborhoods. My findings indicate somewhat different changes than the racial and economic shifts that are usually associated with

gentrification, which suggests that locally specific situations present important details that contextualize the broader trends. Examining a timeline of demographic change and investment in both cities also reveals the cyclical nature of urban greening and gentrification, as the two appear to be occurring in tandem in the studied neighborhoods.

Pulido's (2017) connection between environmental racism and racial capitalism in urban areas becomes clear when examining this cycle of green gentrification. Environmental racism explains the lack of improvements made to the most vulnerable communities, while green revitalization projects sponsored by funding from the state increasingly occur in areas poised for (or already experiencing) demographic change and capital reinvestment. Capital follows capital, meaning investments made to low-income neighborhoods will consequently spur future investments, thus eventually leading to displacement as property values, taxes, and costs of living rise. Using a critical social justice perspective is essential for examining the viability of greening to create healthier and more just cities in the Rust Belt region where disadvantaged communities stand to benefit greatly from green revitalization, yet justifying this need becomes difficult when examining the paradoxically uneven benefits and negative effects felt from these greening initiatives.

Possible Solutions

How can neighborhoods' environmental conditions be improved without sparking the displacement of existing residents? One approach to answering this is the *Just Green Enough* approach, which advocates for conducting urban greening in small pockets as a way to balance its beneficial effects for vulnerable communities without incurring the paradoxical costs towards these residents. Coined by Winifred Curran and Trina Hamilton (2012) and further popularized by Jennifer Wolch and colleagues (2014), the Just Green Enough (JGE) approach establishes a strategy to "reap the public health benefits of improved access to urban green space while avoiding the urban green space paradox" (Wolch et al., 2014). Curran identified the approach used by resident activists in Greenpoint, Brooklyn to achieve environmental

improvements without the associated real estate development and gentrification. Cleanup of the neighborhood would be 'just green enough' to "improve the health and quality of life of existing residents," but not so much to attract development that would drive out working-class families (Curran, 1028, 2012). Essentially, the approach of JGE seeks to implement plots of green space that are small and dispersed throughout an area so as not to attract the attention of real estate developers for increased housing prices. However, JGE has been criticized by some for being problematic, as its focus tends to be on greening for the sake of greening rather than for the benefits it provides to marginalized communities (Rigolon et al. 2019). An approach that actively minimizes green space introduction to prevent gentrification does not allow for poor and minoritized residents to see the same benefits of a green community, thus perpetuating health disparities between classes and ethnic and racial groups in urban settings. Numerous studies that have taken this lens in critiquing JGE have displayed factors more related to demographic shifts (indicating gentrification) than park size — case studies in Barcelona, New York City, and San Francisco showed that park location is a more determinant factor in spurring gentrification (Anguelovski et al., 2018; Rigolon & Németh, 2020), while others found park functionality to be the biggest predictor of demographic change (Artmann et al., 2019; Hansen & Pauleit, 2014).

Alessandro Rigolon's (2019) study presents a "more than just green enough" approach that employs four strategies for park agencies to create environmentally just cities that work against the common trend of gentrification: partnering with urban planners to ensure nearby affordable housing, building a park staff reflective of community identities, engaging a diverse group of community members in outreach activities, and welcoming longtime residents as much as new, wealthier ones (Rigolon et al., 2019). I support this same critical approach to JGE in this paper — although Buffalo and Cleveland have not seen JGE initiatives on a notable scale, I find it important to support the introduction of adequate green space to communities that need it, while also working to combat the associated cycle of urban greening and gentrification. In the next section, I provide an overview of my case study cities for historical and geographical context.

Setting

The Rust Belt region commonly refers to the United States megalopolis bordering the Great Lakes (Neumann, 2016). This designation, based on social and economic commonalities, usually ranges from St. Louis, MO and Milwaukee, WI in the west to Rochester, NY in the east. The Rust Belt's initial growth in the early and mid-twentieth century established it as an industrial manufacturing powerhouse on a global scale due to three main factors (Tighe & Ryberg-Webster, 2019; Bowen & Kinahan, 2014). First, the region's plentiful iron ore, lime, and coal provided a combination of natural resources that allowed cities to easily pursue steel-making industries. Second, early shipping access via the Great Lakes, St. Lawrence River, and Erie Canal, which would later be further improved through the spread of railroads, made for easy transportation of goods. Third, the region drew in impressive numbers of in-migrants looking for work — internationally from Eastern and Southern Europe, and domestically due to the rural-urban migration of whites and the Great Migration of Black Southerners starting around 1910. The diversity of incoming laborers resulted in both an expansion of who counted as 'white' and a hardening of the spatial containment of Black migrants (Shabazz, 2015), resulting in severe racial segregation in many industrial cities. This process would become central to the cities' post-industrial downfall as 'white flight' to the suburbs and the purposeful immobilization of Black residents led to further urban disinvestment and "organized abandonment" (Gilmore, p. 31, 2008, quoting Harvey, 1989, p. 303). By the middle of the twentieth century most of these cities began a period of decline, losing up to 60 percent of their population as manufacturing industries relocated away from strong unions and aging factories in favor of southern states and offshore locations (Hill, 2014; Bowen & Kinahan, 2014). The resulting economic and social effects were devasting for what became known as the Rust Belt region. Since their decline beginning in the 1950s, many of the post-industrial cities in the region have become defined by environmental degradation, poverty, crime, and property vacancies (Triguero-Mas & Kellogg, 2022). While many cities struggled economically to stay afloat for decades, a growing movement of revitalization approaches and government investment has spurred new capital attention for some cities. As these cities have attempted to revitalize in the past 25 years, projects involving urban greening have been

promoted as an important step to restoring social and economic prosperity, which I have found in both Buffalo and Cleveland.

The pattern of green revitalization has become especially prevalent in the Rust Belt region for several reasons. First, as explained above, natural green space is very important for the physical and mental health benefits it can provide to residents, particularly for underserved and disadvantaged communities that have largely made up Rust Belt cities' populations in recent decades. Second, former manufacturing cities provide an ideal environment for local urban greening given their particularly high numbers of vacant lots and abandoned industrial properties (Safransky, 2014). Third, studies point to a connection between urban greening and reduced crime, as well as increased potential customer spending, two benefits that are promoted to help boost the economies and social environments of Rust Belt cities specifically (Schilling & Logan, 2008).

Table 1 *Population change in selected cities*

	Population Peak	**2020 Population**	**Decrease (%)**
Buffalo	580,131 (1950)	278,349	-52%
Cleveland	914,808 (1950)	372,624	-59%

Source: U.S. Census (2020)

The examples of Buffalo and Cleveland were chosen as case studies because of their potential for representativeness to the broader Rust Belt region given their common histories of race and class segregation and central-city decline. Although Cleveland's population peak was notably higher than Buffalo's (see Table 1), both Lake Erie-situated cities have followed generally similar timelines of revitalization, with many of their initiatives that continue to shape their new forms beginning shortly after

2000 and continuing to increase through 2020[2]. Thus, a study of the two cities will provide a timely look into neighborhoods experiencing revitalization-related changes.

Green gentrification is a relatively novel issue being examined by urban researchers, despite the long history of its effect in urban areas.[3] To date, much of the existing academic literature on green gentrification has been focused on larger cities in the Global North including New York City (Checker, 2011; Gould & Lewis, 2017), Barcelona (Maantay et al., 2020), Philadelphia (Pearsall & Eller, 2020), and others (Rigolon & Nemeth, 2020). In an effort to understand green gentrification processes better, it is important for researchers to turn their focus to mid-size cities, as several have done (Draus et al., 2020; Rigolon et al., 2020; Safransky, 2014). Rust Belt cities such as Buffalo and Cleveland have had limited gentrification pressure of any kind on vulnerable neighborhoods until recently — revitalization has only begun to occur in the last 10-25 years. As a result of new investment becoming more prevalent and successful, pockets within these cities areas are now facing gentrification processes akin to those studied in larger cities. Buffalo and Cleveland have both incorporated urban greening into their twenty-first century revitalization efforts, namely through the lakefront redevelopment of previously industrial spaces and the creation of new park space supporting recreation and tourism. Much of this development has been encouraged and funded through state government initiatives such as the "Buffalo Billion" allocated in 2012 by New York State. This brings up the question of whether or not revitalization as a whole results in beneficial and just outcomes for the residents it impacts the most. While the revitalization seen by cities such as Buffalo and Cleveland has mostly been portrayed by the cities and local media sources as remedial work for local economies and infrastructures to prop up their growing aspirations, in many cases not only are more vulnerable residents not seeing its benefits equally, but the experiences of these already disadvantaged residents are becoming worse. As I will address in the analysis section of this thesis, in

[2] Other notable Rust Belt cities include Detroit, which lost 65% of its 1,849,568 population starting in 1950; and Pittsburgh, which lost 55% of its 676,806 population starting in the same year (US Census, 2020).
[3] The establishment of New York's Central Park in 1858 is a notable historical example of green gentrification in the United States (see Black & Richards, 2020).

both Buffalo and Cleveland the revitalization projects seem to have occurred alongside rising rents, high eviction rates, and gentrification occurring across the city. While I cannot assert this a causal relationship for certain, this pattern follows Pulido's (2017) positioning of the state within these urban inequities. In addition to environmental revitalization, the state's role in Rust Belt city-wide reinvestment has largely appeared to have been for the sake of growth for industries and profits, rather than for the protection or empowerment of vulnerable communities.

While urban greening as a tool of revitalization is usually seen as a positive for struggling cities due to the numerous health and social benefits it brings, a critical analysis that incorporates justice lenses such as environmental racism is essential to study the broader effects of improved green space. Though green gentrification has been studied in Cleveland (Triguero-Mass & Kellogg, 2022) and Detroit (Draus et al., 2020, Safransky, 2014), less attention has been given to the Rust Belt's problem of balancing revitalization with protecting its more vulnerable populations from displacement through a specifically social justice approach. As stated earlier, this study will draw on the work of Laura Pulido (2017) in particular, addressing the modern segregation and racial disparities present in each of the post-industrial case study cities.

Buffalo, New York

Buffalo, New York grew as a trading outpost through the eighteenth and nineteenth centuries on land traditionally belonging to the Seneca peoples, who were bought out of their land and displaced by the Holland Land Company in 1791 (Goldman, 1983). Situated at the mouth of the Erie Canal and bordering Lake Erie, Buffalo grew to be the 15th largest city by 1950, a rank attributed to its lucrative trade business and abundant manufacturing jobs in auto assembly, steel manufacturing, grain processing, and household goods industries (Goldman, 1983). Much like the rest of the Rust Belt region, what followed was a period of tremendous decline as northern cities began losing manufacturing jobs to the South (Bowen &

Kinahan, 2014). By 2010 Buffalo's population had decreased by more than half, and its median household income followed the same trend.

Today's Buffalo is a very different place from the mid-twentieth Century, both due to its manufacturing decline and its subsequent efforts at capital reinvestment and development. Healthcare and education services comprise two of its biggest industries, as well as tourism to the Buffalo-Niagara region (Duryea, 2015). Key to Buffalo's recent economic and population rebound has been the election of Mayor Byron Brown, whose office since 2005 has been a large proponent of urban revitalization, albeit mostly through capital-driven spectacle investments (Cope & Latcham, 2009). The growth of Buffalo's service sector helped it add over 25 thousand jobs between 2009 and 2017 (University at Buffalo Regional Institute, 2017), which also came with the addition of Tesla's Giga New York Plant in 2017 (McKinley, 2018). Bolstering this economic rebirth was New York State's $1 billion investment in Buffalo, announced by Governor Andrew Cuomo in 2012 and dubbed the "Buffalo Billion", which aimed to spur financial growth in Western New York by encouraging new investment, the creation of jobs, and the revitalization of Buffalo's urban core. In addition to the many strategies for economic growth, in particular the tourism sector, funding was also allocated towards housing investments through the Better Buffalo Fund.

Figure 1 *Race Distribution in Buffalo, 2020 (U.S. Census, 2020)*

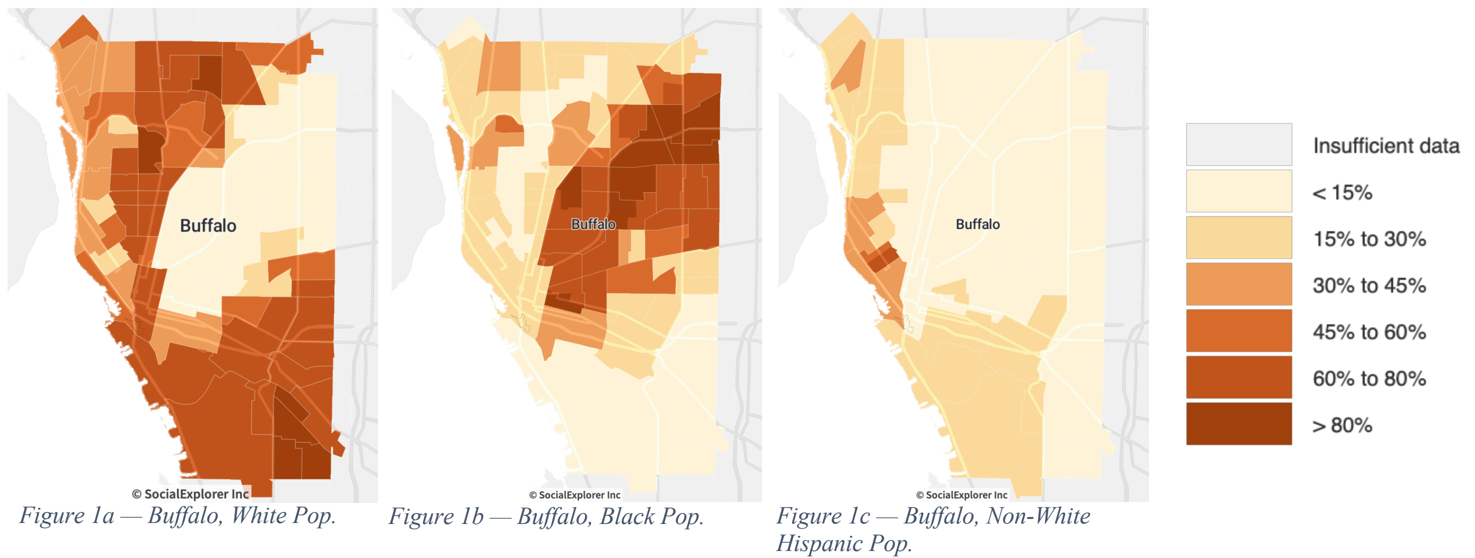


Figure 1a — Buffalo, White Pop. *Figure 1b — Buffalo, Black Pop.* *Figure 1c — Buffalo, Non-White Hispanic Pop.*

While the city was once largely made up of Irish, Italian, and Polish immigrants, many of whom were employed in factories, Buffalo's demographic shift throughout the twentieth Century resulted in a large increase in Black and Latinx populations in particular. Simultaneously, following demographic trends and the influence of racist housing policies, upwards of eighty thousand white ethnics departed the city for the suburbs and destinations farther away in the 1950s alone (Goldman, 1983). Today Buffalo can appropriately be split into two sections: east and west of Main Street, roughly (Figure 1). The East Side, once populated with Polish immigrants, has become concentrated with eighty-five percent of the city's Black residents. For decades these neighborhoods have been subjected to lower qualities of life than the whiter and wealthier sides of the city (Taylor et al., 2021). This includes a lack of green space — the city's Parks Master Plan, in partnership with the Trust for Public Land, has identified most of the East Side as priority neighborhoods for park improvements based on the social, health, and environmental benefits greening can offer (City of Buffalo, 2021). Buffalo's West Side, historically made up of neighborhoods for white immigrants, is commonly divided into the Elmwood and Waterfront communities. Like the separation seen in the East Side, Elmwood is mostly made up of white residents. Waterfront neighborhoods have become home to most of Buffalo's large refugee population (a result of

the city's preferred status for refugees given its affordability, among other things) and other ethnic groups, including the city's substantial Puerto Rican and Dominican communities (City of Buffalo, 2016). The West Side in particular has seen intense gentrification attributed to the work of developers and housing market speculators (Adelman et al., 2019), with one example being the development of the Canalside area, which was concluded to have a positive correlation with property values increases nearby (Setyowati, 2017). This environmental revitalization project and its effects will be studied more closely in my analysis section.

The intense distinction between the two sides of Buffalo has resulted in the city being named the sixth most segregated in the United States as of 2011, twenty years after being ranked the fourth most segregated (Robinson, 2021). The separation has been linked to inequalities related to education, housing, job opportunities, life expectancy, and more (Blatto, 2018). While Buffalo is ranked in the top forty cities for park space abundance and quality in the U.S. (City of Buffalo, 2021), the benefits are not seen equally in the East Side, where predominately Black neighborhoods have fifty-three percent less park space per person than their predominately white counterparts (City of Buffalo, 2021). And while environmentally related revitalization projects have been an important part of Buffalo's recent redevelopment, much of this has been more focused on park improvements than creation, further benefiting those with closer access to the Waterfront than those east of Main Street.

Cleveland, Ohio

Farther west on the shoreline of Lake Erie lies the city of Cleveland. Less is known about the original peoples of northern Ohio, other than that there appears to have been an exodus from the area in the mid-seventeenth Century (Redmond, 2019), and by the start of the nineteenth century the land was appropriated from other tribes by the federal government (Cuyahoga Valley, 2021). In the eighty years leading up to 1920, Cleveland, Ohio's population grew from just over six thousand to one of the top ten population centers in the United States with nearly 800 thousand people due to its booming oil and gas

production, as well as steel and auto industries, and fueled by rapid waves of immigration (Ryberg-Webster & Tighe, 2019). The city's position at the confluence of Lake Erie and the Cuyahoga River made it an ideal location to grow into a major manufacturing center like Buffalo did, and in following the same pattern, Cleveland's population of nearly one million in 1950 fell to 385 thousand by 2019 (U.S. Census).

Since the turn of the twenty-first century, Cleveland's investments in its housing sector and diversifying manufacturing industries, among other assets, have helped give hope for an economic resurgence (Bier & Post, 2014; Austrian, 2006; as cited in Ryberg-Webster & Tighe, 2019). Similarly to Buffalo, another large component of revitalization has been Cleveland's medical industry, marked by its nationally renowned Cleveland Clinic, as well as the University Hospitals of Cleveland and Rainbow Babies & Children's Hospital. These medical centers, along with Case Western Reserve University and nearly 30 other colleges and universities in the region, have brought job opportunities back to Cleveland in its twenty-first century "rebirth" (Duryea, 2015). Spurred by the growth attributed to these sectors, Cleveland has since focused investment attention toward much of its downtown core, as well as the once dangerously polluted lake and river waterfronts. The city has also improved its cultural and recreational assets downtown. In addition to the construction and recent expansion of the Rock and Roll Hall of Fame (Small, 2020), the Detroit Shoreway, a walkable neighborhood in Cleveland's West Side, has been home to the Gordon Square Arts District and neighbor to the Edgewater Park project (Triguero-Mas & Kellogg, 2022; Ryberg-Webster & Tighe, 2019), both of which are receiving continued reinvestment attention and will be the subjects of my later analysis.

As is also the case in Buffalo, Cleveland's long history of disinvestment and segregation continues, and is perpetuated to a perhaps greater severity by these revitalization efforts that prioritize capital investment benefitting private developers and industry. While officials in the 1970s — particularly the city's first Black mayor, Carl Stokes — provided strong leadership in addressing both racial and environmental challenges in Cleveland, the focus on these issues of equity and justice has largely fallen by the wayside

since, with the city as a whole prioritizing a regrowth of its economic competitiveness (Krumholz, 2019). Suburbanization and white flight (similar to Buffalo) during Cleveland's period of downturn resulted in a deeply segregated city split by the Cuyahoga River (Figure 2) — this has persisted strongly enough to rank the metro area as the fifth-worst segregated in the country in 2018 (Hannan, 2020). The majority of Black neighborhoods fall in Cleveland's East Side, which has predictably become a more strained living environment for its residents. Neighborhoods in the East Side get significantly hotter during the summer than in the West Side (attributed, as in Buffalo, to less green space and trees), and negative health effects have followed (Davey Resource Group, 2015). In 2015 the city passed the Cleveland Tree Plan to improve its tree canopy, which came with a list of neighborhoods in most need of attention (Davey Resource Group, 2015). However, downtown and a gentrified West Side neighborhood would receive one tree per square mile, while the East Side's Ward 5 received less than half that amount (Standifer, 2021).

Figure 2 *Race Distribution in Cleveland, 2020 (U.S. Census, 2020)*

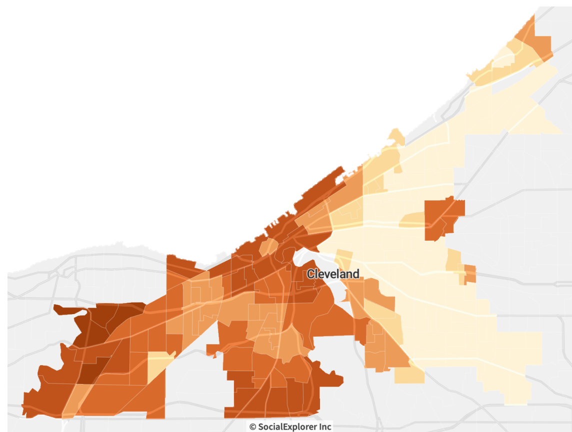


Figure 2a — Cleveland, White Pop.

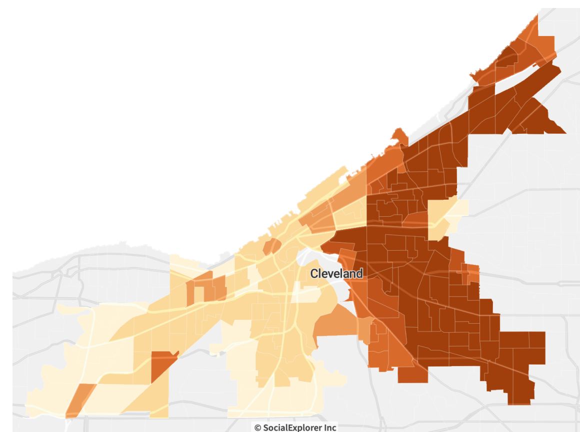


Figure 2b — Cleveland, Black Pop.

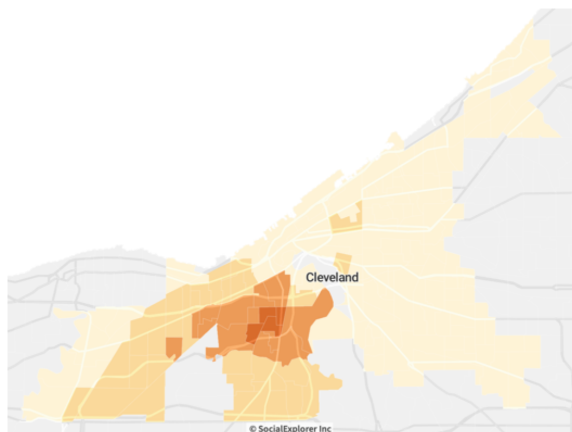
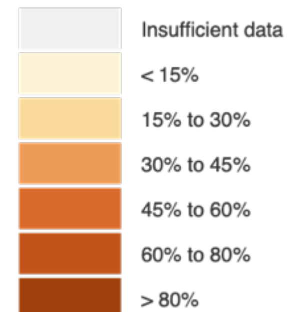


Figure 2c — Cleveland, Non-White Hispanic Pop.



Through this research project I am interested in assessing the prevalence of apparent gentrification patterns near selected environmental revitalization projects, and in doing so, I identify instances in which the cities of Buffalo and Cleveland have contributed to the status quo of racial capitalism in conjunction with targeted capital reinvestment (and continued disinvestment), specifically through the enablement of cyclic patterns of urban greening and gentrification. To answer the question of gentrification's prevalence, I need evidence that suggests examples of change or stagnation — recognizing that capital investment can cause varying outcomes over time, across distinct communities or individuals, and between separate greening projects. This exemplifies how difficult it is to frame environmental revitalization's equity, especially in the Rust Belt region, where intense disparities between communities

divided by race and class exacerbate these varied outcomes (while providing an informative study setting to examine such investments). In exploring the different manners in which capital investment's consequences can manifest, I looked specifically for tract-level demographic changes, the introduction or revitalization of green space, and signs of capital reinvestment, as will be seen in the following chapter.

Chapter 3: Data and Methodology

My vision for this research project took many forms over the past year before I came to this final methodology strategy. My initial approach to the research included studying Toledo, Ohio as a third city. While I do believe further research into smaller Rust Belt cities such as Toledo is important for understanding the local processes that lead to reinvestment and consequential gentrification, the lack of readily accessible news coverage in Toledo, along with challenges from redrawn Census tracts made the city difficult to include in the scope of this study. Additionally, in creating the idea for this project I had hoped to utilize ArcGIS as a mapping software. However, after struggling for several months to fine-tune sufficient maps in ArcGIS using my Census data, experimenting with Social Explorer proved to be a much more streamlined process. While ArcGIS provides a valuable service in creating visually complex maps or ones that depict more geographically precise places, I believe Social Explorer is a very useful option for research projects using relatively simple Census data such as this one.

My examination of environmental gentrification in the Rust Belt cities of Buffalo, NY and Cleveland, OH is based on a mixed-methods approach, combining the quantitative collection of census data with qualitative analysis of local news, planning documents, and previous academic research. I determined a mixed-methods analysis to be the most useful option for deciphering local urban change in these cities, especially given the limited scope of this project. This approach draws on the research criteria established in early studies of gentrification such as Hammel and Wyly (1996) and Wyly and Hammel (1998, 1999), and later reinforced by Barton (2016). These studies use a set of variables to examine when assessing gentrification, as well as supplemental field research to reinforce their multivariate analyses.

My first step was defining a research area in each of the two cities, so as to establish a more pinpointed study subject than the cities themselves. To study green gentrification, it was necessary to select a significant example of environmental revitalization in each city, which were readily available in Buffalo's Canalside project and Cleveland's Edgewater Park. As two of the largest environmental revitalization

projects in each city these were natural choices given the amount of information published about each, and I chose to select surrounding census tracts from which to gather relevant demographic data surrounding them — each tract encompasses a neighborhood that is adjacent to the Canalside in Buffalo or Edgewater Park in Cleveland. From this, I was able to research demographic changes occurring in the nearby neighborhoods that were most likely to have been impacted by the attention to nearby park space and the concurrent increases in capital investment reverberating outward. The study period was set at twenty years, with three timestamps ten years apart – 2000, 2010, and 2020 – in an effort to display change over time while recognizing the gradual nature of gentrification.

I chose three dimensions of data from the U.S. Census Bureau to serve as indicators for gentrification: household median income, white population as a share of the total population, and educational attainment for the population twenty-five years or over (measured by the percent of the population with at least a bachelor's degree). These indicators represent an abbreviated selection of those used in numerous quantitative census-based studies on gentrification; the scope of my study required lessening the number of variables. Hammel and Wyly (1996) and Wyly and Hammel (1999) introduced the usage of a number of other variables, such as professional status, poverty rate, average family income, and others, which were later cited in other studies (Bostic & Martin, 2003; Freeman, 2005; Heidkamp & Lucas, 2006; Barton, 2016; as cited in Anguelovski et al., 2016). In keeping my study limited to three indicators, my intent was to still utilize data that represented robust socioeconomic factors commonly linked to gentrification, with the goal of limiting the complexity of my research but not oversimplifying the process of gentrification as some scholars have warned against (Bostic & Martin, 2003; Hammel & Wyly, 1996; as cited in Anguelovski et al., 2016).

Table 2 *Gentrification Indicators in Buffalo, 2000*

Tract	Household Median Income	White Population Percentage	Percent of Pop w/ Bachelor's
71.02	$18,222	34.05	14.02
165	$66,863	44.47	8.22

Source: U.S. Census (2000), Social Explorer

The survey source of the collected data varies: the most accurate available data for household median income and bachelor's degree attainment for 2010 and 2020 is the American Community Survey (ACS) which provides data estimates over 5-year periods (in these cases 2006-10 and 2016-20, respectively). The 2020 white population percentage was also collected from the ACS. Although not ideal for making comparisons across time periods, the Census Bureau has stated that comparisons between decennial and ACS data are valid due to collection similarities and non-overlapping time ranges (Comparing ACS Data, n.d.). The collected data, which I used to make tables displaying demographic changes (see Table 2 as example), was also used to create simple maps through Social Explorer's online mapping software. The website allows users to select specific census tracts, among other census geography levels, to display data. It also gives users the ability to perform a variety of design actions such as labeling tracts, changing the basemap, and annotating the map by adding shapes or layers. I used these functions to create effective maps for the selected tracts in both Buffalo and Cleveland, which I saved and formatted for this project through the website's "export as image" function.

In the qualitative side of this study, local documents such as news stories, city and developer planning documents, and existing academic research served as the basis for the textual data collection, which forms the bulk of the following analysis section. To systematically assess local changes and events I used the search function of online local news sources to uncover as many relevant articles as possible, using keywords such as *gentrification*, *investment*, *revitalization*, and *development* alongside the names of researched neighborhoods and greening projects such as *Detroit Shoreway* or *Edgewater Park* in

Cleveland. I also took into account that newspapers were unlikely to use loaded words such as *gentrification*, so searches of terms such as *neighborhood change* were able to find articles that I may not have found otherwise. From the results of these searches I analyzed as many news stories as possible that featured these themes as their main subjects. For example, the article "Buffalo's summer concerts: Diversity, gentrification and the meaning of local" was included because of its relevance to changes in public perception of Canalside, but mentions of the same keywords with Canalside in coverage of other news items (e.g., the revitalization of Niagara Falls' Bridge District or Buffalo's mayoral race in 2017) were not prioritized. Strict enforcement of date ranges, though usually important in conducting a local news and document analysis, proved to not be as necessary for these searches. The majority of news coverage of the selected neighborhoods was within the past few years, given the timeframe at which these neighborhoods have received reinvestment, and for the ongoing shifts in capital investment and revitalization initiatives in both cities I chose to prioritize the most recent news coverage. *BuffaloNews* and *Cleveland.com* were two outlets used repeatedly, both of which provided insight into ongoing local changes in demographics, investment, and planning, as well as community perceptions of these shifts. Since these newspapers were not sufficiently accessible through the University of Vermont's library database, I chose to access articles through online monthly subscriptions to these two websites.

Thorough examinations of these and other relevant news sources also pointed my research towards more specific information, that, while still relevant to my study, I may not have otherwise found. For example, through reading a Cleveland.com article about MetroParks' growing influence in Cleveland's natural spaces (Litt, 2022), I learned about the organization's CHEERS program, leading me to their planning documents that provided added details about their plan to develop an additional 76 acres of waterfront property into renovated park space (City of Cleveland et al., 2021). This was also the case with examining locally-based academic studies, which were found both through similar keyword searches in digital research databases and through mentions in other studies or news articles — for example, I happened

upon Henry Louis Taylor's (2021) study of Buffalo's East Side through a local news article covering it (McNeil, 2021).

Together, all of the information I traced through relevant news articles and local scholarly research helped me construct a narrative of revitalization and demographic change in Cleveland and Buffalo that supported patterns shown in the collected demographic data. The following section will provide overviews of this narrative in each city, as well as highlight the relevant data points. In all, I gathered fifteen news related sources in Buffalo, four scholarly or academic sources, and eight planning or government related documents. My analysis of Cleveland consists of sixteen news, six academic, and four planning or government sources. Differences in the types of sources readily available created a disparity in the scope-level of each city — in Buffalo my analysis of reinvestment trends leans heavily towards the citywide patterns and effects, while in Cleveland my information is more reflective of neighborhood-level changes.

Chapter 4: Analysis

To reiterate, the following analysis of case studies Buffalo, New York and Cleveland, Ohio will serve to highlight the ongoing revitalization occurring in each Rust Belt city. My focus in this analysis was large-scale environmental revitalization projects specifically, which have been implemented by public (city, state, and sometimes federal) and private funding with the goal of encouraging a return of capital investment to longtime disinvested urban cores. Central to this examination is the critical perspective of Pulido (2017), who contends that the Environmental Justice movement has largely failed disadvantaged neighborhoods, in which city and state governments are complicit as primary investors of greening projects. Neighborhoods already experiencing growing reinvestment have — as found by Rigolon and Collins (2022) — been the primary benefactors of this revitalization, leaving behind communities that have experienced long-term disinvestment. For both case studies, Canalside in Buffalo and Edgewater Park in Cleveland, initial overviews of recent citywide municipal attention and reinvestment in urban economies and housing development will be followed by a closer examination of environmental revitalization projects, and finally a census tract-level analysis of nearby neighborhoods which have been especially affected by specific instances of greening and its cycle with gentrification. Given disparities in available information and news coverage, my analysis of Buffalo will have a larger focus on citywide reinvestments and less on local residents' reactions to ongoing changes. Cleveland will reflect the opposite information availability, as existing research and news coverage helped me to engage in a narrower examination of specific neighborhoods.

Buffalo, NY (Case Study 1)

Buffalo's City-Wide Attention to Reinvestment

The large-scale reinvestments[4] in (and attention given to) Buffalo's economy and infrastructure, which has included significant development in Buffalo's downtown area, has been largely spurred by significant

[4] As addressed in the analysis section, I will use the term *revitalization* as little as possible. The same revitalization processes that have introduced new capital investment to Buffalo and Cleveland have also perpetuated suffering and

public investment, starting with New York State's investment of $1 billion in Buffalo (Robinson, 2014). Local planners created the Buffalo Billion Investment Plan (2013) as a way to target investment towards building a robust economy, among other goals. This early public investment quickly stimulated private sector investment to begin flowing in from local banks and private developers, leading to more than $3 billion having been invested into Buffalo's downtown since 2013 (Hamlin & Lecy, 2017).

Among the recent downtown development projects is the renovations made to the Seneca One Tower, a former bank headquarters that has been transformed by the Douglas Development team since 2016; it now has an added 115 residential apartments along with various other businesses and amenities (Hughes, 2022). The tower, located downtown, has become a desirable place to live for many residents who have moved into its apartments from the Buffalo suburbs. Alongside large projects such as Seneca One several initiatives have been helping smaller property owners keep up with the improvements — as summarized by a *Buffalo News* article — by funding appearance upgrades to their building fronts, many of which have stood in Buffalo for decades (Epstein, 2023). Locally, landlords are able to apply for funding through the Buffalo Main Streets Initiative. Legacy Development has taken advantage of a similar statewide version of this plan, restoring the facades of several historic buildings, including Shea's Buffalo Theatre, to their original 1800s designs. The $10 million Storefront Revitalization Initiative throughout Erie County is set to begin soon, providing funding for small business owners wanting to improve their storefronts. The Buffalo Urban Development Corporation is aiming to revamp their own program to make it more effective, hoping to aid in developing what they have identified as "24 football fields of surface parking lots" in Buffalo's downtown sector that are "ripe for development" (Epstein, 2023). Buffalo's Urban Development Corporation has identified upwards of $7 billion invested in completed, in-progress, or planned development projects in the downtown area (Downtown Development Guide, 2016).

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violence occurring in vulnerable communities as a result of continued disinvestment, segregation, high eviction rates, and other factors. *Revitalization* throughout this chapter carries with it both the capital gains at the macro (city) level, as well as the suffering that has continued on a micro scale in select communities.

Meanwhile, as development projects have intensified, housing affordability for lower- and middle-class Buffalo residents has declined. Rent prices in the city are now at an all-time high (Dewey, 2023), and Erie County landlords are evicting their residents at higher rates than almost anywhere in the state (Harper, 2022). Through November, 2022 judges evicted over 3,700 Erie County residents in that year alone, more than Manhattan, Queens, or the Bronx which all have much larger populations (Ja'ciel, 2022). In Buffalo's East Side, Prof. Henry Louis Taylor of the University at Buffalo has studied the consistent "downward trajectory" the majority-Black area has faced in the intensely segregated city (Taylor et al., 2021). When interviewed about his paper, Taylor stated that "When we took a look at Black Buffalo 31 years ago, we felt the community was on a downward trend; we were increasingly locked in the economic basement," (Hill, 2021). While the East Side of Buffalo remains largely unchanged, Taylor also identified neighborhoods bordering downtown as significantly at risk of gentrification, as well as West Side neighborhoods that are a mix of upwardly mobile young White residents and lower-income Black and Latinx families (Taylor et al., 2021). As will be demonstrated below, the demographic change in both Buffalo's West Side and the downtown area (which will be the primary focus of this paper's tract-level analysis) is well-evidenced by U.S. Census Bureau data serving as gentrification indicators.

Reinvestment has been a city-wide process in Buffalo, with examples connected to both greening projects and more infrastructure and economic initiatives. Elmwood Village, the 5-Points Neighborhood, and the Fruit Belt are three areas that have seen significant infrastructure investment without directly related environmental improvements, yet they are experiencing significant demographic changes that have made local residents feel uneasy about the affordability of life in Buffalo (Dewey, 2019). As highlighted in local reporting, Elmwood and the 5-points Neighborhood have recently received strong boosts of local capital through an array of local businesses bringing everyday activity to storefront-populated streets (Dewey, 2019; Adelman, 2019). The Buffalo Niagara Medical Campus is another ongoing project north of the downtown area that is continuing to lead gentrification occurring in the Fruit Belt neighborhood just north of downtown, according to local researchers and observers (Watson, 2015). These factors are

worthy of attention even if they do not relate directly to environmental gentrification, since this general municipal attention to revitalization in the city of Buffalo gives context to the overall trajectory the city is operating in. It is also a limitation of my research, and perhaps studying gentrification in general, that it is very hard to separate out causes of neighborhood socioeconomic changes. Even outside of downtown Buffalo, concern has been voiced about gentrification caused by the downtown developments, which are of course connected with the waterfront progress.

Environmental Revitalization in Buffalo

The large-scale makeover of La Salle Park into Ralph C. Wilson Jr. Centennial Park has represented a major recent piece of green revitalization in Buffalo. In 2018 the Wilson Foundation, created in honor of the original owner of the Buffalo Bills, announced a $50 million gift to the ninety-acre waterfront park for a number of “once in a lifetime” improvements that aim to create a space that will “rank among the country's best parks and profoundly impact neighborhoods,” as the Wilson Foundation board president Keith Belanger stated (Sommer, 2022a). Designs for Centennial Park include additions of hills and valleys to a previously “flat lifeless landscape” (Nussbaumer, 2022), along with new cycling paths, five ball fields, and a dog park (Sommer, 2022b). To date, the foundation’s commitment has grown to $80 million, with other donors bringing the total funding for the park’s transformation to over $140 million (Sommer, 2022a).

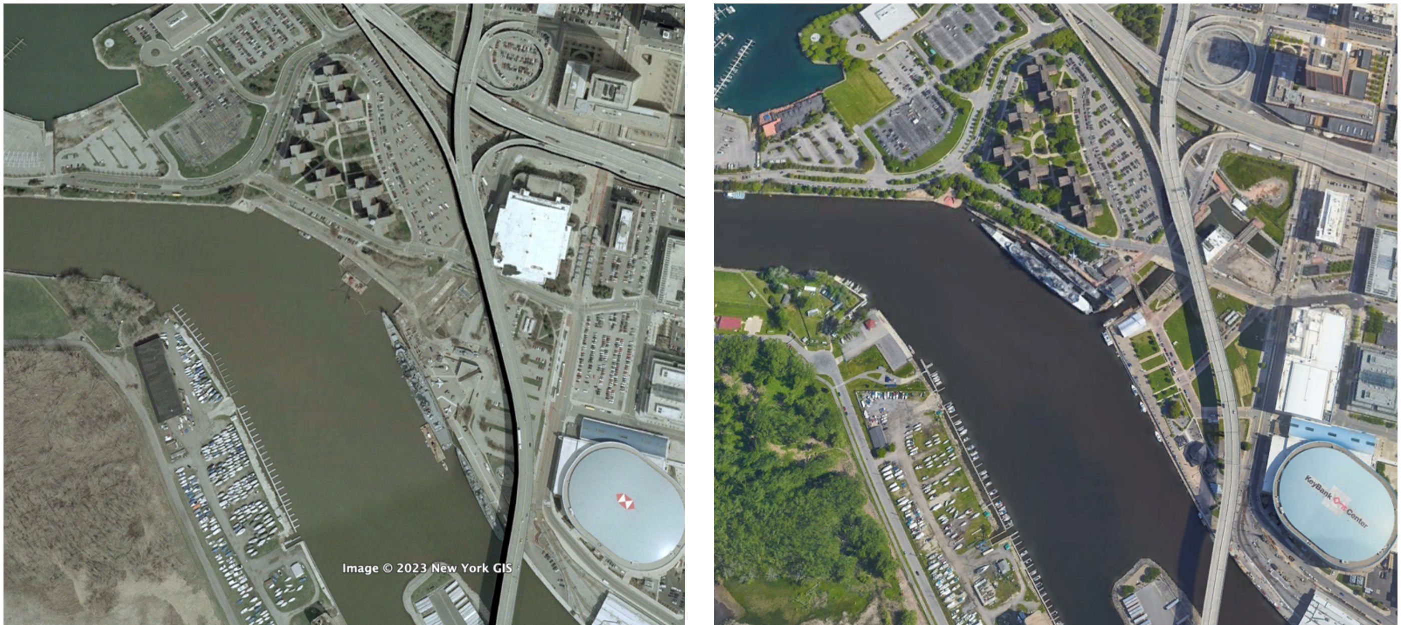
In a community centered approach, a process called “Imagine LaSalle” (2018) has taken input from focus groups and public meetings to give nearby Buffalo residents a role in the choices being made for the park. The project’s summary report notes the availability of the survey in seven different languages and the formation of a diverse focus group composed of community leaders from different backgrounds (Imagine LaSalle, 2018). It also references several times the diverse communities near the park, making special note that the surrounding neighborhoods are generally lower-income and home to many non-English speakers. In the report’s demographics section it appears that each of the nearby census tracts has a non-

white population of at least fifty-five percent, and in three of those tracts the number is more than sixty-five percent. However, the published survey results reflect fifty-seven percent of respondents as white, with sixteen percent Black and thirteen percent Hispanic, suggesting that although the city and planners of Centennial Park appear be taking input from all voices for the new park, perhaps this is not being achieved to the fullest extent.

Canalside Project

The other major environmental revitalization project in Buffalo has been the Canalside project, which has been considered a cornerstone of the city's recent trends of capital investment for good reason. An enormous reimagining of the former Erie Canal's western terminus in downtown Buffalo has transformed the city's Inner Harbor, which now features a new commercial strip, major arenas (KeyBank Center and LECOM Harborcenter), the Explore & More Children's Museum, and the Naval and Military Park. With these new facilities and recreation centers there has been a large urban greening project along the waterfront specifically, which was formerly made up by a parking lot and other pavement (Image 1). The area features year-round recreational and entertainment activities and events, and has largely been geared towards increasing the attractiveness and value of downtown as the city has focused its attention on reinvestment by "boosting tourism and attracting private investment," as former governor Andrew Cuomo said at Canalside's grand opening of 2015's summer season when the canal was officially filled in and made ready for public use (Gov. Cuomo, 2015).

Image 1 *Before and After Canalside Revitalization — April 2002 to May 2022*



Buffalo's Canalside area, shown 20 years apart. Visible is the green space introduction, especially along the waterfront (Buffalo's Navy Park).

Source: Google Earth Pro, Satellite View (Screen capture)

Tract Analysis

Looking broadly at the residential areas surrounding Buffalo's recent waterfront Canalside project, a significant, if varying, amount of demographic change is clearly present (Table 3, Appendix 1 and 2). In the twenty-year time span, two of the five analyzed tracts (71.02 and 70) saw a rise in household median income, while three (72.02, 165, 164) decreased; two tracts (165 and 164) increased in their share of white population, while three (71.02, 72.02, 70) had their white populations decrease; and all five tracts increased in the percent of the adult population with at least a bachelor's degree — three of those (71.02, 165, 164) by over 130 percent (Table 4). With respect to each of these three indicators, the two tracts (68 and 71.01) that had their boundaries geographically altered in 2020 still saw significant increases between 2000 and 2010. Evidencing the complexity of gentrification as a socioeconomic phenomenon, the patterns of increasing wealthy, educated, white residents is not consistent over the five tracts — change in each of

the three indicators varies differently across the analyzed tracts surrounding Buffalo's Canalside project. Notably, more significant change occurred in education levels than any other variable (Figure 3), suggesting that existing residents became more educated, or, perhaps residents with similar income and race makeup but more education moved in.

Table 3 *Gentrification Indicators — Buffalo, NY*

	Household Median Income			White Population Percentage			Percent of Pop w Bachelor's		
Tract	2000	2010	2020	2000	2010	2020	2000	2010	2020
68	32,174	39,564	-	62.86	75.65	-	36.69	49.91	-
71.01	17,156	18,766	-	32.34	37.37	-	7.18	10.17	-
71.02	18,222	14,863	24,000	34.05	39.65	30.33	14.02	25.46	32.41
72.02	43,335	41,529	35,846	89.11	61.93	54.73	34.38	38.64	39.12
165	66,863	20,280	65,250	44.47	55.62	60.24	8.22	16.42	48.73
164	43,965	16,435	38,170	44.84	40.69	46.53	3.98	7.62	10.78
70	26,214	25,262	32,583	52.47	47.44	36.28	14.76	19.71	18.81

Selected Buffalo Census Tracts, Demographic Data[5]

"Household Median Income" levels adjusted to 2020 USD

Table 4 *Percent Change of Gentrification Indicators — Buffalo, NY*

	Household Median Income, Percent Change			White Population Percentage Percent Change			Percent of Pop w Bachelor's Percent Change		
Tract	2000-10	2010-20	Total	2000-10	2010-20	Total	2000-10	2010-20	Total
68	46.3	-	-	20.3	-	-	36	-	-
71.01	30.1	-	-	15.6	-	-	41.6	-	-
71.02	-2.95	61.5	31.7	16.4	-23.5	-10.9	81.6	27.3	131.2
72.02	14	-13.7	-17.3	-30.5	-11.6	-38.6	12.4	1.24	13.8
165	-63.9	221.7	-2.4	25.1	8.3	35.5	99.8	196.8	492.8
164	-56.1	132.2	-13.2	-9.3	14.4	3.8	91.5	41.5	170.9
70	14.7	29.0	24.3	-9.6	-23.5	-30.9	33.5	-4.6	27.4

Selected Buffalo Tracts, Change in Demographic Data
"Med. Income 2010-2020" and "Total" adjusted to 2020 USD
"Med. Income 2000-10" adjusted to 2010 USD

[5] Noting the peculiar dips in Household Median Income for 2010, specifically in tracts 165 and 164. This deviation is significant enough that a Great Recession-related decrease alone seems unlikely, but it's unclear what else would have resulted in this. A similar anomaly appeared in Cleveland as well.

In trying to narrow my document analysis of Buffalo, I attempted to uncover more specific information about the changes occurring in the census tracts 71.02 and 165 (highlighted in Table 3). While unfortunately the availability of existing coverage on these tracts was somewhat limited, they are still worth examining given their position in Buffalo's reinvestment-rich downtown sector. About $200 million alone from Buffalo's Urban Development Corporation has been devoted to residential development in the 71.02 and 165 tract area since the early 2000s (Downtown Development Guide, 2016). With the magnitude of investment in Buffalo since 2013, it is hard to determine how much of this capital attention can be attributed to the effects of Canalside's development. However, the improvements made to Canalside were part of a vision for the city's future that began more than a decade before the Buffalo Billion investment, and it is easy to see how the improvements made on the waterfront made Buffalo's downtown development a more realistic possibility. These tracts — both of which are positioned alongside or within downtown and the Canalside area — have predictably seen demographic changes fairly consistent with expected gentrification patterns. Tract 165's education levels and white population numbers have increased significantly over the past two decades. Tract 71.02 saw similar but less intense change, particularly in median income levels and education levels, but with a decrease in white population. As investment has come into the waterfront and downtown areas of Buffalo, causing housing challenges for residents, local views on the area have predictably shifted. For Canalside in particular, there seems to be growing frustration with the way events held there are being managed. One article from *The Buffalo News* voiced disappointment that the summer 2020 concert series lineup consisted mostly of white men instead of a more accurate representation of the diverse identity and taste of Buffalo's waterfront and West Side area, representing a larger sense of unease about the investment not reflecting the population's "interests, passions, or concerns." (Miers, 2019).

Figure 3 *Buffalo, Educational Attainment for Population 25 Years and Over, Bachelor's Degree or More (2000, 2010, 2020)*

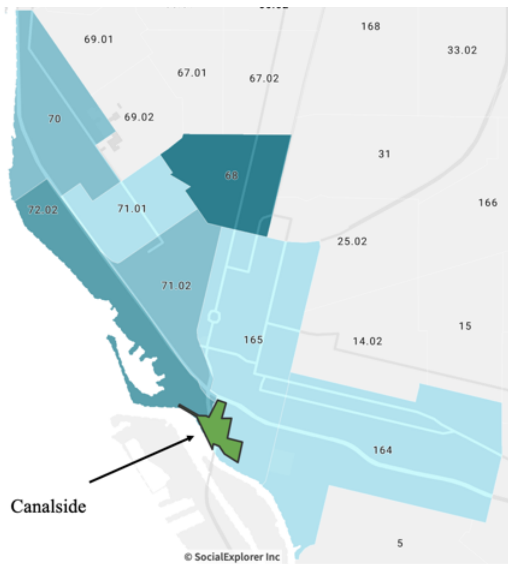


Figure 3a — 2000 (Census 2000 on 2010 Geographies)

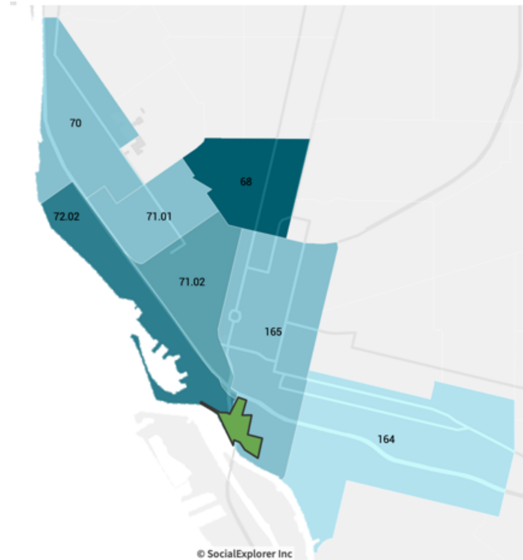


Figure 3b — 2010 (ACS 2010, 5-year Estimates)

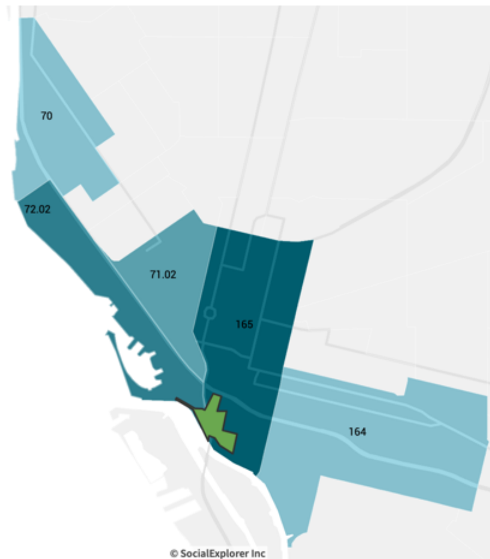
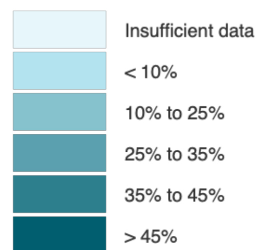


Figure 3c — 2020 (ACS 2020, 5-year Estimates)



While the existence of gentrification is difficult to assert based on changes in the demographic data shown here, using this change alongside the stated opinions of local residents and researchers helps to explain Buffalo as a city that is rapidly changing, both in terms of capital reinvestment towards green

revitalization projects and urban infrastructure, as well as the population makeup of residents near these changes. As has been studied in numerous other cases, the impressive implementation of major greening programs, such as Centennial Park and Buffalo's Canalside, seems to serve as a catalyst for demographic change long before other major investments in the downtown area. Here we see evidence of Pulido's assertion, that despite the success of the Environmental Justice movement in creating more green space for urban areas, those who stand to benefit the most are not able to afford to experience the benefits. Even in the East Side, where the city has identified priority investment areas for green space, the cited study from Taylor (2021) asserts that these neighborhoods have received few to no reinvestment initiatives in the last thirty years, and many residents still lack crucial access to adequate green space, among other important community assets. In Downtown and on the West Side where environmental revitalization projects have been focused, those most in need of expanded park access are falling victim to the state's strong hand in encouraging investment without installing protections for vulnerable residents. Eviction rates and rental prices are both rising, and, as suggested through gentrification indicators collected from the Census Bureau, existing residents may be being displaced by more educated and higher-paid ones.

Cleveland, OH (Case Study 2)

Cleveland's City-Wide Attention to Reinvestment

Perhaps due to the sheer number of development projects occurring in Cleveland, consolidating information into a comprehensive narrative in the city proved to be more difficult than in Buffalo. One major sector of investment has been housing — Cleveland's leaders have worked to develop the city's housing stock to reflect a diversity of housing needs among residents since the 1990s (Elrod, n.d.). Today that continues through the investment of private and public funding into development in the heart of Cleveland — Euclid Avenue, running east to west out of the downtown area, has been a central point of reinvestment. Near downtown, the Midtown area along Euclid Ave. has been home to the development of a $200-million bus transit line and a convention center complex totaling over $700-hundred million, both of which were funded by a county-wide sales tax (Krumholz, 2019). The Midtown Cleveland

organization, along with the Foundry Lofts, Signet Real Estate Group, and others have combined to spend billions of dollars on introducing a large amount of new housing to an area that has previously lacked residents (Chilcote, 2021; Souther, n.d.). A litany of news articles mention the renovations to or developments of homes and apartment complexes along Euclid Ave. in the general Midtown area (Tercek, 2023; Axelrod, 2023; Chilcote, 2021), and at least another $150 million being put towards other hotels and apartment buildings in the neighborhood (Current Projects, 2023). In addition to housing, downtown is seeing an influx of new or renovated office buildings from private developers — ten separate projects are listed on the Center for Cleveland's "Current Projects" page, among them the $600 million new Sherwin-Williams Headquarters that will house more than nine-thousand employees (Sims, 2022). Cleveland's downtown sector has been another hotspot for development. Cleveland's famous Rock and Roll Hall of Fame is also receiving private funding attention in the form of a new expansion that will cost trustees over $73 million (Small, 2020).

As expected when examining the nuanced effects of revitalization, Cleveland's recent city-wide reinvestments are also beginning to carry with them signs of gentrification and income inequality. Farther east on Euclid Ave. in the largely Black Fairfax and Hough neighborhoods are examples of health center expansion causing gentrification concerns, a pattern experienced across the city. Here residents are beginning to fear their properties are being purchased by the expanding main campus of the Cleveland Clinic (Elrod, n.d.). South of the Detroit Shoreway neighborhood in Cleveland's West Side is experiencing the same pattern (Elrod, n.d.). There Cleveland's MetroHealth campus, a growing source of jobs in the city, is continuing to expand, and beginning to trigger real estate activity in surrounding neighborhoods. Local news articles have covered the worry this is causing for the largely Hispanic neighborhood of Clark-Fulton, with one resident remarking that "You can already see gentrification, just by the prices" and criticizing local planners who are "not bringing the community in and talking to them and asking them what they want to be seeing" (Litt, 2020a). However, opinions in Clark-Fulton appear to be mixed: some local Hispanic business owners have seen increases in sales due to the neighborhood's

"new life," largely attributed to more upper-middle class residents moving into the area (Elrod, n.d.). Despite varying local opinions on the threat of gentrification, Cleveland's inequity challenges persist. Paired with the growing strain on Cleveland's housing market has been a hollowing of the middle class — today only a quarter of families in the city earn between 80 and 150 percent of the city's median income, compared to nearly fifty percent in 1960 (Krumholz, 2019). Further evidencing the ongoing challenges in Cleveland, the city was ranked as one of the top for 'most distressed communities,' using education rates, home vacancy rates, employment, and other factors in a national list authored by the Economic Innovation Group (Schwartz, 2016).

Environmental Revitalization in Cleveland

Perhaps even more so than in Buffalo, the city's capital commitments during Cleveland's period of reinvestment have strongly focused on environmental projects. Spearheaded by Mayor Jane Campbell (2002-06), the city's Waterfront District Plan priced at $1 billion has progressively worked at expanding pedestrian access to and the quality of Cleveland's entire waterfront, aiming as well to unify the entirety of the city's Lake Erie shoreline as a park system (Clark, 2021). This project has involved renovating pedestrian tunnels, converting the West Shoreway freeway into a reduced speed limit boulevard, and adding features such as the North Coast Harbor marina and Lakefront Nature Preserve. Significant, too, has been the increasing influence of MetroParks, an organization that manages 18 parks and reservations in the greater Cleveland area and is continuing to grow its influence. In addition to expanding walking and biking trails along the Cuyahoga River, MetroParks' latest project has been the Cleveland Harbor Eastern Embayment Resilience Study (CHEERS). The project has received around $4 million in federal, state, and city investments, and is tasked with creating a seventy-six acre park and beach area over the next decade and a half in Cleveland's East Side, which has historically lacked adequate lakefront access (Clark, 2021). As of yet, these projects have not carried with them any documented concerns of housing changes among city residents.

Detroit Shoreway and Edgewater Park

The improvements made in Cleveland's Edgewater Park have been a large point of progress for environmental revitalization in the city. In 2013, Cleveland MetroParks took control of the park and began to turn a space once characterized by high crime (Santus, 2013) and a lack of useful visitor and recreational amenities into one with new facilities such as a $4.3 million public beach house, an improved pier, and a children's play area (Petryszyn, 2017; Kiska, 2016). Apart from these large investments, Edgewater's revitalization has focused more on general cleanliness and improvements to existing infrastructure to create a more "visitor friendly" experience that is tangible for visitors, but perhaps less so in examining the park's appearance (Image 2).

Image 2 *Before and After Edgewater Park Revitalization — November 2011 to April 2023*

Cleveland's Edgewater Park, shown 20 years apart. Changes here are less visibly apparent, with more emphasis on "visitor friendly" improvements (see below).

Source: Google Earth Pro, Satellite View (Screen capture)

As highlighted in Triguero-Mas and Kellogg's account of the growing changes in Detroit Shoreway published in 2022, Edgewater Park's upgrades have come with significant development nearby. Situated south of Edgewater is Detroit Shoreway, a neighborhood undergoing dramatic change in the form of reinvestment, especially within the revamped Gordon Square Arts District that spans between census tracts 1031 and 1035 (Triguero-Mas & Kellogg, 2022). While development and improvements to Gordon Square have been decades in the making, the past two decades have featured intense investment in the area. Private real estate developers put up The Edison at Gordon Square, a 300-unit luxury apartment building bordering Edgewater Park on Detroit Shoreway's northern side (O'Brien, 2016). In the early 2000's around $30 million was raised by the Detroit Shoreway Community Development Organization (DSCDO), funded through a mix of organization and private donations after investors saw the long-term potential for municipal attention and reinvestment in the neighborhood (Ryberg-Webster & Ashley, 2018). This funding has since been put towards the restoration of the Capitol Theater, streetscape alterations, and other changes by the Detroit Shoreway Community Development Organization, helping to turn the neighborhood into a growing community for the arts, businesses, and homeowners (Ryberg-Webster & Ashley, 2018).

It is evident that many of the improvements being made in Detroit Shoreway have been in active progress since at least 2005, with the large $30 million investments made prior to Edgewater Park's revitalization efforts beginning in 2013. More explicitly than in Buffalo, this appears to evidence the concept of cyclic capital inflows between gentrification and urban greening referenced by Rigolon and Collins (2022). It appears that this cycle is also ongoing in Detroit Shoreway, where the green revitalization to Edgewater seems to be acting as a primary factor in creating much of the neighborhood's more recent change. Edgewater's upgrades beginning in 2013 have set the stage for more ongoing development in the form of The Edison apartment complex, for example (O'Brien, 2016). The changes in housing here have also had environmental revitalization at their core — real estate agents and developers in the area are using access and quality improvements to Edgewater Park as main selling points for developing new property and

attracting new residents who often have higher purchasing power and are looking for a dense neighborhood and a “sustainable lifestyle” (Triguero-Mas & Kellogg, 2022). More recently MetroParks has expanded its investments in the area, completing construction in 2021 on a 6-mile paved trail crossing neighborhoods in Cleveland’s West Side (Worrell, 2022). The new TIGER trail will pass through Detroit Shoreway in the form of the Red Line Greenway and the Whiskey Island Connector, both of which help connect Edgewater and Detroit Shoreway to more park space and natural areas in downtown Cleveland and along the Cuyahoga River (Litt, 2020b).

Before its recent comeback, Detroit Shoreway dealt with decades of deteriorated conditions following the hardships of Rust Belt economic decline (Ryberg-Webster & Ashley, 2018). Because of this, as Ryberg-Webster and Ashley’s account of changes in the neighborhood contends, many residents do not identify the risks associated with gentrification as significantly dangerous to their sense of economic security in the housing market given the many improvements they see investments are able to bring to a struggling community. Cleveland at large has not seen any major shifts in its housing market prices, and some locals perceive gentrification as a relatively good thing for its ability to decrease local inequalities (Triguero-Mas & Kellogg, 2022).

Although this goal of reinvesting in the community was on the mind of many of the organizers of Detroit Shoreway’s fundraising and improvements, there is still some discouragement among residents about the ongoing local changes. A podcast series released by Cleveland’s public media station in 2020 explored the perspectives of local residents on the ongoing changes in Detroit Shoreway, many of whom lamented tax hikes to pay for the renovations made to Edgewater, the increasing trend of house flipping in the Gordon Square area, and how all the recent changes have meant steep rent increases (Glanville, 2022). Coverage of a town forum at the end of the series featured some of these opinions. One resident from the nearby Ohio City neighborhood states that he has a “worry about keeping the rich texture of the neighborhood without losing the people that I know and love because they cannot afford the rising costs

of real estate taxes" (Checefsky, 2022). Another longtime resident had similar concerns: "I am surprised by what is happening with development. If my rent increases to market rate, which it might, I cannot afford to live here anymore." Interviewees in a 2022 paper from Margarita Triguero-Mas and Wendy Kellogg also expressed anxieties about the changing neighborhood. One resident, in discussing the housing market changes since Edgewater's development, said that "In the five years since my son bought his house [in Detroit Shoreway neighborhood], there's no house in this [Detroit Shoreway] neighborhood that they [my daughter and her partner] could afford. And they're not, they're not super low income…" (p. 79, 2022). All of these concerns appear to be well-founded. In addition to housing market prices finally beginning to increase, today eviction rates in Detroit Shoreway are among the highest in the city of Cleveland, paired with also having the most rapidly expanding real estate market (Checefsky, 2022).

Tract Analysis

In the twenty-year time span under consideration, half of the four analyzed tracts (1071.01 and 1035) saw a rise in household median income, with the other half (1011.02 and 1036.02) seeing a decrease; three of the tracts (1071.01, 1036.02, 1035) had their white population percentage increase, while only tract (1011.02) saw decreasing white population; and three tracts (1071.01, 1011.02, 1035) increased in the percent of adults with at least a bachelor's degree (Table 5). The demographic changes in these Cleveland tracts showed more consistency than in Buffalo — 1035 and 1071.01 saw increases in all three indicators, while 1011.02 and 1036.02 decreased in two metrics each. The Detroit Shoreway neighborhood has received significant local attention over the past two decades for its ongoing changes. Unfortunately the boundaries of the other tracts in the neighborhood were altered between 2010 and 2020, making comparable data hard to gather, but tract 1035, which encompasses the eastern edge of Detroit Shoreway overlapping into Ohio City, can provide a serviceable example. Tract 1031, included for its relevance despite its boundaries shifting in 2020, will also be important to look at as another tract that can summarize the changes taking place in Gordon Square and Detroit Shoreway as a whole.

Table 5 *Gentrification Indicators — Cleveland, OH*

Tract	Household Median Income			White Population Percentage			Percent of Pop w Bachelor's		
	2000	2010	2020	2000	2010	2020	2000	2010	2020
1011.02	52,155	54,746	48,854	84.11	75.15	75.18	43.17	39.04	51.18
1031	41,511	50,379	-	63.98	59.11	-	14.3	23.16	-
1036.02	105,637	31,400	56,705	64.29	60.51	78.07	24.38	39.09	53.97
1035	39,740	31,400	56,705	62.75	59.77	64.11	20.23	20.51	54.81

Selected Cleveland Census Tracts, Demographic Data
"Household Median Income" levels adjusted to 2020 USD

Table 6 *Percent Change of Gentrification Indicators — Cleveland, OH*

Tract	Household Median Income, Percent Change			White Population Percentage Percent Change			Percent of Pop w Bachelor's Percent Change		
	2000-10	2010-20	Total	2000-10	2010-20	Total	2000-10	2010-20	Total
1011.02	24.98	-10.8	-6.3	10.7	0.04	-10.6	-9.6	31.1	18.6
1031	44.4	-	-	-7.6	-	-	61.96	-	-
1036.02	-64.6	80.6	-46.3	-5.9	29	21.4	60.3	38.1	121.37
1035	-5.99	80.6	42.7	-4.7	7.3	2.2	1.4	167.2	170.9

Selected Cleveland Tracts, Change in Demographic Data
"Med. Income 2010-2020" and "Total" adjusted to 2020 USD
"Med. Income 2000-10" adjusted to 2010 USD

Again, in the Detroit Shoreway census tracts (1031 and 1035) the biggest change appeared in education levels (Figure 4), as was the case in the tracts surrounding Buffalo's Canalside project. The percent of residents in tract 1035 with a bachelor's degree increased by over one hundred and fifty percent between 2000 and 2020, with significant increases to median income levels and slight increases to white population percentage (Table 6, Appendix 3 and 4). While tract 1031's boundaries changed in 2020 (thus making data collection difficult) similar change is still visible between 2000 and 2010 when investment began growing in the area. Educational and household median income both increased significantly, with white population percentage actually decreasing slightly.

Figure 4 *Cleveland, Educational Attainment for Population 25 Years and Over, Bachelor's Degree or More (2000, 2010, 2020)*

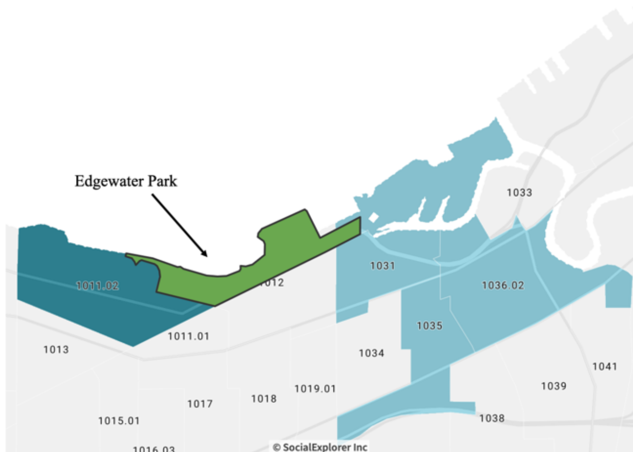


Figure 4a — 2000 (Census 2000 on 2010 Geographies)

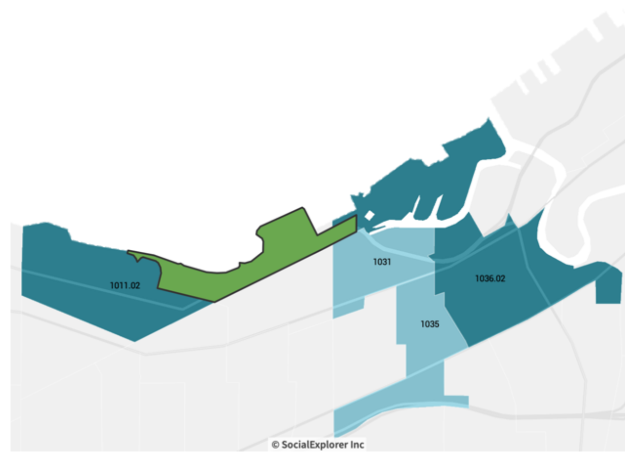


Figure 4b — 2010 (ACS 2010, 5-year Estimates)

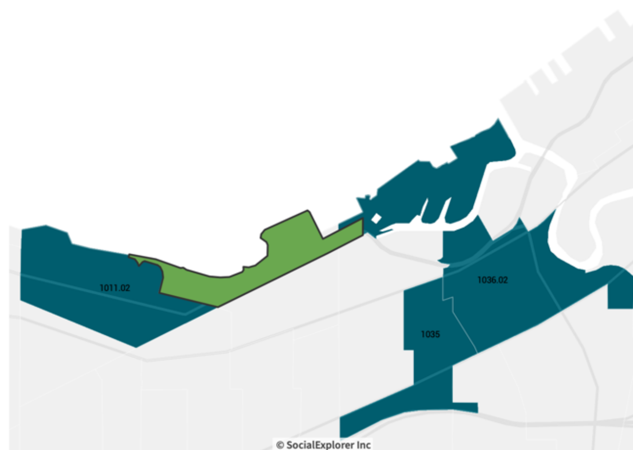
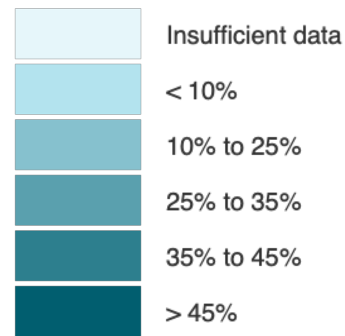


Figure 4c — 2020 (ACS 2020, 5-year Estimates)



As was predicted, capital reinvestment in Detroit Shoreway has come with significant demographic changes to the neighborhood. Compared to Buffalo, Cleveland's pattern of change is perhaps more similar to Rigolon and Collins' (2022) assertion of a cyclical relationship between urban greening and gentrification. The most recent wave of Detroit Shoreway's reinvestment began around 2005 and has since brought with it significant change. As has been shown in other studies, the investment that began to prime Detroit Shoreway and its Gordon Square Arts District likely made Edgewater's revitalization a more appealing greening project, which eventually led to an even greater increase in investment,

development, and consequential demographic shifts. As was also the case in Buffalo, Cleveland's intense development in recent years has already started to spur gentrification in pockets of the city as major reinvestment projects bring in new capital. While in other parts of the city this has largely been focused on housing and commercial investments, Detroit Shoreway's changes seem to be occurring on a less extreme scale, yet with similar outcomes. Acting in tandem, the remediation of Edgewater Park and new investments made to the Gordon Square Arts District have come with further inflows of capital, evidenced by the restorations of historical buildings seen as community assets, as well as the construction of new housing complexes and the influx of business infrastructure. Median income and educational attainment have led the way in demographic changes, representing a perhaps more upwardly mobile set of residents taking root in a neighborhood showing clear signs of gentrification. Cleveland appears to serve as another example of a city whose environmental revitalization focus — though ecologically important and most likely bringing with it similar beneficial effects to those studied in existing literature — is not being experienced equitably. The Detroit Shoreway that once experienced severe disinvestment has progressively received more private and public investment attention, and as residents become more fearful of the neighborhood's affordability, greening is used as a selling point for incoming buyers and renters.

Chapter 5: Conclusion

Laura Pulido called for future researchers to "develop a research agenda that recognizes the degree to which environmental racism is a function of racial capitalism, but one that is also linked to the needs of vulnerable communities." (p. 530, 2017). It was my intention to follow this prompt in the direction of this thesis. Decades of disinvestment in Buffalo and Cleveland left economically struggling communities of color, and, though greater attention towards capital gains in Rust Belt cities today are attempting to bring investment back into business sectors, these environmental initiatives have also come with demographic change and more exclusive housing markets. Buffalo and Cleveland's studied neighborhoods have both experienced significant demographic changes in the past twenty years. While racial population shifts did not necessarily reflect the severity or consistency usually associated with gentrification, changes in the makeup of these areas still appear to be occurring, especially when examining the consistent rises in education levels.

The qualitative findings drawn from this project support the argument that housing and demographic shifts in the pattern of gentrification often coincide with or follow the environmental revitalization projects. In both cases of Canalside and Edgewater Park, significant changes occurred in the fabric and makeup of surrounding census tracts — in Buffalo this was largely through home ownership, while in Cleveland the changes have so far mostly come through reinvestment in the arts and neighborhood amenities supporting wealthier, more educated residents. While the changes did not necessarily bring an influx of white residents as is often associated with gentrification, the growing investment and degree-holding residents still suggests gentrifying urban neighborhoods. This points to an interesting pattern that is distinct from the usual narratives of gentrification in larger cities — that it is a process driven by white residents causing displacement. Instead, the biggest change visible in the collected data was increases in education, suggesting either educated new residents of color moving in, or current people of color in the neighborhoods becoming more educated. This may call for further research into the types of local change

being seen in Rust Belt cities, where gentrification seems to be characterized by a multi-racial, middle-class expansion rather than merely white people moving to city centers.

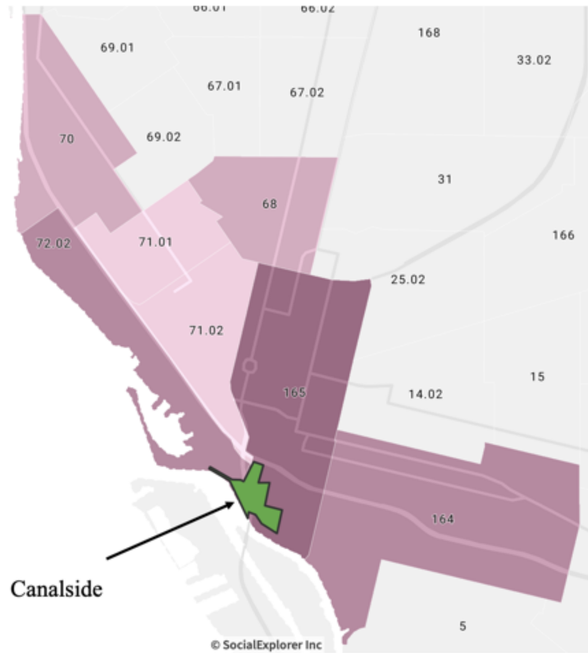
As this project suggests, defining causality between reinvestment, urban greening, and gentrification is difficult, and represents a limitation of my research. A more in-depth longitudinal examination of data or consultations with local residents would yield more telling narratives of the changes occurring in these neighborhoods. However, to the extent that this mixed-methods research has identified some link between ongoing demographic change in these select neighborhoods and significant reinvestment in environmental improvements and neighborhood infrastructure, Buffalo and Cleveland as case studies can be considered indicative of the capital reinvestment patterns occurring across the Rust Belt. The prevalence of environmental revitalization in Rust Belt cities will likely continue to bring with it reinvestment in communities and a shift in local economies, in many cases away from longtime residents. The phenomenon of gentrification is a complex issue that has no single cause or reason for occurring, but a recognition of the effects urban greening can have on the fabric of a neighborhood, along with whether and how its desirability and perceived value is increased, is important to understand if cities are to approach the issue of urban environmental injustice in an equitable fashion.

Acknowledgments

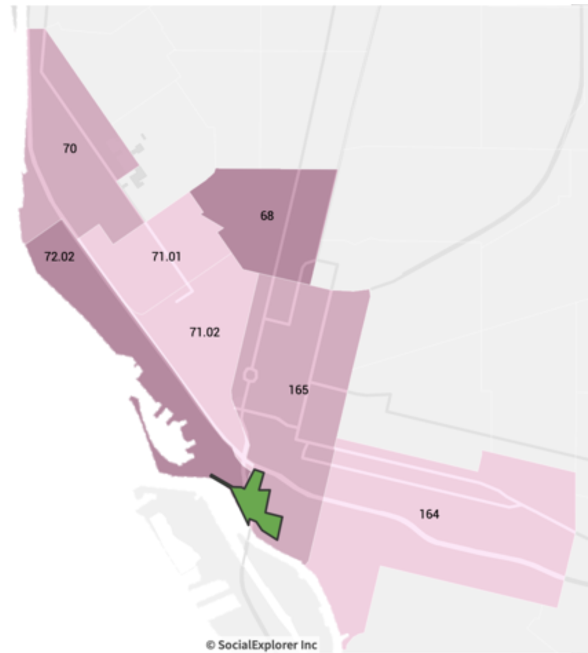
I would like to thank my thesis advisor, Dr. Meghan Cope, for all of her enthusiastic support and guidance throughout the last year, as well as Dr. Alec Ewald and Prof. Laurie Kutner for graciously agreeing to help serve on my defense committee. I would also like to thank my friend, Jasper, for his solidarity during the writing process, and finally my partner, Romaney, for her endless encouragement.

Appendix Figures & Tables

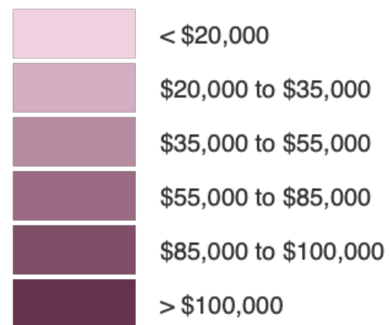
A1 — *Buffalo, Household Median Income (2000, 2010, 2020)*



Appendix 1a — 2000 (Census 2000 on 2010 Geographies)

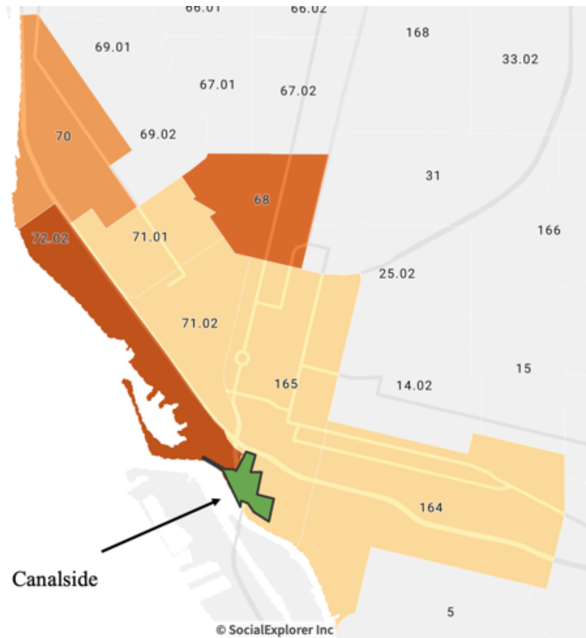


Appendix 1b— 2010 (ACS 2010, 5-year Estimates)

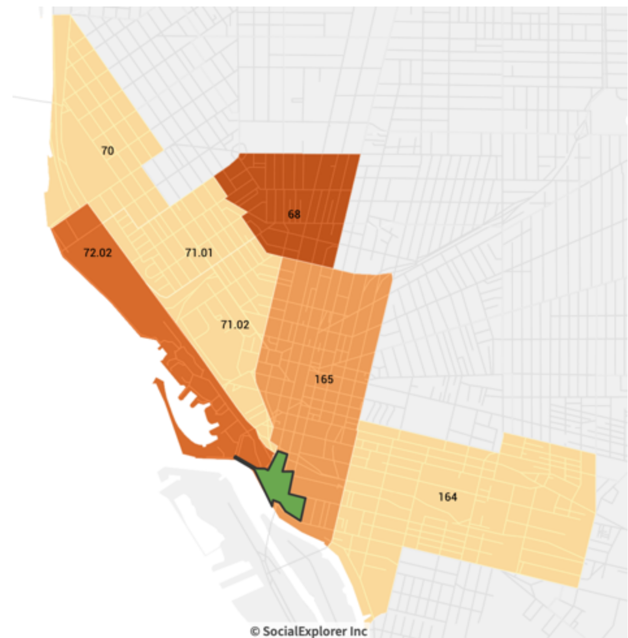


Appendix 1c — 2020 (ACS 2020, 5-year Estimates)

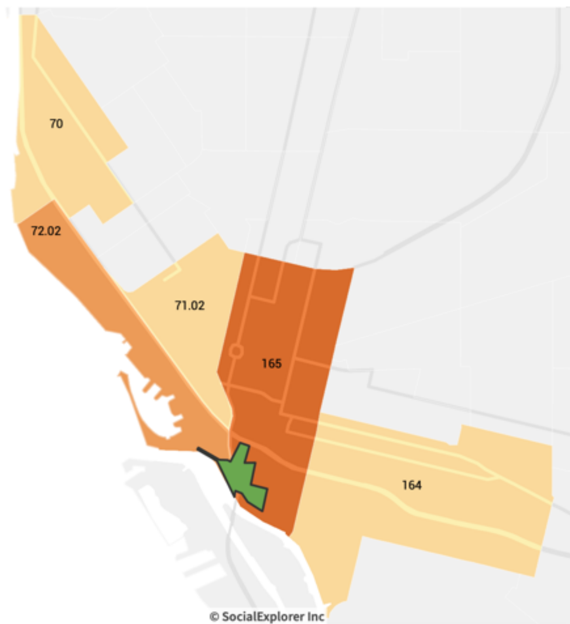
A2 — *Buffalo, White Population Percentage (2000, 2010, 2020)*



Appendix 2a — 2000 (Census 2000 on 2010 Geographies)



Appendix 2b — 2010 (Census 2010)



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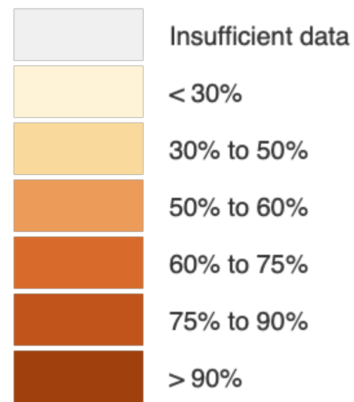
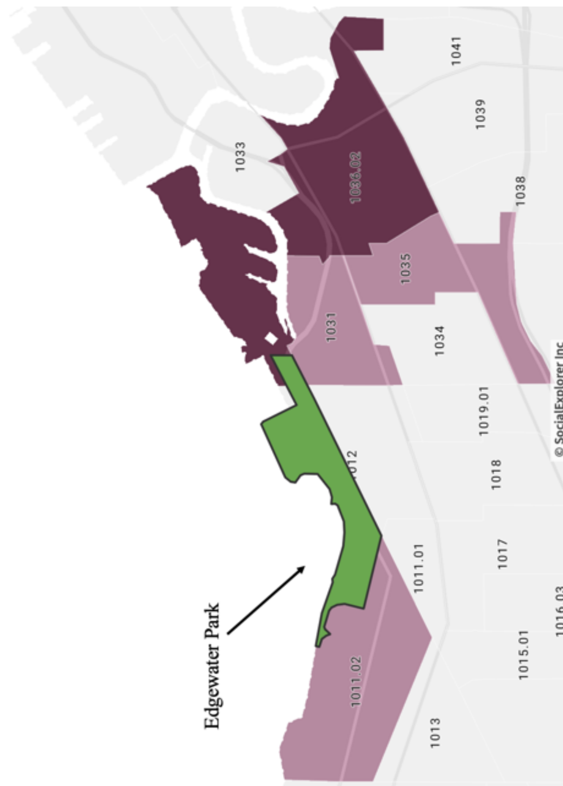
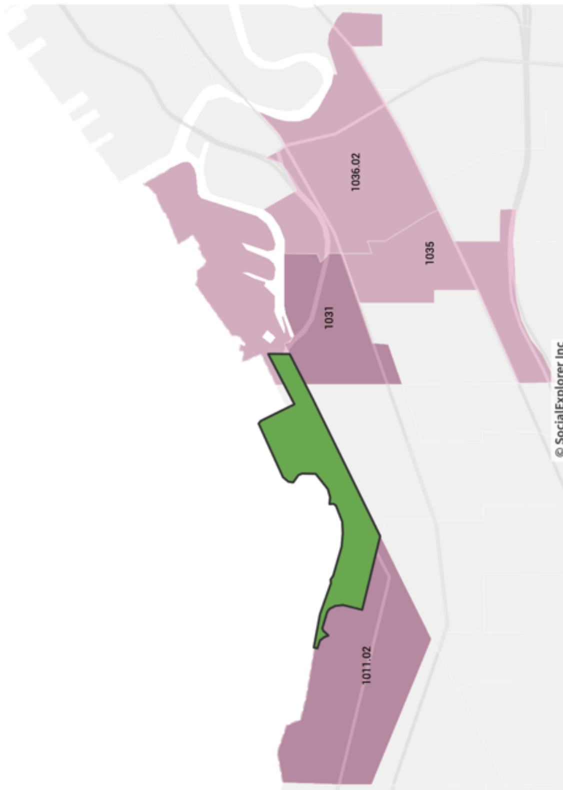


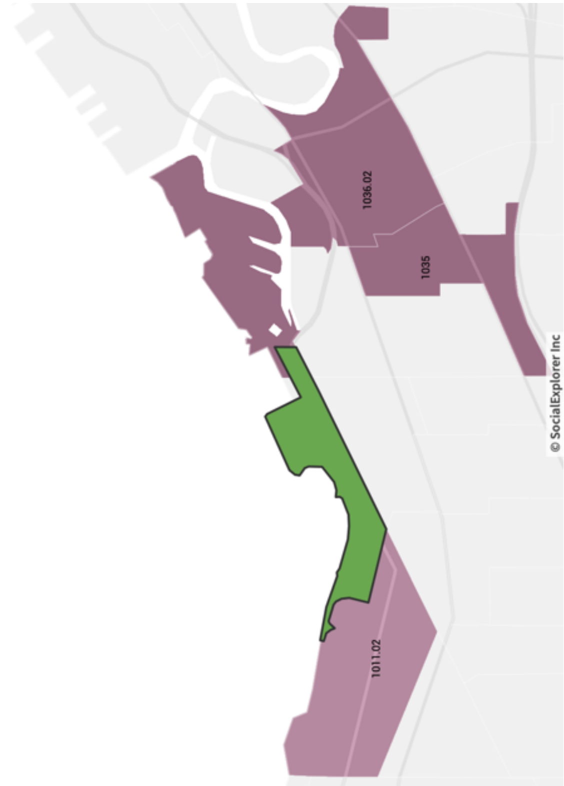
A3 — Cleveland, Household Median Income (2000, 2010, 2020)



Appendix 1a — 2000 (Census 2000 on 2010 Geographies)



Appendix 1b— 2010 (ACS 2010, 5-year Estimates)



Appendix 1c — 2020 (ACS 2020, 5-year Estimates)

< $20,000

$20,000 to $35,000

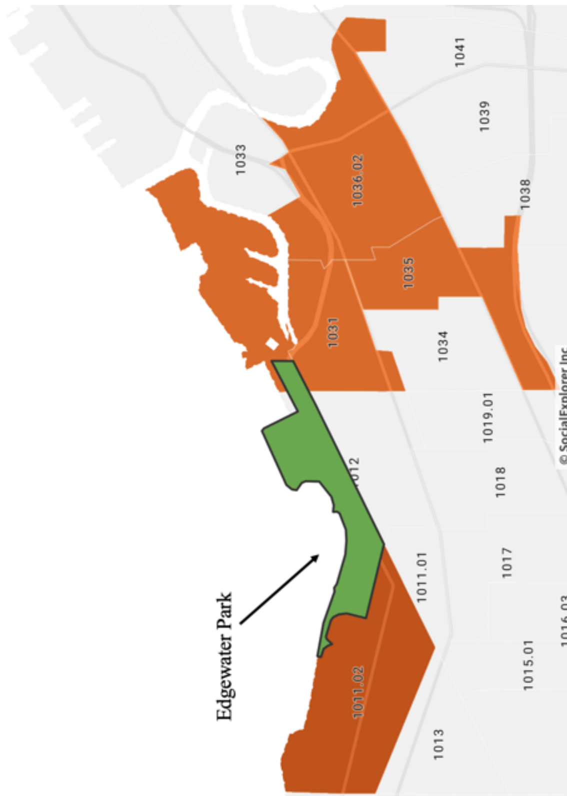
$35,000 to $55,000

$55,000 to $85,000

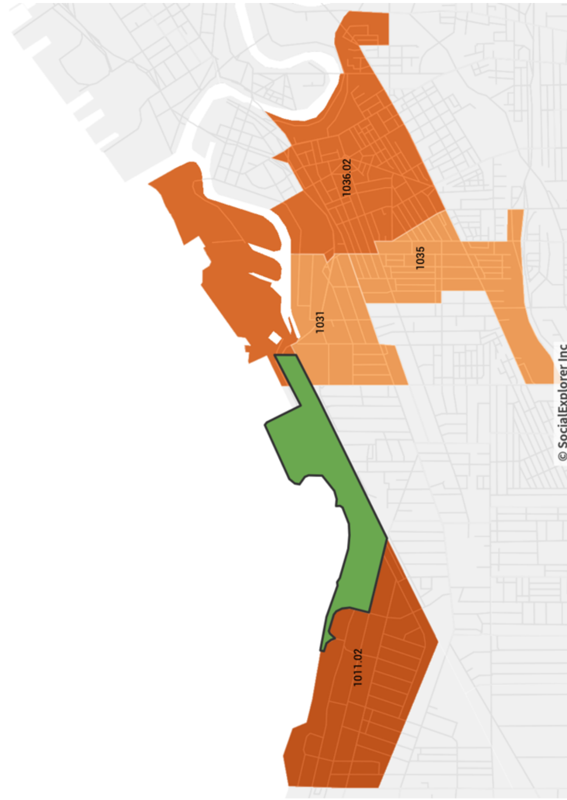
$85,000 to $100,000

> $100,000

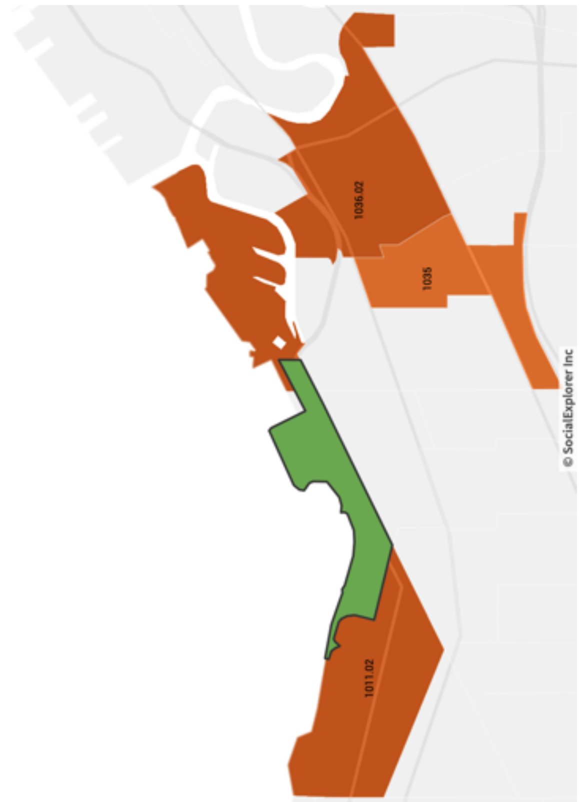
A4 — Cleveland, White Population Percentage (2000, 2010, 2020)



Appendix 4a — 2000 (Census 2000 on 2010 Geographies)



Appendix 4b — 2010 (Census 2010)



Appendix 2c — 2020 (ACS 2020, 5-year Estimates)

Insufficient data
< 30%
30% to 50%
50% to 60%
60% to 75%
75% to 90%
> 90%

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