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Environmental Outcomes of Municipal Incorporation: A Quantitative Analysis of Environmental Conditions in Incorporating Cities of Color and Majority White Municipalities

Russell M. Smith
Winston-Salem State University

Richard G. Moye, Jr.
Winston-Salem State University

Communities of color are disproportionately impacted by environmental justice issues and numerous scholars have highlighted the relationship between environmental racism and minority communities. However, little research has explored the relationship between the establishment of new majority-minority municipalities and issues of environmental inequality. Does a community of color's decision to incorporate lead to improved environmental conditions compared to recently incorporated majority white municipalities? This study explores the relationship between the incorporation of majority-minority communities and environmental conditions in new municipalities through a quantitative analysis, which includes the use of a bivariate independent T-test and multivariate regression modeling, comparing new Cities of Color and recently incorporated white municipalities. The study hypothesizes that Cities of Color will experience poorer environmental conditions compared to new majority white municipalities as a result of environmental racism, locally unwanted land uses and municipal underbounding, which have all been shown to be rationales for seeking incorporation by majority-minority communities. This study does not attempt to determine if these rationales were the reason for a community of color to seek incorporation. Rather, the research seeks to determine if environmental inequalities exist amongst new municipalities. As highlighted in previous studies, environmental indicators levels of hazards are higher in Cities of Color compared to majority white municipalities, but the differences were not statistically significant.

Introduction

The establishment of a new municipality is a complex and uneven process. Municipal incorporation is the establishment of a new local government entity from previously unincorporated territory. New cities have a multitude of implications for the region in which they are birthed, for existing municipalities and for the residents of the newly formed cities. Historically, new municipalities have been largely viewed as wealthy, white suburban enclaves on the fringes of major metropolitan cities that seek to exclude communities of color from their borders (Teaford 1979, Weiher 1991, Burns 1994, Musso 2001, Pulido 2006). However, recent research has dispelled this myth and highlighted the incorporation of Cities of Color (CoCs) (Hunter and Robinson 2018, Smith 2018, Smith and Waldner 2018, Smith et al. 2016). These CoCs can be found across the country and consist of majority Black, Hispanic, and Asian populations, but a majority of them are located in the Southeastern part of the United States and include Green Level, NC and Sedalia, NC. As Carter (2009) observes, "a large part of being raced is being placed" (p. 476).

Research on why new municipalities have been formed has historically centered on a limited number of rationales including defensive incorporations that seek to fend off the annexation advances of an

existing municipality, preserving community character, the provision of needed public services (e.g., water, sewer, parks, etc.) and fiscal concerns (i.e., taxes, grants, redistributive revenues) (Rigos and Spindler 1991, Smith and Debbage 2006, Rice, Waldner and Smith 2014). However, this research has tended to look at municipal incorporation as a monolith, in which all new municipalities are treated the same and has not considered the potential alternative rationales for incorporating that might be offered by communities of color. To this end, Smith and Waldner (2018) recently conducted a content analysis which examined the rationales for the incorporation of communities of color and determined that differences do exist between CoCs and majority white Newly Incorporated Municipalities (NIMs).

Specifically, Smith and Waldner (2018) determined that Cities of Color form as a result of several race/racism specific rationales including: environmental racism, unwanted land uses, lack of delivery of public services to the community, and municipal underbounding. Smith and Waldner (2018) state,

> "Race also indirectly drives the creation of majority-minority cities. When compared to all new cities, majority-minority cities are far more likely to form to combat environmental racism or other nuisances, such as an undesirable land use like a hog farm or hazardous waste plant" (161).

Many additional scholars have highlighted the relationship between the siting of noxious and hazardous land uses and minority communities (Pulido, Sidawi, and Voz, 1996, Sidawi, 1997, Boone and Modarres, 1999, Pulido, 2000, Boone, 2002, Bolin, Grineski, and Collins, 2005, Mennis and Jordan, 2005, Ueland and Warf, 2006, Buzzelli, 2007, Sicotte, 2008, Grinesk et al., 2010, Golub et al., 2013). These studies link race and poorer environmental conditions in numerous case studies across the United States. In the end, this literature clearly shows that communities of color are disproportionately impacted by environmental justice issues (Bullard and Johnson 2000, Taylor 2009).

This study seeks to determine if Cities of Color have poorer environmental conditions compared to new white municipalities. To explore this, the study quantitatively explores environmental conditions in new Cities of Color and recently incorporated white municipalities to determine if statistically significant differences between the two groups exist along a select group of environmental indicators. The study hypothesizes that Cities of Color will experience poorer environmental conditions compared to new majority white municipalities resulting from past environmental injustices. Environmental Protection Agency (EPA) Environmental Justice Indicators are utilized to compare environmental conditions in newly formed Cities of Color against new majority White municipalities.

Literature Review

At the center of this study are two seemingly unrelated geographic phenomena – municipal incorporation and environmental justice. The first provides a political mechanism by which unincorporated territory can be converted into a municipality, with a wide variety of legislative powers at its disposal. The second term centers on the discriminatory practice of disproportionately placing environmental ills in or near communities of color. Below is a brief examination of the scholarly literature on each topic. This literature review seeks to provide the reader with a fuller understanding of these concepts and their connection to this research.

Municipal Incorporation

Municipal incorporation is the legal process by which a previously unincorporated community seeks to be officially recognized by the state in which it is located as a local government unit (Smith 2018). The majority of states have similar standards for incorporating which include minimum population and density thresholds, minimum distance away from existing municipalities, minimum number of services offered and minimum tax rate (Smith 2018). However, it is important to note that the general requirements and minimums can differ quite dramatically by state.

Past research on the creation of new cities has focused on understanding the location and frequency

of incorporation activity (Hawley 1959, Stauber 1961, Schmandt 1965, Smith and Debbage 2011). Rigos and Spindler (1991) advanced the understanding of municipal incorporation by conducting a nationwide quantitative analysis on the factors that influence new city formation and determined that lax state regulations have a large influence on incorporation proceedings at the state level. Rigos and Spindler (1991) also coined the term "defensive incorporation" for municipalities that incorporate as a result of fear of an impending annexation by an existing municipality.

Over the last decade, the scholarship on municipal incorporation has continued to evolve. Studies that have explored the socio-economic differences between new municipalities and existing cities (Smith and Debbage 2011) and new majority white cities and CoCs (Smith et al. 2016) have been completed. Leon-Moreta (2015a, 2015b) focused on empirically studying the formation of new municipalities in the United States and determined that "income heterogeneity raises the probability of municipal incorporation" (Leon-Moreta 2015a, 3160). Leon-Moreta (2015b) also explored the influence of socio-economic factors on municipal incorporation and found that population growth, nonrestrictive land use regulations and municipal revenue also influenced municipal incorporation proceedings.

Originally identified by Hawley (1959) and Stauber (1961) more than half a century ago, new city clusters continue to be explored by scholars (Smith, 2008, Waldner, Rice and Smith 2013, Smith 2014, Waldner and Smith 2015, Smith 2018). This research has identified a herd mentality that leads to the incorporation of multiple NIMs in close geographic proximity. Waldner and Smith (2015) identified a "pioneer NIM" in the clusters they examined that paved the path to incorporation success for future NIMs. Additional research on new municipalities has sought to explore the relationship between municipal incorporation and other forms of local government boundary change including annexation, secession, and consolidations/mergers (Smith and Afonso 2016, Smith and Fennell 2012, Smith 2011).

Most recently scholars have identified the creation of majority minority NIMs and have begun the process of exploring these unique geographic phenomena (Smith 2018, Smith and Waldner 2017, Smith et al. 2016). These studies have highlighted the socio-economic differences between Cities of Color and majority white NIMs along several key variables including population size, household size, educational attainment and median value of homes (Smith et al. 2016). Other recent research on CoCs revealed that the genesis for why these communities incorporate has less to do with traditional incorporation triggers (i.e., annexation and community identity) and more to do with the role of direct and indirect racism in the form of municipal underbounding, siting of unwanted land uses and the need for public services (Smith and Waldner 2017).

Finally, according to a recent survey of these new majority-minority municipalities, the dire financial situations portrayed by many prior to incorporation have not come to fruition and almost 90% of CoCs reported budget surpluses or balanced budgets (Smith 2018). The research on CoCs is in its infancy and more scholarship examining these unique local government boundary change manifestations, like that included within this study, is warranted.

Environmental Justice

Environmental justice and the Environmental Justice Movement (EJM) seeks to remediate instances of environmental racism and is seen as an outgrowth of the Civil Rights Movement, in which communities of color began grassroots efforts to educate, remediate and prevent a myriad of harmful and discriminatory environmental practices against communities of color. Environmental racism is described as the "processes that resulted in minority and low-income communities facing disproportionate environmental harms" compared to other groups (Taylor 2014, 2) and was first utilized in the United Church of Christ Commission for Racial Justice report "Toxic Wastes and Race in the United States". Holifield (2001) offers a thorough review of these terms and an overview of recent empirical research related to environmental justice. Holifield's work highlights the wide geography that scholars have covered exploring issues of environmental justice and racism and provides a thoughtful discussion on the need for concrete definitions in the field of environmental justice.

Warren County, NC is often credited with being the birthplace of the US EJM due to a 1982 community protest against the dumping of contaminated soil in a minority community (Agyeman 2005). The results of the protests were a report generated by the General Accounting Office (GAO) of the US Government on the location of four hazardous waste landfills in the Southeast US. The study determined enough evidence of environmental racism existed for there to be concerns about inequalities in the siting of these facilities (GAO 1983).

Following this watershed moment in the fall of 1982, a multitude of scholars have explored issues of environmental justice and their impact on communities of color (Bullard 1990, Bullard et al. 2008, Taylor 2014). These studies have sought to draw qualitative and quantitative connections between environmental justice issues and communities of color. Beginning with Bullard's (1983) examination into the siting of waste dumps in Houston and continuing through today, scholars and activists have made the connection between race/ethnicity and place. Pulido, Sidawi and Voz (1996) provide an analysis of the evolution of polluting practices against communities of color in the Los Angeles region.

Meanwhile, other scholars have tackled similar issues related to the siting of locally unwanted land uses, pollution and transportation in a variety of geographies stretching across the United States (Boone and Modarres 1990, Bowen et al. 1995, Boone 2002, Bolin, Grineski, and Collins, 2005, Mennis and Jordan, 2005, Ueland and Warf, 2006, Buzzelli, 2007, Sicotte, 2008, Grineski, Staniswalis, and Peng, 2010). In sum, these studies have sought to establish a relationship between the spatial arrangement of environmental ills and minority communities. However, it should be noted that Bowen's (2002) review of more than 40 empirical environmental justice related studies determined that "little can be said with scientific authority regarding the existence of geographical patterns of disproportionate distributions and their health effects on minority, low-income and other disadvantaged communities" (3). Even if the health impacts are not scientifically indisputable – the siting and fear of these facilities are real.

In the end, the literature on environmental racism and environmental justice is clear -- these issues are issues of race, ethnicity and poverty. Bullard and Johnson (2000) state, "Environmental protection is a right, not a privilege reserved for a few who can 'vote with their feet' and escape or fend off environmental stressors" (558). Since these affected and inflicted upon communities can not follow Tiebout's (1956) hypothesis and "vote with their feet" to find a more desirable location, that meets their needs, in which to reside – could it be possible that these communities are turning to municipal incorporation as a mechanism by which to achieve spatial justice and combat environmental injustice?

Goel et al. (1988) assert that very idea in an examination of two black majority communities. Municipal "incorporation represents an opportunity for black communities to exercise an amount of self-determination" (477) and that "the strategy seeks to undertake the unfinished business of the civil rights movement" (479). Goel et al. (1988) viewed municipal incorporation as "the only vehicle left open for a segregated and powerless black community to use to empower itself" (423). However, municipal incorporation does not always generate the desired results. DeHoog, Lowery and Lyons (1991) found the incorporation of a majority black community in Kentucky resulted in poorer services and a fewer number of services for the new community largely as a result of substantial economic and racial segregation which placed additional burdens on the new city. However, this paper seeks to build upon the notion that municipal incorporation can be utilized by communities of color in an attempt to improve their communities and specifically the environmental conditions found within their borders

Research Methods

Do Cities of Color have poorer environmental conditions compared to new white municipalities? To answer this question, an analysis of majority-minority cities established in the United States between January 1, 1990 and December 31, 2009 was conducted to explore differences in environmental outcomes. The null hypothesis holds that no statistically significant difference would exist between majority-minority cities and majority white

NIMsamong a select group of environmental justice indicators. In contrast, our hypothesis is that majority-minority cities are more likely to have elevated levels of many different environmental pollutants than majority white NIMs based on the recent content analysis completed by Smith and Waldner (2017).

To determine if this hypothesis and the limited literature on this subject are correct, a multi-variate regression analysis was performed to examine the relationship between the new municipalities established in the United States between 1990 and 2010 and a group of select variables. A review of the existing literature on municipal incorporation formed the basis for choosing the majority of these variables. Upon completion of the collection of the data, SPSS was utilized to conduct a multiple regression analysis to examine if there is a relationship between environmental justice indicators and type of municipal incorporation (i.e., majority white NIMs or majority minority NIMs). All data was obtained through three principal sources: the US Census Bureau's Boundary and Annexation Study, the EPA's EJSCREEN database, and the US Census Bureau's American Community Survey (ACS).

A review of the U.S. Census Bureau's Boundary and Annexation Survey (BAS) revealed the incorporation of 435 newly incorporated municipalities between 1990 and 2009.[1] These 435 NIMs were designated either majority-minority cities (n=44) or White NIMS (n=391) based on an analysis of the race/ethnic composition of each community utilizing 2010 U.S. Census data. For the purposes of this study a majority-minority community is defined as a municipality (i.e., city, town or village) where the combined Black, Hispanic, Asian and/or Native-American population is at least 50% of the total population. White NIMs are new municipalities with a non-Hispanic White population or greater than 50% according to 2010 Census data. Since the dataset included unequal sample sizes, a bivariate independent t-test was employed to compare CoCs with majority White NIMs.

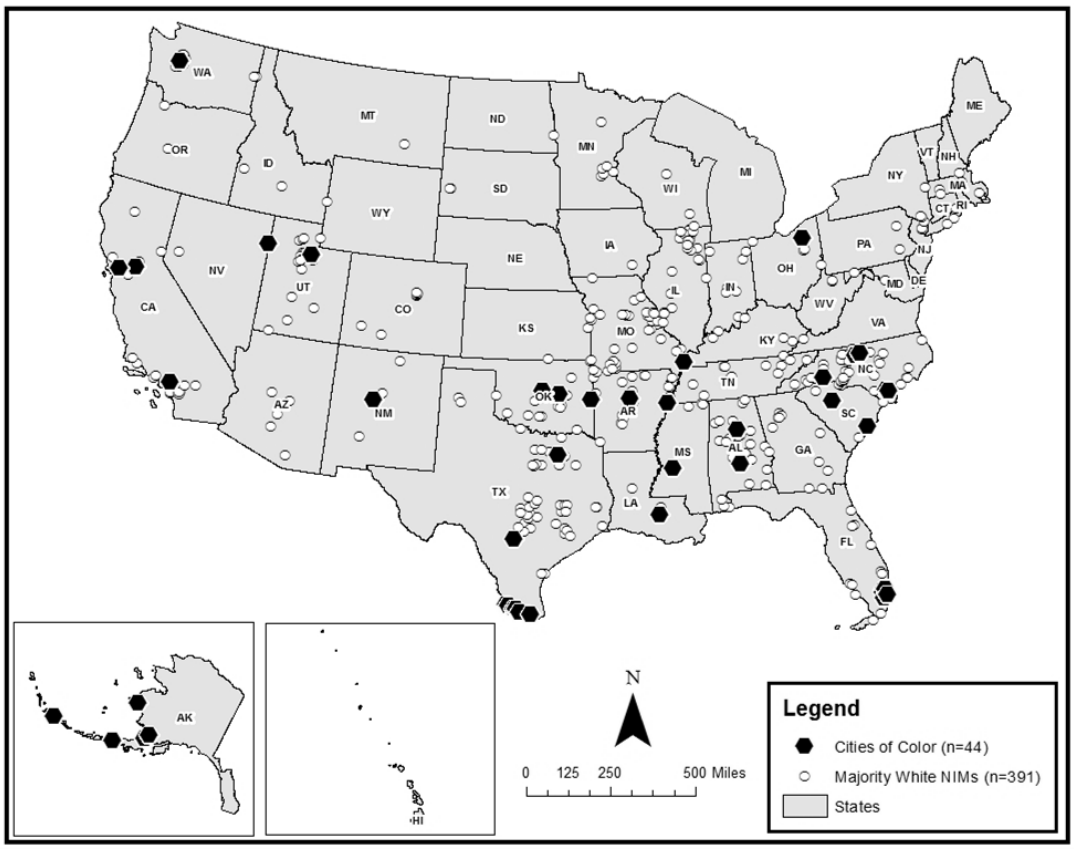

Figure 1. Cities of Color Incorporated in the United States, 1990 – 2010, Data Source: U.S. Census Bureau

[1] United States Census Bureau (2013) Boundary and Annexation Survey (BAS). http://www.census.gov/geo/partnerships/bas/bas_newannex.html (last accessed 15 August 2013).

Next, the study collected data from the EPA's EJSCREEN Mapper, an online mapping program which provides a variety of environmental justice related data for different geographies, for the 435 new municipalities incorporated between 1990 and 2010. The following variables were collected from the EJSCREEN Mapper: National-Scale Air Toxics Assessment (NATA) Air Toxics Cancer Risk, NATA Respiratory Hazard Index, NATA Diesel Particulate Matter, Particulate matter, Ozone, Traffic Proximity and Volume, Lead Paint Indicator, Proximity to Risk Management Plan (RMP) sites, Proximity to Treatment Storage and Disposal Facilities (TSDFs), Proximity to National Priorities List (NPL) sites, and Wastewater Dischargers Indicator (Stream Proximity and Toxic Concentration).[2] Table 1 provides a summary of the environmental justice indicators.

Table 1. Summary of Environmental Justice Indicators and Data Source

Indicator	Expected Relationship	Key Medium	Details	Source	Data Year
National-Scale Air Toxics Assessment (NATA) air toxics cancer risk	+	Air	Lifetime cancer risk from inhalation of air toxics	EPA NATA	2011
NATA respiratory hazard index	+	Air	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference concentration)	EPA NATA	2011
NATA diesel PM	+	Air	Diesel particulate matter level in air, µg/m3	EPA NATA	2011
Particulate matter	+	Air	PM2.5 levels in air, µg/m3 annual avg.	EPA, Office of Air and Radiation (OAR) fusion of model and monitor data	2013
Ozone	+	Air	Ozone summer seasonal avg. of daily maximum 8-hour concentration in air in parts per billion	EPA, OAR fusion of model and monitor data	2013
Traffic proximity and volume	+	Air/other	Count of vehicles (AADT, avg. annual daily traffic) at major roads within 500 meters, divided by distance in meters (not km)	Calculated from 2014 U.S. Department of Transportation (DOT) traffic data, retrieved 2016	2014
Lead paint indicator	+	Dust/ lead paint	Percent of housing units built pre-1960, as indicator of potential lead paint exposure	Calculated based on Census/American Community Survey (ACS) data, retrieved 2015	2011-2015
Proximity to Risk Management Plan (RMP) sites	+	Waste/ air/ water	Count of RMP (potential chemical accident management plan) facilities within 5 km (or nearest one beyond 5 km), each divided by distance in kilometers	Calculated from EPA RMP database, retrieved 03/2017	2017
Proximity to Treatment Storage and Disposal Facilities (TSDFs)	+	Waste/ air/ water	Count of TSDFs (hazardous waste management facilities) within 5 km (or nearest beyond 5 km), each divided by distance in kilometers	Calculated from EPA RCRA Info database, retrieved 01/2017	2017
Proximity to National Priorities List (NPL) sites	+	Waste/ air/ water	Count of proposed or listed NPL - also known as superfund - sites within 5 km (or nearest one beyond 5 km), each divided by distance in kilometers	Calculated from EPA CERCLIS database, retrieved 12/05/2016	2016
Wastewater Dischargers Indicator (Stream Proximity and Toxic Concentration)	+	Water	RSEI modeled Toxic Concentrations at stream segments within 500 meters, divided by distance in kilometers (km)	Calculated from RSEI modeled toxic concentrations to stream reach segments, created 01/2017	2017

Source: US Environmental Protection Agency. (2018). EJSCREEN Environmental Justice Mapping and Screening Tool: EJSCREEN Technical Documentation

[2] United States Environmental Protection Agency (USEPA) (2018) EJSCREEN. Retrieved April 18, 2018 from www.epa.gov/ejscreen

Additional variables included in the multi-variate regression analysis included: total population, median family income, college attainment, median value of owner-occupied housing units, percentage of housing owner occupied, metropolitan status (yes or no), and clustering status (more than 1 new municipality located within the same county or not). These variables were included within the analysis to control for variation in new cities population size, income and education level and home ownership rates. These variables have been determined to be important differentiating variables among existing cities and new cities (Smith and Debbage 2011) and white NIMs and Cities of Color (Smith et al. 2016).

One limitation of this study is the time difference between when some of the new municipalities incorporated (as early as 1990) and the age of the environmental datasets. The environmental indicators show pollution levels and other environmental hazards from a period after incorporation of the cities studied. As a result, it is difficult to draw definitive conclusions about the environmental conditions within each new municipality. With that said, this is the best statistical analysis that can be conducted given this limitation.

Findings

Data on environmental indicators was available for 413 out of the 435 new municipalities. Table 2 includes the descriptive statistics for each of the environmental indicators. Next, we compared the 44 Cities of Color to the other 391 majority white municipalities on each of the environmental indicators. Table 3 contains the results of the independent t-tests for each of the environmental indicators.

There are some large, substantively important differences that were not statistically significant in the categories of Traffic Proximity and Wastewater Discharge Indicators. Traffic Proximity and Volume are about 50% higher in the CoCs than in the majority white municipalities. However, there is a large amount of variability in Traffic Proximity and Volume within CoCs and also a large amount of variability in Traffic Proximity and Volume within White NIMs. Select municipalities in New York and California each had levels of Traffic which were more than ten times as high as the average traffic level. The presence of these outliers makes the differences in mean traffic proximity between CoCs and NIMs not statistically significant.

There are statistically significant differences in the categories of RMP Proximity and Ozone. Other than Ozone, in each category where there is a difference, levels of the environmental hazard are higher in the Cities of Color than in the majority White municipalities. According to the EPA, leading causes of Ozone include industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors and chemical solvents, which may be found in greater quantities in larger urban settings. Cities of Color have a larger mean population (approximately 13,000) compared with majority white NIMs (approximately 9,000) and as a result were expected to have higher level of Ozone when contrasted with majority white NIMs. A potential explanation for this result comes from Reames and Bravo's (2019) study which determined that blacks were less likely to be exposed to Ozone than Whites because higher ozone levels tend to be found in more suburban and rural areas with high tree canopies.

These results highlight the vulnerability of majority minority communities to the siting of pollution emitting industries and the physical geography of locating in lowlands, where wastewater treatment plants are usually located in order to accommodate gravity feed sewer systems. Historically, minority communities have been pushed to some of the most vulnerable lands within a region, which can also be some of the least expensive property (Cutter 2012). These lands are prone to flooding, downwind from polluting factories, in close proximity to transportation facilities and/or in locations that best accommodate wastewater treatment plants. The combination of market economics and environmental vulnerability put these locations at higher environmental risk than other geographies and have led to the concentration of minority residents in these spaces (Bullard 1993; Cutter 2012; Taylor 2014).

Table 2. Descriptive Statistics of Environmental Indicators

		Particulate Matter (PM 2.5 in ug/m3)	Ozone (ppb)	NATA Diesel PM (ug/m3)	NATA Air Toxics Cancer Risk (risk per MM)	NATA Respiratory Hazard Index	Traffic Proximity and Volume (daily traffic count/distance to road)	Lead Paint Indicator (% pre-1960s housing)	Superfund Proximity (site count/km distance)	RMP Proximity (facility count/km distance)	Hazardous Waste Proximity (facility count/km distance)	Wastewater Discharge Indicators (toxicity-weighted concentration/m distance)
N	Valid	413	413	419	419	419	419	419	419	419	419	413
	Missing	22	22	16	16	16	16	16	16	16	16	22
Mean		8.842	39.000	0.507	36.253	1.439	159.803	0.162	0.077	0.302	0.052	3.019
Median		9.120	38.500	0.404	37.000	1.300	36.000	0.120	0.038	0.160	0.032	0.000
Std. Deviation		1.480	3.975	0.373	9.238	0.760	394.689	0.150	0.131	0.409	0.085	27.744
Skewness		-0.805	0.530	1.521	-0.118	3.307	6.219	1.726	4.673	4.122	7.580	12.891
Minimum		4.170	29.000	0.000	13.000	0.210	0.000	0.000	0.001	0.003	0.001	0.000
Maximum		12.200	53.800	2.100	61.000	9.000	4600.000	0.890	1.100	4.500	1.200	460.000
Percentiles	25	8.175	36.200	0.255	30.000	1.000	11.000	0.055	0.019	0.085	0.016	0.000
	50	9.120	38.500	0.404	37.000	1.300	36.000	0.120	0.038	0.160	0.032	0.000
	75	9.800	41.400	0.651	42.000	1.700	120.000	0.230	0.074	0.340	0.057	0.007

Source: US Environmental Protection Agency. (2018). EJSCREEN Environmental Justice Mapping and Screening Tool: EJSCREEN Technical Documentation

Table 3. Bivariate Independent T-Test Results by Indicator

	Particulate Matter (PM 2.5 in ug/m3)	**Ozone (ppb)**	**NATA Diesel PM (ug/m3)**	**NATA Air Toxics Cancer Risk (risk per MM)**	**NATA Respiratory Hazard Index**	**Traffic Proximity and Volume (daily traffic count/ distance to road)**	**Lead Paint Indicator (% pre-1960s housing)**	**Superfund Proximity (site count/km distance)**	**RMP Proximity (facility count/km distance)**	**Hazardous Waste Proximity (facility count/km distance)**	**Wastewater Discharge Indicators (toxicity-weighted concentration/m distance)**
Cities of Color	8.416	37.373	0.486	35.79	1.515	231.46	0.131	0.086	0.518	0.054	1.165
Majority White NIMs	8.885	39.166	0.510	36.31	1.431	151.61	0.167	0.076	0.277	0.052	3.207
Statistically Significant	No	Yes	No	No	No	No	No	No	Yes	No	No

Source: US Environmental Protection Agency. (2018). EJSCREEN Environmental Justice Mapping and Screening Tool: EJSCREEN Technical Documentation

The next step in our analysis was to perform a multivariate analysis to test whether the differences we observed at the bivariate level still exist after including relevant control variables. Table 4 shows the results of multivariate model predicting levels of ozone. Percent owner occupied had a negative impact on the amount ozone, and the years since incorporation also had a negative impact on the level of ozone. Status as a City of Color was statistically related to the level of ozone once the control variables were included. Table 5 shows the results of the multivariate model predicting Proximity to RMP facilities.

No multivariate tables are presented for the other environmental indicators which were not statistically associated with status as CoC in the multivariate analysis. However, Status as a CoC was significantly related to levels of Ozone and to RMP Proximity (see table 5). Cities of Color had lower levels of Ozone and significantly higher levels of RMP Proximity.

The significantly higher levels of RMP Proximity means that residents of Cities of Color were more likely to live close to a Risk Management Plan facility than residents of majority White municipalities. EPA regulations require a company to develop an RMP for facilities that handle one or more of over 250 regulated substances under section 112(r) of the Clean Air Act. These substances include a wide range of chemicals that have been shown to cause a wide variety of medical conditions for individuals who come to contact with them.

Table 4. Multivariate Regression Model Predicting Levels of Ozone (ppb)

	Coefficients	Std. Error	t	Sig.
(Constant)	**44.09**	**1.458**	**30.243**	**0.000**
Minority NIM (1 = Yes)	**-2.044**	**0.696**	**-2.935**	**0.004**
Percent Owner Occupied (2010)	**-0.045**	**0.014**	**-3.186**	**0.002**
College Attainment	-0.017	0.011	-1.558	0.120
Median family income (dollars)	-3.17E-07	0.000	-0.030	0.976
Total Population (2010)	2.00E-06	0.000	0.197	0.844
Median value owner occupied housing units	1.07E-06	0.000	0.505	0.614
Population under Age 5	0.015	0.078	0.187	0.852
Years Since Incorporation	**-0.062**	**0.028**	**-2.214**	**0.027**

Dependent Variable: Ozone (ppb)

Table 5. Multivariate Regression Model Predicting Proximity to RMP Facilities (Facility Count per Km of Distance)

Coefficients	Coefficients	Std. Error	t	Sig.
(Constant)	0.008	0.142	0.06	0.952
Minority NIM (1 = Yes)	**0.264**	**0.069**	**3.846**	**0.000**
Percent Owner Occupied (2010)	**0.003**	**0.001**	**2.283**	**0.023**
College Attainment	0.001	0.001	1.192	0.234
Median family income (dollars)	-5.00E-07	0.000	-0.459	0.647
Total Population (2010)	**2.60E-06**	**0.000**	**2.462**	**0.014**
Median value owner occupied housing units	-1.00E-07	0.000	-0.334	0.739
Population under Age 5	-0.009	0.008	-1.092	0.275
Years Since Incorporation	0.003	0.003	0.944	0.346

Dependent Variable: RMP Proximity (facility count/km distance)

Conclusion

Numerous previous studies have highlighted the link between environmental injustices and communities of color (Bullard 1983, United Church of Christ 1987, Bowen et al. 1995, Pulido, Sidawi and Voz, 1996, Bell and Ebisu 2012). This study confirms these earlier results and found that for most of the environmental indicators, levels of hazards are higher in Cities of Color compared to majority white municipalities. Interestingly, while levels of hazards were higher in CoCs, they were not determined to be statistically significantly different compared to majority white municipalities. A potential explanation for this is Cutter's assertion on the ambiguity in research on environmental discrimination related to the threat under examination, the geographic scale for analysis, subpopulation chosen, and time frame (1995).

There were two types of environmental indicators where the differences were significant even after considering relevant control variables: Ozone and RMP proximity. Ozone levels were actually lower in CoCs, but RMP Proximity was higher for CoCs. For Ozone, the length of time since incorporation was associated with lower levels of Ozone. This may be a sign that residents of the new municipalities gain more influence, and their efforts to reduce pollution take effect gradually. One example of a strategy that municipalities could enact to reduce emissions is

requiring installation of vapor recovery nozzles at gasoline pumps.[3] Decreases in ozone may also be linked to regulation of ozone under the National Ambient Air Quality Standards (NAAQS) in differing geographies.

Meanwhile, RMP facility proximity is higher in Cities of Color than in other municipalities. This result potentially highlights the continuation of environmental racism associated with the siting of unwanted land uses that need Risk Management Plans within communities of color. For example, St. Gabriel, LA incorporated in 1994 following a proposal to locate another chemical plant in the community. The parish (i.e., county) in which St. Gabriel was located was already home to 19 chemical plants and issues of environmental racism were studied by President Clinton's U.S. Commission on Civil Rights in 1993 prior to incorporation. These majority minority communities may utilize municipal incorporation as a tool to tackle issues of environmental racism associated with the siting of facilities that need Risk Management Plans within their communities and as a result, experience higher rates of environmental hazards within their communities.

The connection between Cities of Color and Environmental Justice indicators is complex. The municipal incorporation process that birthed these new majority-minority municipalities may have been decades in the making and as a result can impact the statistical results of this study. Likewise, the EJ indicators are from current datasets and could influence the impact these factors have on new Cities of Color, especially when the CoC has been incorporated for several decades. This study does provide the first empirical analysis that explores the relationship between the incorporation of a majority-minority community and environmental concerns. Previous research, based on a review of newspaper accounts of incorporation proceedings, highlighted the role of environmental racism/environmental justice in the incorporation of new cities of color (Smith and Waldner 2018). The work represented in this study advances this area of scholarship by completing the first quantitative analysis of environmental conditions in newly incorporated municipalities.

The implications of this work include the finding that while not all variables were statistically significant in the multivariate analysis, Cities of Color do have much higher rates of environmental harms for several indicators (as measured by the environmental justice indicators from the EPA) compared to majority white NIMs. This highlights the need for "just sustainability" and a move towards "spatial justice" that more equitably and fairly allocates and disperses environmental assets and ills across a region and moves beyond the environmental sustainability focus of protecting the natural environment (Agyeman 2005, Soja 2010). Agyeman et al. (2003) argue for the inclusion of race and class into the sustainability lexicon as a means to achieve a more "just sustainability" for all. Meanwhile Soja's call for spatial justice could be realized through local government boundary change actions such as municipal incorporation (Soja 2010). This is especially critical for urban areas that face a multitude of environmental pressures that are often dumped into poor and minority communities. By connecting environment injustices (spatial injustices) and sustainability, communities may begin to plan for a more equitable and fair future.

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