
AIR QUALITY EQUITY: WHY THE CLEAN AIR ACT FAILED TO PROTECT LOW-INCOME COMMUNITIES AND COMMUNITIES OF COLOR FROM COVID-19

HELEN SPRAINER*

ABSTRACT

The effects of the COVID-19 pandemic highlight the many ways in which low-income communities and communities of color suffer disproportionate harms during a disaster. This pandemic is an environmental injustice because the inequitable development and enforcement of our environmental laws has left some communities more at risk for serious infection and death from COVID-19 than others. Specifically, a type of air pollution called fine particulate matter has been identified as one of the many causes of this injustice. This pollutant is currently regulated by the Clean Air Act, but U.S. communities of color are nonetheless exposed to higher rates of fine particulate matter pollution than their white counterparts across the entire country. There are similar inequities based on socioeconomic status. A recent study from scientists at Harvard found that long-term exposure to this fine particulate matter pollution is correlated with higher incidences of death from COVID-19. This finding is particularly troubling because low-income communities and communities of color have been breathing most of this country's fine particulate matter pollution for decades. This historic, inequitable exposure is one of many factors contributing to the higher mortality rates from COVID-19 in these communities. This Note analyzes the relationships between fine particulate matter pollution, race, socioeconomic status, and COVID-19 to understand why the Clean Air Act is failing low-income communities and communities of color. It focuses on Cancer Alley in Louisiana as a case study. Cancer Alley residents experience a confluence of environmental, racial, and economic factors that contribute to persistent environmental health disparities. This community is afflicted by a multitude of localized factors that are contributing to this injustice, including a lack of political power and increasing industrialization. This case study highlights the importance of using the authority of the Clean Air Act to implement location-specific solutions to alleviate disparate exposure to fine particulate

* Helen Sprainer is a judicial clerk for the Honorable Mary M. Schroeder, Senior Judge, U.S. Court of Appeals for the Ninth Circuit. J.D., New York University School of Law, 2021. The opinions in this Note should not be ascribed to any current or former employer. Thank you so very much to Professors Florencia Marotta-Wurgler, Katrina Wyman, and Richard Revesz for their helpful feedback and support throughout the writing process. And many thanks to the staff at the Environmental Law Journal.

matter pollution. This Note suggests utilizing the Clean Air Act's existing authority to better protect U.S. communities from environmental injustices.

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INTRODUCTION

Black communities in the state of Louisiana are disproportionately dying of infection from COVID-19. A 46-year-old Black woman, who worked as a nurse at the New Orleans East Hospital, was exposed to COVID-19 while treating her patients and ultimately died.¹ The hospital where she used to work is located in the 9th Ward of New Orleans, and 83 percent of their COVID-19 patients were Black in April of 2020.² Similarly, the Zulu Social Aid & Pleasure Club—a center for Black culture in New Orleans—has

¹ See *7 Out of 10 Patients Killed by COVID-19 in Louisiana Were African American*, NPR (Apr. 12, 2020), <https://www.npr.org/2020/04/12/832682489/7-out-of-10-patients-killed-by-COVID-19-in-louisiana-were-african-american>.

² See *id.*

been devastated by the virus.³ In the month after the Mardi Gras celebration of February 2020, twenty of the club's members were hospitalized and five members died.⁴ These two stories attempt to give life to the following statistic: in April of 2020, Black residents accounted for 70 percent of Louisianans who died from COVID-19, but only 33 percent of the total population of Louisiana.⁵ More recent analyses show that the extent of this disparity has decreased over time, with some reports finding that as of June 2021, Black individuals accounted for 39 percent of deaths,⁶ and others concluding that Black individuals accounted for up to 52 percent of deaths⁷ from COVID-19. Although the long-term trend suggests that this inequality is decreasing over time, even the lowest estimates demonstrate that Black individuals in Louisiana are disproportionately dying from COVID-19, especially as compared to their white counterparts. White Americans made up 62.9 percent of the population and

³ See Tegan Wendland, *Black Communities Are Hit Hardest by COVID-19 in Louisiana and Elsewhere*, NEW ORLEANS PUB. RADIO (Apr. 6, 2020), <https://www.wwno.org/latest-news/2020-04-06/black-communities-are-hit-hardest-by-COVID-19-in-louisiana-and-elsewhere>.

⁴ See *id.*; Charisse Gibson, *Zulu Rocked by Coronavirus Deaths, Members Self-Quarantine*, 4WWL (Mar. 31, 2020), <https://www.wvltv.com/article/news/health/zulu-coronavirus-deaths/289-4b03058c-87e5-46eb-b7ed-79965609f1f4>.

⁵ See Press Release, John Bel Edwards, Governor of Louisiana, Gov. Edwards Announces Creation of COVID-19 Health Equity Task Force (Apr. 10, 2020), <https://gov.louisiana.gov/index.cfm/newsroom/detail/2457>; Linda Villarosa, 'A Terrible Price': The Deadly Racial Disparities of Covid-19 in America, N.Y. TIMES (Apr. 29, 2020), <https://www.nytimes.com/2020/04/29/magazine/racial-disparities-COVID-19.html>.

⁶ See *Covid-19 Information*, LA. DEP'T OF HEALTH, <https://ldh.la.gov/index.cfm/page/4065> (last visited June 2, 2021); *COVID-19 Deaths by Race/Ethnicity*, KFF, <https://www.kff.org/other/state-indicator/COVID-19-deaths-by-race-ethnicity/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D> (last visited June 2, 2021); *Louisiana*, JOHNS HOPKINS UNIV. & MED., <https://coronavirus.jhu.edu/region/us/louisiana> (last visited June 12, 2021). The numbers cited in these sources reflect the accurate count on June 3, 2021, but these numbers are frequently updated. Please see the sources cited for the most up-to-date numbers.

⁷ See *Racial Data*, PUB. AFF. RSCH. COUNCIL OF LA., <http://parlouisiana.org/racial-data-2> (last visited June 12, 2021). The numbers cited in this source reflect the accurate count on June 12, 2021, but these numbers are frequently updated. Please see this source for the most up-to-date numbers. See also Kimberly A. Terrell & Wesley James, *Racial Disparities in Air Pollution Burden and COVID-19 Deaths in Louisiana, USA, in the Context of Long-Term Changes in Fine Particulate Pollution*, ENV'T JUST. 1 (2020).

only 46 percent of deaths as of June 12, 2021.⁸ Looking at the morbidity rate during this same time frame, Black individuals made up 51 percent of COVID-19 cases and only 33 percent of the population, while white Americans made up 36.2 percent of cases and 46 percent of the population.⁹ These statistics show an unmistakable trend: Black individuals in Louisiana are disproportionately infected with and dying from COVID-19.

There are a number of different factors that contribute to this injustice. This Note focuses on the fact that low-income communities and communities of color across the country are exposed to higher long-term concentrations of an air pollutant that makes COVID-19 more deadly.¹⁰ This disparity is an environmental justice crisis. EPA defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”¹¹ The pandemic has created an environmental justice crisis because low-income communities and communities of color are disproportionately exposed to environmental health hazards that exacerbate the severity of infection with COVID-19. One of these environmental health hazards is fine particulate matter, a class of air pollution that is finer than 2.5 micrograms.¹² One example of fine particulate matter pollution is the soot that streams from tailpipes, smokestacks, and wildfires.¹³ A Harvard study of COVID-19 mortality rates in the United States found that an increase in exposure of only 1 $\mu\text{g}/\text{m}^3$ in long-term fine particulate matter pollution is correlated with an 11 percent increase in the death rate from COVID-19.¹⁴ This environmental injustice begs the question: why are our environmental laws failing these communities?

⁸ See *Racial Data*, *supra* note 7.

⁹ See *id.*

¹⁰ See Xiao Wu et al., *Air Pollution and COVID-19 Mortality in the United States: Strengths and Limitations of an Ecological Regression Analysis*, 6 SCI. ADVANCES 45 (2020).

¹¹ *Environmental Justice*, EPA, <https://www.epa.gov/environmentaljustice> (last visited Sept. 5, 2021).

¹² See *Particle Pollution*, AM. LUNG ASS'N, <https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution> (last visited June 22, 2021).

¹³ See *id.*

¹⁴ See Wu et al., *supra* note 10, at 1.

To begin to answer this question, this Note takes a case study of the relationships between race, socioeconomic status, fine particulate matter pollution, and mortality from COVID-19 in an area of Louisiana that is called “Cancer Alley.” Cancer Alley is located in southern Louisiana along the Mississippi River.¹⁵ The low-income and minority residents in Cancer Alley are an “environmental justice community” because they experience a confluence of environmental, racial, and economic factors that contribute to disproportionately high environmental hazards and persistent environmental health disparities.¹⁶ Cancer Alley is heavily industrialized, and its residents are mostly Black and living in poverty.¹⁷ The racial and socioeconomic disparities in exposure to fine particulate matter and deaths from COVID-19 are devastatingly apparent in Cancer Alley.¹⁸

The analysis in this Note finds that there are three main reasons for this inequitable exposure to fine particulate matter pollution in Cancer Alley. First, low-income communities and communities of color in Cancer Alley do not have the political power to control zoning in their communities, and largely white governance structures are zoning these communities for increasing industrial development. Second, the resulting industrialization has increased the amount of fine particulate matter pollution in Cancer Alley over the past five years. Third, long-term exposure to fine particulate matter pollution is one of the factors that makes these residents more susceptible to deadly infection from COVID-19.

After identifying the source of this environmental injustice, the next question is: how can our environmental laws begin to right this wrong? The relevant environmental law is the Clean Air Act, which regulates fine particulate matter at the federal level by way of National Ambient Air Quality Standards (NAAQS).¹⁹ The NAAQS for fine particulate matter establishes the maximum amount of this pollutant that can be in the atmosphere at any given time.²⁰ This standard is supposed to be set at a level that is “requisite to protect the public health” and allows “an adequate margin of safety” to ensure

¹⁵ See Terrell & James, *supra* note 7, at 3.

¹⁶ See *id.*

¹⁷ See *id.*

¹⁸ See *id.* at 6.

¹⁹ See 40 C.F.R. § 50.13 (2021).

²⁰ See RICHARD L. REVESZ ET AL., ENVIRONMENTAL LAW AND POLICY 359 (4th ed. 2019).

that the American population is not exposed to dangerous levels of fine particulate matter pollution.²¹ Each state then comes up with an individualized plan—called a State Implementation Plan—to ensure that it is in compliance with the NAAQS.²² Accordingly, the Clean Air Act establishes a regulatory scheme of “cooperative federalism” whereby the federal government sets the goal for air quality and the states achieve that goal in a manner consistent with state and local policies and priorities.²³

After understanding how the Clean Air Act regulates fine particulate matter, the next question is: how much fine particulate matter pollution is in Cancer Alley, and how does this compare to the federal NAAQS? If, for example, the concentration of fine particulate matter pollution in Cancer Alley is not in compliance with the NAAQS, the solution would need to focus on enforcement of the federal standards. Accordingly, Louisiana could change its State Implementation Plan to address the excessive pollution with hyper-local solutions. If, by contrast, Cancer Alley is in compliance, this finding would suggest that the NAAQS are not sufficiently stringent to “protect the public health”²⁴ because the communities in Cancer Alley are experiencing significant health impacts, despite compliance with the federal standards. The solution would then be to make the NAAQS for fine particulate matter more stringent at the federal level.

The most obvious solution to the environmental justice crisis in Cancer Alley is to work within the existing framework of the NAAQS and draw upon both federal and state authority under the Clean Air Act. Luckily, the Environmental Protection Agency (EPA) under the current Biden administration is already considering a change to the NAAQS for fine particulate matter because it recently announced that it is revisiting the standard that was upheld by the Trump EPA in 2020.²⁵ Additionally, President Biden’s memorandum entitled “Modernizing Regulatory Review” affords EPA and the Office of Management and Budget (OMB) the opportunity to undertake a rigorous and effective environmental justice analysis

²¹ 42 U.S.C. § 7409(b)(1).

²² See 42 U.S.C. § 7410(a)(1).

²³ REVESZ ET AL., *supra* note 20, at 388.

²⁴ 42 U.S.C. § 7409(b)(1).

²⁵ See Jennifer Hijazi, *EPA Will Reconsider National Air Standards for Soot*, BLOOMBERG L. (June 10, 2021), <https://news.bloomberglaw.com/environment-and-energy/epa-will-reconsider-national-air-standards-for-soot>.

before promulgating the new NAAQS for fine particulate matter.²⁶ This Note suggests that the Biden EPA should go one step further. To better protect environmental justice communities, the Biden EPA should promulgate new regulations for State Implementation Plans that would require states to research environmental injustices, come up with a plan to alleviate these inequities, and meaningfully include environmental justice communities in this process.

This Note's analysis proceeds in four parts. Section I discusses the relationships between environmental justice communities, fine particulate matter pollution, and mortality rates from infection with COVID-19. Section II provides an overview of how fine particulate matter pollution is regulated under the Clean Air Act and how environmental justice concerns are currently incorporated into the NAAQS. Section III is an analysis of the disparate impact of COVID-19 and inequitable exposure to fine particulate matter in Louisiana. Section IV proposes several different solutions to the problems identified and analyzed throughout this paper.

I. FINE PARTICULATE MATTER POLLUTION AND COVID-19

A. Overview of Fine Particulate Matter

First, it is helpful to discuss the basics of particulate matter pollution. Particulate matter is an umbrella term that refers to a mixture of solid particles and liquid droplets that travel through the air.²⁷ These particles are invisible to the naked eye unless millions of them are concentrated together, forming a gray haze that can be seen spewing from a tailpipe, billowing from an industrial smokestack, or smothering a city.²⁸ It is created by many different types of anthropogenic and natural sources, including industry, agriculture, construction, fires, and fossil fuel combustion—either to generate energy or power a vehicle.²⁹ Depending on the source of the

²⁶ See Memorandum on Modernizing Regulatory Review, 86 Fed. Reg. 7223 (Jan. 26, 2021).

²⁷ See EPA, EPA/600/R-19/188, INTEGRATED SCIENCE ASSESSMENT FOR PARTICULATE MATTER ES-1 (2019), <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=347534>.

²⁸ See *Particle Pollution*, *supra* note 12.

²⁹ See EPA, EPA-452/R-20-002, POLICY ASSESSMENT FOR THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER 2-2, 2-3, 2-4 (2020), <https://www.epa.gov/system/files/documents/2021-10/final-policy-assessment-for-the-review-of-the-pm-naaqs-01-2020.pdf>.

pollution, it can be composed of nitrates, sulfates, organic chemicals, metals, soils, or dust.³⁰

Particulate matter is categorized and regulated based on its size because the size is associated with differing health effects.³¹ This paper discusses the environmental justice concerns of fine particulate matter, which are less than 2.5 micrometers in diameter. Exposure to fine particulate matter is the largest environmental health risk factor in the United States.³² Due to its small size, fine particulate matter can get trapped in the lungs when inhaled and even travel through the bloodstream, damaging the cardiovascular, respiratory, and nervous systems.³³ Just to name a few of the adverse health effects, prolonged or repeated exposure can cause both the development and exacerbation of asthma, heart attacks, neurodegeneration, lung cancer, and mortality.³⁴ Nationally, the greatest source of fine particulate matter pollution comes from wildfires (32 percent of all pollution), followed by dust (18 percent), agriculture (18 percent), stationary fuel combustion (14 percent), mobile sources (seven percent), miscellaneous sources (six percent), and industrial processes (five percent). However, in urban areas, most American residents are exposed to fine particulate matter created by vehicles and fuel combustion.³⁵

B. Environmental Justice Communities Are Disproportionately Exposed to Fine Particulate Matter Pollution

In light of the worrisome health impacts associated with exposure to fine particulate matter pollution, it is worth celebrating that the national concentration of this pollution has decreased by 43 percent since 2000, thanks in large part to the success of the Clean Air

³⁰ See *What Is Particulate Matter?*, EPA, <https://www3.epa.gov/region1/eo/uep/particulatematter.html> (last visited June 22, 2021).

³¹ See POLICY ASSESSMENT FOR THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER, *supra* note 29, at 2-1; INTEGRATED SCIENCE ASSESSMENT FOR PARTICULATE MATTER, *supra* note 27, at E-1.

³² See Christopher W. Tessum et al., *Inequity in Consumption of Goods and Services Adds to Racial-Ethnic Disparities in Air Pollution Exposure*, 116 PNAS 6001, 6001 (2019).

³³ See INTEGRATED SCIENCE ASSESSMENT FOR PARTICULATE MATTER, *supra* note 27, at 1-21.

³⁴ See *id.* at 1-21 to 1-31.

³⁵ See POLICY ASSESSMENT FOR THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER, *supra* note 29, at 2-5.

Act, which was originally passed in 1970.³⁶ Additionally, the percentage of the population that is exposed to fine particulate matter levels higher than $12 \mu\text{g}/\text{m}^3$, the current health-based annual average standard,³⁷ has decreased from 62.8 percent in 2000 to less than one percent—only 0.23 percent—in 2016.³⁸ Not every American has benefited equally from this dramatic improvement, however. Most troublingly, a recent study found that from 2000 to 2016, although the total amount of fine particulate matter pollution has decreased, the inequalities in exposure based on race, ethnicity, and income have increased.³⁹

Counties with the highest levels of fine particulate matter pollution have a significantly higher percentage of Black residents, Hispanic residents, and residents below the poverty line.⁴⁰ By contrast, white populations, Native American populations, and wealthier individuals are exposed to lower concentrations of fine particulate matter pollution.⁴¹ Unfortunately, these disparate levels of exposure are not a new phenomenon. The first study to document the unequal exposure of Black individuals to environmental hazards was published almost four decades ago, in 1983.⁴²

³⁶ See *Our Nation's Air: Air Quality Trends Show Clean Air Progress*, EPA (2020), <https://gispub.epa.gov/air/trendsreport/2020/#sources>.

³⁷ See Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. 82,684, 82,685 (Dec. 18, 2020) (to be codified at 40 C.F.R. pt. 50).

³⁸ See Abdulrahman Jbaily et al., *Inequalities in Air Pollution Exposure Are Increasing in the United States*, MEDRXIV (July 15, 2020), <https://www.medrxiv.org/content/10.1101/2020.07.13.20152942v1> (preprint not yet subject to peer review).

³⁹ See *id.*

⁴⁰ See Marie Lynn Miranda et al., *Making the Environmental Justice Grade: The Relative Burden of Air Pollution Exposure in the United States*, 8 INT'L J. ENV'T RES. & PUB. HEALTH 1755, 1769 (2011) (concluding that counties with the worst fine particulate matter quality have a statistically significant larger percentage of non-Hispanic Black people and a larger percentage of people in poverty); Jbaily et al., *supra* note 38, at 2 (finding that areas with higher populations of Black and Hispanic individuals are exposed to higher concentrations of fine particulate matter).

⁴¹ See Jbaily et al., *supra* note 38, at 2–3.

⁴² See U.S. GEN. ACCT. OFF., SITING OF HAZARDOUS WASTE LANDFILLS AND THEIR CORRELATION WITH RACIAL AND ECONOMIC STATUS OF SURROUNDING COMMUNITIES (1983); Richard J. Lazarus, *Pursuing "Environmental Justice": The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787, 801 (1993).

Disparities in exposure to fine particulate matter pollution between Black populations and white populations are greater than those based on poverty status.⁴³ Black populations are exposed to 1.54 times the number of tons of fine particulate matter per year than the overall population.⁴⁴ By comparison, those living under the poverty line are exposed to 1.35 times the fine particulate matter than the overall population.⁴⁵ As the percentage of Black individuals increases, so does the average fine particulate matter concentration, with a steep increase in areas where 85 percent or more of the total population is Black.⁴⁶ Not only are areas with a lower Black population exposed to less fine particulate matter pollution, but within areas that are predominately white, the few non-whites living in that area are more likely to live near the local sources of fine particulate matter pollution.⁴⁷

To make matters worse, exposure to fine particulate matter pollution is disproportionately caused by the consumption choices made by white populations, but disproportionately inhaled by Black and Hispanic populations.⁴⁸ Americans contribute to fine particulate matter pollution when they consume electricity, food, goods, information and entertainment, services, shelter, and transportation because the production, transportation, and use of these goods relies on the combustion of fossil fuels, industry, and agriculture.⁴⁹ On average, white populations experience 17 percent less of the fine particulate matter pollution caused by their consumption, while Black populations bear 56 percent excess exposure relative to their consumption and Hispanic populations experience 63 percent excess exposure.⁵⁰

C. Environmental Injustices During COVID-19

These environmental injustices are also painfully apparent in the inequities arising during the global outbreak of COVID-19.

⁴³ See Ihab Mikati et al., *Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status*, 108 AM. J. PUB. HEALTH 480, 480 (2018).

⁴⁴ See *id.*

⁴⁵ See *id.*

⁴⁶ See Jbaily et al., *supra* note 38, at 6.

⁴⁷ See Mikati et al., *supra* note 43, at 484.

⁴⁸ See Tessum et al., *supra* note 32, at 6001.

⁴⁹ See *id.* at 6002.

⁵⁰ See *id.* at 6001.

Numerous studies are finding that low-income communities and communities of color are at risk of experiencing higher rates of infection and mortality.⁵¹ There are a multitude of factors contributing to these horrifying statistics, including social conditions, structural racism,⁵² healthcare inequities,⁵³ and, as discussed in this Note, disproportionate exposure to air pollution.⁵⁴ Researchers have also found a correlation between race, inequitable exposure to fine particulate matter, and deaths from COVID-19.⁵⁵

Non-white communities and low-income communities are disproportionately impacted by COVID-19. Counties with higher proportions of Black individuals experience more cases of COVID-19 and more deaths.⁵⁶ Although less than 20 percent of all counties in the United States have more Black residents than the national average (counties that are at least 13 percent Black), these counties suffered from 52 percent of the total nationwide COVID-19 diagnoses and 58 percent of COVID-19 deaths.⁵⁷ Similarly, COVID-19 cases increase nationwide in accordance with the proportion of Hispanic residents, especially in the Midwest and Northeast.⁵⁸ Counties with more than the average number of Hispanic residents (counties that are at least 17.8 percent Hispanic) constitute only 11 percent of the counties in the Northeast but 63.4 percent of cases and 66.1 percent of deaths in the region; four percent of the total counties in the Midwest but 31.9 percent of cases and 22.6 percent of deaths; and 33 percent of the total counties in the West but 75.4 percent of cases and 73.7 percent of deaths.⁵⁹ Studies have also found that disparities

⁵¹ See, e.g., Mathew A. Raifman & Julia R. Raifman, *Disparities in the Population at Risk of Severe Illness from COVID-19 by Race/Ethnicity and Income*, 59 AM. J. PREVENTIVE MED. 137, 137–38 (2020).

⁵² See Gregorio A. Millett et al., *Assessing Differential Impacts of COVID-19 on Black Communities*, 47 ANNALS EPIDEMIOLOGY 37, 37 (2020) (“Social conditions, structural racism, and other factors elevate risk for COVID-19 diagnoses and deaths in black communities.”).

⁵³ See Ibraheem M. Karaye & Jennifer A. Horney, *The Impact of Social Vulnerability on COVID-19 in the U.S.: An Analysis of Spatially Varying Relationships*, 59 AM. J. PREVENTATIVE MED. 317, 317 (2020).

⁵⁴ See Wu et al., *supra* note 10, at 1.

⁵⁵ See Terrell & James, *supra* note 7, at 1.

⁵⁶ See Millett et al., *supra* note 52, at 37.

⁵⁷ See *id.*

⁵⁸ See Carlos E. Rodriguez-Diaz et al., *Risk for COVID-19 Infection and Death Among Latinos in the United States: Examining Heterogeneity in Transmission Dynamics*, 52 ANNALS EPIDEMIOLOGY 46, 49 (2020).

⁵⁹ See *id.* at 50.

in income give rise to disparate rates of severe illness from COVID-19.⁶⁰ Of those with a household income of less than \$25,000 who are over the age of 65, 40 percent are at a higher risk of severe illness, compared to 24 percent of those with a higher income.⁶¹ These inequities are unacceptable.

The first step to addressing these injustices is identifying their cause. It is important to remember that there are many different causes, and therefore many different solutions to the problem. Researchers attribute the inequitable burden of COVID-19 on low-income communities and communities of color to disparities in housing, jobs, education, psychosocial stresses,⁶² nutrition, and healthcare, in addition to environmental factors.⁶³ For example, communities of color are more likely to live in poor and crowded housing, making social distancing difficult.⁶⁴ Black and Hispanic communities are twice as likely to not have access to indoor plumbing as compared to white communities, meaning it is more challenging for them to wash their hands to reduce the chance of infection.⁶⁵ Additionally, Hispanic individuals are overrepresented in in-person jobs that have been deemed “essential,” like meatpacking plants, factories, and service-based industries.⁶⁶ Similarly, only one in five Black individuals can work from home.⁶⁷ Low-income communities are less likely to have paid sick leave, encouraging people experiencing symptoms of COVID-19 to show up to work, and exposing their coworkers to the virus.⁶⁸ When infected, individuals in communities of color are less likely to receive adequate medical care than those in white communities, with a study finding that doctors are less likely to refer Black individuals to get tested when they

⁶⁰ See Raifman & Raifman, *supra* note 51, at 137.

⁶¹ See *id.*

⁶² See *Psychosocial Stressor*, AM. PSYCH. ASS’N DICTIONARY OF PSYCH., <https://dictionary.apa.org/psychosocial-stressor> (last visited Oct. 5, 2021) (defining a psychosocial stressor as “a life situation that creates an unusual or intense level of stress that may contribute to the development or aggravation of mental disorder, illness, or maladaptive behavior. Examples of psychosocial stressors include divorce, the death of a child, prolonged illness, unwanted change of residence, a natural catastrophe, or a highly competitive work situation.”).

⁶³ See Karaye & Horney, *supra* note 53, at 317.

⁶⁴ See *id.* at 318.

⁶⁵ See *id.* at 321.

⁶⁶ See Rodriguez-Diaz et al., *supra* note 58, at 51.

⁶⁷ See Millett et al., *supra* note 52, at 41.

⁶⁸ See Karaye & Horney, *supra* note 53, at 321.

present with COVID-19 symptoms.⁶⁹ Finally, communities of color are more likely to experience environmental health problems that increase their risk of COVID-19 morbidity.⁷⁰

Fine particulate matter pollution is one of the environmental factors that has been correlated with increased COVID-19 morbidity.⁷¹ A recent study of COVID-19 mortality rates in the United States found that an increase in exposure of only $1\mu\text{g}/\text{m}^3$ in long-term exposure to fine particulate matter is correlated with an 11 percent increase in the death rate from COVID-19.⁷² This link between air pollution and mortality from coronavirus pathogens was first identified during the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak in China, which is caused by a different coronavirus (SARS-CoV).⁷³ A study found that exposure to a number of air pollutants, including PM_{10} , significantly increased the risk of death from SARS.⁷⁴

Numerous other studies have confirmed this link between fine particulate matter and COVID-19 since the outbreak of the pandemic. A study of infection rates in the Netherlands “reported a nearly 100% increase in COVID-19 cases for every 20% increase in fine particulate matter concentrations.”⁷⁵ At least seven other studies analyzing trends in the United States, China, and Europe are confirming this association between air pollution and deaths caused by COVID-19.⁷⁶ Although there is still much research to be done to understand this link, some experimental studies are finding that exposure to particulate matter suppresses people’s early immune response.⁷⁷ As COVID-19 spread across the United States, and the data started to show that low-income communities and communities of color were dying at disproportionately high levels from COVID-19, it did not take scientists long to put two and two together. If low-income communities and communities of color are disproportionately inhaling fine particulate matter pollution, and this exposure

⁶⁹ *See id.* at 318.

⁷⁰ *See id.* at 317.

⁷¹ *See* Wu et al., *supra* note 10, at 1.

⁷² *See id.* at 2.

⁷³ *See* Eric B. Brandt et al., *Air Pollution, Racial Disparities, and COVID-19 Mortality*, 146 J. ALLERGY & CLINICAL IMMUNOLOGY 61, 61 (2020).

⁷⁴ *See id.*

⁷⁵ Terrell & James, *supra* note 7, at 2–3.

⁷⁶ *See id.* at 2–3.

⁷⁷ *See id.* at 2.

worsens diseases that are risk factors for severe COVID-19 infection, these communities could be disproportionately burdened by COVID-19.⁷⁸

To better understand the source of these inequities, this Note will look to the state of Louisiana as a case study in Section III. But first, Section II will dive into how fine particulate matter pollution is currently being regulated to establish the regulatory context for the Louisiana case study. With a better understanding of how our legal framework operates, we can begin to understand how it is failing low-income communities and communities of color in Louisiana and across the country.

II. REGULATING FINE PARTICULATE MATTER POLLUTION

A. Overview of the NAAQS

EPA regulates fine particulate matter pollution by establishing a maximum concentration of acceptable pollution in the air around us—the NAAQS—in accordance with its authority under the Clean Air Act of 1970.⁷⁹ Scientists agree that there is no threshold below which the American public is completely safe from the health effects of exposure to fine particulate matter pollution.⁸⁰ Accordingly, EPA sets the NAAQS by relying on its policy judgement and the most recent scientific understanding of the risks associated with exposure.⁸¹

The EPA Administrator issues primary and secondary NAAQS.⁸² The primary NAAQS must protect “public health” with

⁷⁸ See, e.g., Brandt et al., *supra* note 73, at 61.

⁷⁹ See REVESZ ET AL., *supra* note 20, at 359–60.

⁸⁰ See Kimberly M. Castle & Richard L. Revesz, *Environmental Standards, Thresholds, and the Next Battleground of Climate Change Regulations*, 103 MINN. L. REV. 1349, 1401 (2019).

⁸¹ See *id.* at 1390–91 (“Overall, this 2008 rulemaking reflected an important shift in how the EPA regulates NAAQS pollutants: from assuming that there is a threshold below which no health effects will occur to acknowledging that the decision is ultimately a policy judgement because there is no exposure level where all risks can be avoided.”); *Process of Reviewing the National Ambient Air Quality Standards*, EPA, <https://www.epa.gov/criteria-air-pollutants/process-reviewing-national-ambient-air-quality-standards> (last updated Nov. 15, 2021) (explaining that EPA relies on an Integrated Science Assessment, Risk/Exposure Assessment, and Policy Assessment to establish the NAAQS).

⁸² See 42 U.S.C. § 7409(a).

an “adequate margin of safety,”⁸³ without consideration of how much it will cost to impose these standards on the nation.⁸⁴ The secondary NAAQS are intended to protect public welfare.⁸⁵ “Welfare” is defined as an effect on, among other things, the environment, property, transportation, the economy, and personal comfort and wellbeing.⁸⁶ Once the NAAQS are established, the EPA Administrator must review the standards at least once every five years and propose revisions as appropriate.⁸⁷ Today, EPA has only established NAAQS for six different pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter.⁸⁸

Compliance with the NAAQS for fine particulate matter pollution is measured in a given air quality control region (AQCR).⁸⁹ The AQCRs were intended to be established by the EPA Administrator in 1971 “after consultation with appropriate State and local authorities” in “any interstate area or major intrastate area which he [sic] deems necessary or appropriate for the attainment and maintenance of ambient air quality standards.”⁹⁰ In Louisiana, for example, there are only three AQCRs, each covering wide sections of the state and parts of neighboring states.⁹¹ As a result, it is not possible to know the localized exposure of environmental justice communities to NAAQS pollutants based on the NAAQS compliance data alone. Air quality is measured throughout the AQCRs by a network of air monitoring stations.⁹² These stations are operated by national, state, and local governance systems, using criteria set by EPA for their location and operation.⁹³

This air quality data is used to determine compliance with the primary and secondary NAAQS for fine particulate matter pollution as an average concentration annually and over the course of a

⁸³ 42 U.S.C. § 7409(b)(1).

⁸⁴ See *Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 471 (2001).

⁸⁵ See 42 U.S.C. § 7409(b)(2).

⁸⁶ See 42 U.S.C. § 7602(h).

⁸⁷ See 42 U.S.C. § 7409(d)(1).

⁸⁸ See REVESZ ET AL., *supra* note 20, at 360–61.

⁸⁹ See 42 U.S.C. § 7407.

⁹⁰ 42 U.S.C. § 7407(c).

⁹¹ See *AQCRs (Air Quality Control Regions)*, EPA, <https://aqs.epa.gov/aqsweb/documents/codetables/aqcrs.html> (last visited Oct. 9, 2021).

⁹² See *Air Quality Planning and Standards: Air Pollution Monitoring*, EPA, <https://www3.epa.gov/airquality/montring.html> (last updated June 8, 2016).

⁹³ See *id.*

twenty-four-hour period.⁹⁴ If the concentration exceeds the NAAQS in a given area, that area is deemed to be in “nonattainment,” which triggers a series of corrective actions intended to bring the area into compliance with the national standard.⁹⁵ To attain the primary annual standard, the three-year average of an area’s annual average fine particulate matter concentration must not exceed $12 \mu\text{g}/\text{m}^3$.⁹⁶ To be in compliance with the primary twenty-four-hour standard, the ninety-eighth percentile of twenty-four-hour fine particulate matter concentrations in one year, averaged over three years, must not exceed $35 \mu\text{g}/\text{m}^3$.⁹⁷ These two standards are intended to work together to reduce the adverse health effects associated with both short- and long-term exposure to fine particulate matter pollution.⁹⁸

It is important to note that it is not easy for the average citizen to independently determine whether the air that they are breathing is in compliance with the NAAQS for fine particulate matter. They would need access to hourly rates of fine particulate matter concentrations over the course of three years and then calculate a series of averages. And the average citizen is likely unaware that these standards exist and that this data is publicly available. The inaccessibility of these calculations has environmental justice implications that will be discussed more fully in Section III. For now, it is sufficient to note that the average citizen is completely dependent upon the government’s monitoring and data collection to determine whether they are being exposed to high levels of fine particulate matter pollution.

B. *Incorporating Environmental Justice Concerns into the NAAQS*

Environmental justice means all people—“regardless of their race, color, national origin, or income”—experience the “same degree of protection from environmental and health hazards.”⁹⁹ To achieve environmental justice, EPA should identify communities

⁹⁴ See Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. 82,684, 82,715 (Dec. 18, 2020) (to be codified at 40 C.F.R. pt. 50).

⁹⁵ 42 U.S.C. § 7407(d)(1)(A) (defining nonattainment); 42 U.S.C. §§ 7501(1), 7502(c)(4) (nonattainment areas must achieve annual incremental reductions in emissions to achieve attainment by the attainment date).

⁹⁶ See *id.*

⁹⁷ See *id.*

⁹⁸ See generally Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. at 82,694–95.

⁹⁹ *Environmental Justice*, *supra* note 11.

that are exposed to disproportionate levels of an environmental health hazard and ensure that environmental laws, regulations, and policies are being developed, implemented, and enforced to redress the inequity.¹⁰⁰ Only by proactively addressing environmental injustices can EPA guarantee that all people have “equal access to the decision-making process to have a healthy environment in which to live, learn, and work.”¹⁰¹

There are several different ways for EPA to incorporate environmental justice concerns into the NAAQS, but the agency does not currently take full advantage of this authority.¹⁰² First, the Clean Air Act itself authorizes EPA to incorporate environmental justice concerns into the NAAQS. Recall that the NAAQS are required to protect “public health” with “an adequate margin of safety.”¹⁰³ Congress intended for “public health” to be defined broadly in order to protect the most sensitive individuals, including people experiencing “conditions rendering them particularly vulnerable to air pollution.”¹⁰⁴ For example, EPA can identify low-income communities and communities of color as the most sensitive individuals if these communities disproportionately experience the adverse health and environmental effects from a pollutant.¹⁰⁵ Relying on this finding, EPA can set the NAAQS to protect this subpopulation.¹⁰⁶ Indeed, EPA has an Environmental Justice Screening and Mapping Tool to help the agency identify environmental justice communities.¹⁰⁷ And the statutory requirement that the EPA Administrator review the NAAQS every five years ensures that the EPA Administrator has

¹⁰⁰ *See id.*

¹⁰¹ *Id.*

¹⁰² *See* CLIFFORD VILLA ET AL., ENVIRONMENTAL JUSTICE: LAW, POLICY & REGULATION 175 (3d ed. 2020) (“[T]wo important standard-setting provisions allowing for integration of environmental justice concerns are sections 108 and 109 of the Clean Air Act.”); Richard J. Lazarus & Stephanie Tai, *Integrating Environmental Justice into EPA Permitting Authority*, 26 *ECOLOGY L.Q.* 617, 631 (1999) (“The Clean Air Act (CAA) presents EPA with more opportunities to integrate environmental justice concerns into the Act’s substantive standards than the Agency has utilized.”).

¹⁰³ 42 U.S.C. § 7409(b)(1).

¹⁰⁴ *Am. Lung Ass’n v. EPA*, 134 F.3d 388, 389 (D.C. Cir. 1998) (quoting S. Rep. No. 91-1196, at 10 (1970)).

¹⁰⁵ *See* Lazarus & Tai, *supra* note 102, at 632.

¹⁰⁶ *See id.*

¹⁰⁷ *See EPA’s Environmental Justice Screening and Mapping Tool*, EPA, <https://ejscreen.epa.gov/mapper> (last visited Sept. 11, 2021).

the authority and ability to incorporate the newest information about environmental justice concerns whenever the standard is updated in accordance with the statute.¹⁰⁸ Equipped with this statutory authority and the requisite data, EPA could define Black individuals living in Cancer Alley as a sensitive population and establish the NAAQS to protect the health of this population group. As discussed further in Section II.C., the most recent update to the fine particulate matter NAAQS identified communities of color as a sensitive population. The Trump administration, however, failed to take meaningful action to change the realities in these communities.

EPA can also incorporate environmental justice concerns into the NAAQS pursuant to the Executive Order on Environmental Justice, No. 12,898.¹⁰⁹ This Executive Order was originally issued by President Clinton in 1994 and authorizes EPA to identify and address any disproportionate adverse human health or environmental effects of its activities on low-income communities and communities of color.¹¹⁰ For example, the Obama EPA utilized this authority in 2012 to change how EPA calculated compliance with the fine particulate matter NAAQS.¹¹¹ Prior to the change in 2012, compliance with the annual standard could be calculated by averaging the data from multiple different air quality monitors, instead of pulling data exclusively from one monitor.¹¹² In 2012, EPA observed that the highest concentrations tended to be measured at those monitors located in low-income communities and communities of color.¹¹³ However, when the data was averaged across multiple different monitors, the averages tended to bely this inequity, hiding the disproportionate impacts on low-income communities and communities of color.¹¹⁴ The Obama EPA recognized that this annual standard constituted a potential disproportionate adverse effect on communities of color and low-income populations in contravention

¹⁰⁸ See Lazarus & Tai, *supra* note 102, at 632.

¹⁰⁹ See Exec. Order No. 12,898, 3 C.F.R. 847 (1995); VILLA ET AL., *supra* note 102, at 183.

¹¹⁰ See Exec. Order No. 12,898, *supra* note 109.

¹¹¹ See National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. 3086, 3124–25 (Jan. 15, 2013) (to be codified at 40 C.F.R. pts. 50–53, 58).

¹¹² See *id.* at 3124.

¹¹³ See *id.* at 3125.

¹¹⁴ See *id.*

of Executive Order 12,898.¹¹⁵ Accordingly, EPA revised the form of the annual standard to eliminate the averaging provision.¹¹⁶ The D.C. Circuit upheld this decision because EPA “reasonably concluded” that the averaging provision was “inconsistent with EPA’s goal of ensuring that the NAAQS provide requisite protection for all individuals.”¹¹⁷ Accordingly, EPA can address environmental injustices using its authority under the Clean Air Act and Executive Order 12,898.

C. *The 2020 Update to the Fine Particulate Matter NAAQS*

In December of 2020, the Trump EPA reviewed the NAAQS for fine particulate matter and decided to retain the same standards that were initially adopted in 2012 by the Obama administration.¹¹⁸ Accordingly, the primary annual standard is 12 $\mu\text{g}/\text{m}^3$, and the primary twenty-four-hour standard is 34 $\mu\text{g}/\text{m}^3$.¹¹⁹ The environmental justice analysis for the 2020 revision is noteworthy, however, because the Trump EPA identified communities of color as a sensitive population that is at risk of experiencing fine particulate matter-related health effects.¹²⁰ By contrast, when the Obama EPA adopted the fine particulate matter NAAQS in 2012, the populations deemed to be the most sensitive to fine particulate matter pollution were “children, older adults, people with pre-existing heart and lung diseases, and those of lower socioeconomic status.”¹²¹ The Obama EPA found “little evidence for increased fine particulate matter-risk by race.”¹²²

¹¹⁵ See EPA, REGULATORY IMPACT ANALYSIS FOR THE FINAL REVISIONS TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER 9-5 to 9-6 (2012).

¹¹⁶ See National Ambient Air Quality Standards for Particulate Matter, 78 Fed. Reg. at 3127.

¹¹⁷ Nat’l Ass’n of Mfrs. v. EPA, 750 F.3d 921, 925 (D.C. Cir. 2014).

¹¹⁸ See Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. 82,684, 82,684, 82,689 (Dec. 18, 2020) (to be codified at 40 C.F.R. pt. 50).

¹¹⁹ See 40 C.F.R. § 50.18(b)-(c) (2019).

¹²⁰ See Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. at 82,703.

¹²¹ POLICY ASSESSMENT FOR THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER, *supra* note 29, at 3-44.

¹²² INTEGRATED SCIENCE ASSESSMENT FOR PARTICULATE MATTER, *supra* note 27, at 12-34.

In 2020, the Trump EPA reviewed a growing number of studies that had been published since the former rulemaking.¹²³ These newer studies found that non-white individuals, and Black individuals in particular, experienced higher rates of exposure to fine particulate matter pollution and higher rates of fine particulate matter-related mortality.¹²⁴ Studies found higher associations between minority status, fine particulate matter exposure, and adverse respiratory, cardiovascular, and reproductive outcomes.¹²⁵ These researchers also found that this discrepancy could not be explained by economic status alone because, for example, Black individuals making enough money to be ineligible for Medicaid had a higher risk than Medicaid-eligible whites.¹²⁶ Accordingly, EPA's analysis identifying the populations that are most sensitive to fine particulate matter pollution stated that certain non-white populations are an "at-risk population" with a "greater likelihood of experiencing fine particulate matter-related health effects." EPA concluded that "there is strong evidence demonstrating that Black and Hispanic populations, in particular, have higher [fine particulate matter] exposures than non-Hispanic white populations," and that "there is consistent evidence across multiple studies demonstrating an increase in risk for nonwhite populations."¹²⁷

Because the Trump EPA identified communities of color as sensitive populations, it could have addressed this racial inequality by modifying the NAAQS to protect the health of these sensitive populations in accordance with Section 109 of the Clean Air Act, as discussed in Section II.B. Unfortunately, despite concluding that communities of color are sensitive populations for purposes of the NAAQS, the Trump EPA's environmental justice analysis pursuant to Executive Order 12,898 was lacking. EPA concluded that its decision to retain the 2012 standards for the 2020 NAAQS "does not have disproportionately high and adverse human health or environmental effects on minority, low-income populations and/or indigenous peoples."¹²⁸ EPA states that it reviewed the available

¹²³ See *id.* at 12-36, 12-38.

¹²⁴ See *id.*

¹²⁵ See *id.* at 12-37, 12-38.

¹²⁶ See *id.* at 12-36, 12-37.

¹²⁷ Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. 82,684, 82,703 (Dec. 18, 2020) (to be codified at 40 C.F.R. pt. 50).

¹²⁸ *Id.* at 82,745.

information about this racial disparity and concluded that the existing standards are sufficient to protect the health of sensitive groups with the requisite margin of safety.¹²⁹ That is the end of the analysis.

During the notice and comment procedures, some commentators argued that EPA did not sufficiently analyze environmental justice and equity concerns in accordance with Executive Order 12,898.¹³⁰ The commentators contended that EPA's rule does not protect sensitive populations because low-income communities and communities of color are continuing to disproportionately suffer from the adverse health and environmental effects of fine particulate matter pollution.¹³¹ EPA responded by reiterating that it considered all of the relevant and available evidence regarding the health effects experienced by low-income and non-white populations.¹³² EPA stated that "to the extent that the public health burden of [particulate matter] air pollution is disproportionately affecting minority or low-income populations, reaching attainment with existing standards will effectively reduce that disparity."¹³³ EPA reasoned that the majority of the epidemiological studies finding these racial disparities reported that racial minorities were exposed to a long-term mean concentration of 13.5 $\mu\text{g}/\text{m}^3$, which exceeds the annual standard of 12 $\mu\text{g}/\text{m}^3$.¹³⁴

This logic does not support EPA's conclusion, however, because *some* of those epidemiological studies find that racial minorities experience disproportionate adverse health impacts even while living in areas in compliance with the federal standard. For these communities experiencing disproportionate environmental health hazards despite compliance, reaching attainment with existing standards will not reduce that disparity. Nonetheless, EPA concludes that America's low-income communities and communities of color are only experiencing a disproportionate pollution burden in areas that are currently exceeding the national standards and that bringing these areas into attainment will resolve any inequity that

¹²⁹ *See id.*

¹³⁰ *See* EPA, Docket No. EPA-HQ-OAR-2015-0072, RESPONSES TO SIGNIFICANT COMMENTS ON THE 2020 PROPOSED RULE ON THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER 41 (2020).

¹³¹ *See id.*

¹³² *See id.*

¹³³ *Id.*

¹³⁴ *See* Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. at 82,714.

these communities are experiencing. As this Note turns to the analysis of the disparate impact of COVID-19 in Louisiana, it will examine whether the evidence supports EPA's conclusion that the current NAAQS are sufficient to protect low-income communities and communities of color from unjust exposure to fine particulate matter pollution.

III. DISPARATE IMPACT OF COVID-19 IN LOUISIANA: A CASE STUDY

EPA's most recent data shows that the entire state of Louisiana is in compliance with the federal fine particulate matter NAAQS that were adopted by the Trump administration in 2020.¹³⁵ Despite compliance with the NAAQS, the following analysis shows that low-income communities and communities of color located in Cancer Alley are being exposed to disproportionately high levels of fine particulate matter pollution. Additionally, these communities are experiencing higher mortality rates from COVID-19. These trends are unacceptable. The NAAQS are partially responsible for the conditions experienced by these communities.

To better understand why, this Section will analyze the disparate impacts of fine particulate matter pollution and COVID-19 death rates in Cancer Alley. Cancer Alley is an 85 mile stretch of the Mississippi River bank running between Baton Rouge and New Orleans¹³⁶ and is home to over 200 industrial sources of air pollution.¹³⁷ Cancer Alley is filled with metal manufacturers, fertilizer plants,¹³⁸ and approximately 25 percent of the country's petrochemical production.¹³⁹ Cancer Alley is 40 percent Black and 55 percent white, as compared to state averages of 32 percent and 64 percent

¹³⁵ See *Counties Designated Nonattainment for PM-2.5 (1997), PM-2.5 (2006), and/or PM-2.5 (2012)*, EPA (May 31, 2021), <https://www3.epa.gov/airquality/greenbook/mappm25both.html>; *PM-2.5 (2012) Designated Areas by State/County/Area*, EPA (May 31, 2021), <https://www3.epa.gov/airquality/greenbook/kbcty.html>.

¹³⁶ See Julia Mizutani, *In the Backyard of Segregated Neighborhoods: An Environmental Justice Case Study of Louisiana*, 31 GEO. ENV'T. L. REV. 363, 372–73 (2019).

¹³⁷ See Terrell & James, *supra* note 7, at 3.

¹³⁸ See *id.*

¹³⁹ See Mizutani, *supra* note 136, at 372–73.

respectively.¹⁴⁰ Almost eighty of the census tracts located in Cancer Alley are at least 90 percent Black, and many of the households in these census tracts report exceptionally low incomes.¹⁴¹ Additionally, many families in Cancer Alley have lower than average levels of education.¹⁴² Unsurprisingly, many Cancer Alley residents have a higher risk of cancer from air pollution than more than 95 percent of Americans.¹⁴³ Cancer Alley residents are exposed to increasing levels of fine particulate matter pollution.¹⁴⁴

First, this Section will discuss the data showing that Black individuals and those experiencing unemployment in Cancer Alley are exposed to higher levels of particulate matter pollution and also suffer from higher mortality rates from COVID-19. Second, it will analyze the localized factors that are contributing to these injustices to better understand how the Louisiana State Implementation Plan could more effectively implement the NAAQS. Finally, it will discuss the role of the NAAQS at the federal level in this environmental justice crisis.

*A. Relationships Between Fine Particulate Matter Pollution,
Race, Socioeconomic Status, and COVID-19 in Cancer
Alley*

Doctors Kimberly A. Terrell and Wesley James published a study in 2020 (hereinafter “Terrell study”) that analyzed the relationship between air pollution, race, and socioeconomic status in Louisiana using data from the beginning of the COVID-19 pandemic through July 17, 2020.¹⁴⁵ The Terrell study concluded that increased death rates from COVID-19 in Louisiana are associated with long-term exposure to higher concentrations of fine particulate matter and that death rates are higher for Black residents.¹⁴⁶ As for socioeconomic status, the study concluded that unemployment was associated with higher concentrations of air pollution.¹⁴⁷ Poverty, by

¹⁴⁰ See Wesley James, Chunrong Jia & Satish Kedia, *Uneven Magnitude of Disparities in Cancer Risks from Air Toxics*, 9 INT’L J. ENV’T RSCH. & PUB. HEALTH 4365, 4366 (2012).

¹⁴¹ See *id.*; Mizutani, *supra* note 136, at 373.

¹⁴² See Mizutani, *supra* note 136.

¹⁴³ See Terrell & James, *supra* note 7, at 3.

¹⁴⁴ See *id.* at 10.

¹⁴⁵ See *id.* at 4.

¹⁴⁶ See *id.* at 6–7.

¹⁴⁷ See *id.* at 1.

contrast, was not associated with increased COVID-19 death rates.¹⁴⁸ These racial and socioeconomic disparities in exposure to fine particulate matter and deaths from COVID-19 are most prominent in Cancer Alley. Recall that Cancer Alley is 40 percent Black, almost eighty of the census tracts located there are at least 90 percent Black, and many households report exceptionally low incomes.¹⁴⁹ Of the ten parishes in Louisiana with the highest COVID-19 death rates, six of them were in Cancer Alley and, among these six parishes, the death rates were between 2.1- and 3.7-fold higher than the state median.¹⁵⁰ For context, only four of the fifty-three parishes located outside of Cancer Alley are on this top ten list, and two of them are located adjacent to Cancer Alley.¹⁵¹ These statistics show that Cancer Alley is disproportionately burdened by deadly cases of COVID-19, that residents of Cancer Alley are exposed to disproportionately high levels of fine particulate matter pollution, and that many of those who died from COVID-19 in Cancer Alley were either Black, unemployed, or both.¹⁵² Although certainly not the only culprit, fine particulate matter pollution is associated with higher mortality rates from COVID-19.

B. *Local Trends that Contribute to this Inequality*

Although the NAAQS are set at the federal level, the states create and implement localized plans to ensure compliance with the federal standard. To understand why Louisiana's State Implementation Plan may not be protecting the residents of Cancer Alley from high levels of fine particulate matter pollution, this Section analyzes the local political and environmental factors that are contributing to this environmental injustice.

There are two localized factors that are contributing to the inequitable exposure to fine particulate matter pollution amongst Black communities and unemployed communities in Louisiana. First, residents of Cancer Alley lack the political power to oppose increased industrialization near their homes. Many of the towns located in Cancer Alley are unincorporated, meaning that these towns

¹⁴⁸ *See id.*

¹⁴⁹ *See Mizutani, supra* note 136, at 373; James, Jia & Kedia, *supra* note 140, at 4366.

¹⁵⁰ *See Terrell & James, supra* note 7, at 6.

¹⁵¹ *See id.*

¹⁵² *See id.* at 1, 5, 6.

do not have any local governance structures to oversee their affairs.¹⁵³ These unincorporated towns were first created when slavery was abolished and newly freed Black individuals were permitted to buy small parcels of land at the edges of existing plantations.¹⁵⁴ These communities passed their land on to their descendants, resulting in clusters of small Black communities in Cancer Alley.¹⁵⁵ Large industrial facilities moved in next door to these communities when the nearby plantations were sold off to corporations.¹⁵⁶

Because these unincorporated towns do not have local governments, the parish within which a town is located establishes the local zoning rules.¹⁵⁷ Unfortunately, the parish does not always prioritize the health and safety of these towns. For example, the Formosa Plastics Corporation plant was built in the unincorporated Black community in Cancer Alley called Wallace after the mostly white officials of the St. John the Baptist Parish rezoned Wallace from residential to industrial use.¹⁵⁸ Although communities have fought for environmental justice for decades, industrial development in Cancer Alley still targets Black communities that were founded by newly freed slaves after emancipation.¹⁵⁹ The disparities of the COVID-19 pandemic contributes to the urgency of this issue.¹⁶⁰

The second factor contributing to disproportionately high levels of fine particulate matter pollution is the increased industrialization in Cancer Alley over the past five years. By contrast to this localized trend, the overall concentrations of fine particulate matter pollution in the entire state of Louisiana diminished by 17 percent over the course of the past two decades.¹⁶¹ Between 2000 and 2016, fine particulate matter concentrations decreased from an average of more than 11 $\mu\text{g}/\text{m}^3$ across the entire state—up to 15 $\mu\text{g}/\text{m}^3$ in some cities—to an average of less than 8.4 $\mu\text{g}/\text{m}^3$ across the entire state.¹⁶² The Terrell study attributes this reduction to the decommissioning

¹⁵³ See Mizutani, *supra* note 136, at 373.

¹⁵⁴ See *id.*

¹⁵⁵ See *id.*

¹⁵⁶ See *id.*

¹⁵⁷ See *id.*

¹⁵⁸ See *id.* at 373–74.

¹⁵⁹ See Terrell & James, *supra* note 7, at 3.

¹⁶⁰ See *id.* at 11.

¹⁶¹ See *id.* at 7.

¹⁶² See *id.* at 10.

of coal-fired power plants across Louisiana and a 75 percent reduction in fine particulate matter emissions from vehicles since 1990.¹⁶³

Beginning in 2017, however, fine particulate matter concentrations began to climb back up exclusively in southern Louisiana, including Cancer Alley, to an average of more than 11 $\mu\text{g}/\text{m}^3$.¹⁶⁴ Remember that the current annual NAAQS for fine particulate matter is 12 $\mu\text{g}/\text{m}^3$, meaning that Cancer Alley is in compliance with the 2020 NAAQS, although it is dangerously close to exceeding the national standards. The Louisiana petrochemical industry points to vehicle emissions as the largest source of fine particulate matter pollution in Louisiana.¹⁶⁵ However, the Terrell study's findings and the data from EPA both directly contradicted the Louisiana petrochemical industry's narrative.

The Terrell study shows that industrial emissions are a significant cause of this recent increase in largely low-income communities and communities of color.¹⁶⁶ A new wave of industrialization began in Louisiana around 2014 in response to the boom in U.S. natural gas production.¹⁶⁷ As a result, industrial emissions increased by a third from 2014 to 2017 such that industrial emissions in 2017 were relatively the same as 1990 industrial emissions.¹⁶⁸ EPA's statewide data affirms that industrial emissions in Louisiana are to blame for this pollution. EPA data from 2020 shows that industrial fuel combustion was the third highest source of fine particulate matter pollution in Louisiana after prescribed fires and miscellaneous sources respectively.¹⁶⁹ Industrial fuel combustion accounted for 19.14 thousand tons of emissions, while highway vehicles accounted for only 1.92 thousand tons of emissions, and non-highway vehicles accounted for 2.39 thousand tons in 2020.¹⁷⁰ Overall, these long-term trends suggest that recent increases in fine particulate matter pollution from the industry located in Cancer Alley is

¹⁶³ *See id.*

¹⁶⁴ *See id.* (Figure 4 shows that fine particulate matter pollution in southern Louisiana has increased since 2017 and reached levels above 11 $\mu\text{g}/\text{m}^3$).

¹⁶⁵ *See Terrell & James, supra* note 7, at 3.

¹⁶⁶ *See id.* at 3–10.

¹⁶⁷ *See id.* at 3.

¹⁶⁸ *See id.* at 10.

¹⁶⁹ *See* EPA, STATE TIER 1 CAPS TRENDS (Mar. 25, 2021), <https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data>.

¹⁷⁰ *See id.*

exposing low-income communities and communities of color to a disproportionately high concentration of fine particulate matter and that this inequality could be one of many factors contributing to higher death rates from COVID-19 amongst Louisiana's low-income communities and communities of color.

C. *The Role of the NAAQS in Cancer Alley*

According to EPA's most recent data, the entire state of Louisiana is in compliance with the federal fine particulate matter NAAQS.¹⁷¹ As discussed in Subsections A and B above, despite compliance with the federal standard, the unemployed communities and communities of color in Cancer Alley are experiencing a grave environmental injustice because they are experiencing higher rates of exposure to fine particulate matter.¹⁷² And scientists are beginning to find that increasing exposure to fine particulate matter is correlated with, and could be one of many factors, contributing to higher mortality rates from COVID-19.¹⁷³

As discussed in Section II.C., the Trump EPA concluded that any environmental justice concerns were caused by a lack of compliance and could therefore be alleviated by bringing these environmental justice areas into compliance, rather than changing the standard.¹⁷⁴ The communities of Cancer Alley provide a direct counterexample. These communities are being disproportionately affected by fine particulate matter pollution and mortality from COVID-19 despite compliance with the 2020 NAAQS. One of the most important takeaways from this Note is that the current fine particulate matter NAAQS may not be sufficiently stringent because compliance is not protecting environmental justice communities from an excessive burden of fine particulate matter-related mortality.

¹⁷¹ See *Counties Designated Nonattainment for P.M.-2.5 (1997, 2006, and/or 2012 Standards)*, EPA (Sept. 30, 2021), <https://www3.epa.gov/airquality/greenbook/mappm25both.html>; *PM-2.5 (2012) Designated Areas by State/County/Area*, EPA (Sept. 30, 2021), <https://www3.epa.gov/airquality/greenbook/kbcty.html>.

¹⁷² See Terrell & James, *supra* note 7, at 1, 5, 6.

¹⁷³ See Wu et al., *supra* note 10, at 1.

¹⁷⁴ See RESPONSES TO SIGNIFICANT COMMENTS ON THE 2020 PROPOSED RULE ON THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER, *supra* note 130, at 41.

The most recent research adds an additional wrinkle to this conclusion. Researchers warn that the monitoring network in Louisiana is “grossly inadequate,”¹⁷⁵ which could indicate that the federal fine particulate matter compliance data is inaccurate. Most worrisome is that there is a lack of monitoring and air quality data in Cancer Alley.¹⁷⁶ Although Cancer Alley spans approximately 130 miles of the Mississippi River, there is currently only one monitoring site.¹⁷⁷ Without data and monitoring from EPA, it is challenging for environmental justice communities to determine whether they are being exposed to dangerously high levels of fine particulate matter. These calculations require access to several years’ worth of data and averaging capabilities. This dearth of data could be masking hot spots within Cancer Alley where communities could be experiencing hazardous air quality in excess of the 2020 NAAQS, but are unaware of this danger because there is no monitoring of their air quality. The Trump EPA awarded the state of Louisiana \$978,866 in December of 2020 to enhance its monitoring network for fine particulate matter.¹⁷⁸ Time will tell whether this money successfully addresses the lack of monitoring in Cancer Alley.

This analysis suggests that there are two different explanations for why exposure to fine particulate matter pollution might be harming environmental justice communities in Cancer Alley, assuming that this exposure is contributing to the negative health outcomes in Cancer Alley and other environmental justice communities. The first is that the 2020 NAAQS is insufficiently stringent. There could be several different reasons for this. For example, the standards may not be strong enough to protect many people, not just those living in environmental justice communities. Indeed, the Trump EPA itself concluded that “the groups at risk of PM-2.5-related health effects represent a substantial portion of the total U.S. population.”¹⁷⁹ Or perhaps the standards protect most American residents, but not

¹⁷⁵ Terrell & James, *supra* note 7, at 11.

¹⁷⁶ *See id.*

¹⁷⁷ *See id.*

¹⁷⁸ *See Louisiana Receives \$978,866 from EPA to Enhance Air Quality*, EPA (Dec. 10, 2020), <https://www.epa.gov/newsreleases/louisiana-receives-978866-epa-enhance-air-quality>.

¹⁷⁹ POLICY ASSESSMENT FOR THE REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER, *supra* note 29, at 3-44; Review of the National Ambient Air Quality Standards for Particulate Matter, 85 Fed. Reg. 82,684, 82,684, 82,703 (Dec. 18, 2020) (to be codified at 40 C.F.R. pt. 50).

environmental justice communities because EPA did not recognize environmental justice populations as sensitive populations and therefore did not establish standards that would protect them.

The second explanation is that the 2020 NAAQS are sufficiently stringent, but the standards are exceeded in environmental justice communities such as Cancer Alley. Again, this could be the case for several reasons. Perhaps compliance with the standards is monitored over large areas instead of at the more granular level that is required to track compliance in environmental justice communities. Alternatively, emissions limitations may not be properly enforced against polluters in environmental justice communities. This lack of enforcement could manifest itself in a lack of enforcement actions, inadequate penalties, or both. As discussed in the following section, there are several different options for EPA to address the different factors that may be contributing to the environmental injustices highlighted by the COVID-19 pandemic.

IV. POTENTIAL SOLUTIONS

Although the main focus of this Note is to understand why the NAAQS for fine particulate matter are not protecting environmental justice communities, it is hard to write about these problems without looking for solutions. This Note, therefore, concludes with a few suggestions to improve the NAAQS. These suggestions warrant further research, however. For example, should EPA focus on reducing disparities in exposure to fine particulate matter pollution, or disparate health impacts related to that exposure? How should EPA define these inequities, and what should the metrics be? All of these questions and more will need to be explored in more detail.

A. *Updating the NAAQS*

Although low-income communities and communities of color have been exposed to higher concentrations of fine particulate matter pollution for decades, COVID-19 and the higher mortality rate correlated with this disparate exposure has made the search for a solution even more urgent. The most straightforward solution is for the federal government to revise the current NAAQS for fine particulate matter pollution and to make these standard more stringent. Fortunately, the Biden EPA just announced that it will reconsider the NAAQS and assess the latest research on the adverse health

effects of this air pollutant.¹⁸⁰ Additionally, the Biden EPA will reconstruct a specialized panel—which was dismantled during the Trump administration—to independently review the research and conclusions of EPA.¹⁸¹

B. *Incorporating Regulatory Reforms*

Another potential solution is for the Office of Information and Regulatory Affairs (OIRA) to create a regulatory review process that promotes social welfare, racial justice, and equity in accordance with President Biden’s memorandum entitled “Modernizing Regulatory Review.”¹⁸² If the new NAAQS do not sufficiently address environmental injustices, OIRA should either require EPA to create a mitigation plan to accompany its rule or require EPA to redraft the rule to minimize the disproportionate impacts on low-income communities and communities of color.¹⁸³ Accordingly, OIRA review could serve as a backstop in the event that the Biden EPA’s environmental justice analysis of the NAAQS is inadequate.

C. *Modifying State Implementation Plans*

Alternatively, the Clean Air Act could do more for environmental justice communities by way of the State Implementation Plans. For example, the Biden EPA could promulgate regulations requiring states to routinely analyze inequitable exposure to pollution within the state, to adopt a plan to address these inequities, and to meaningfully include environmental justice communities in this process. This requirement should supplement the development and enforcement of State Implementation Plans to ensure that the benefits of the Clean Air Act are distributed more equally across the United States.

One of the advantages to turning to the State Implementation Plans is that environmental injustices require a state-by-state solution. One of the most challenging aspects of researching why the federal NAAQS are failing America’s low-income communities and

¹⁸⁰ See Hijazi, *supra* note 25.

¹⁸¹ See *id.*

¹⁸² See Memorandum on Modernizing Regulatory Review, 86 Fed. Reg. 7223 (Jan. 26, 2021).

¹⁸³ See Richard L. Revesz, *Regulation and Distribution*, 93 N.Y.U. L. REV. 1489, 1566–72 (2018) (providing an example of how OIRA could incorporate environmental justice concerns into its review).

communities of color is that there are a multitude of different location-specific factors that contribute to these inequities, making it hard to research on a federal level. For example, these communities in Cancer Alley are experiencing disproportionately high adverse effects because they lack political power to control zoning in their communities and are experiencing increasing industrialization. Mobile sources like cars and trucks are not a significant source of fine particulate matter pollution because emissions from these sources have decreased dramatically over the past two decades.¹⁸⁴ By contrast, highways are a significant sources of fine particulate matter pollution in Los Angeles.¹⁸⁵ Because of the multitude of these location-specific factors, federal NAAQS alone are insufficient to address environmental this injustice.

Luckily, the Clean Air Act currently relies on state-specific plans to implement the federal NAAQS by requiring states to use their discretion to achieve the federal NAAQS in accordance with their priorities by creating and implementing a State Implementation Plan.¹⁸⁶ The Clean Air Act currently requires these State Implementation Plans to include various elements, such as enforceable emissions limitations, monitoring and reporting systems, and an enforcement regime.¹⁸⁷ These requirements are supplemented by the regulations that EPA promulgates. These regulations could be changed to require states to include environmental justice communities in analyzing environmental injustices on a localized level and creating a plan to address these injustices.

This change should be legally enforceable because the voluntary initiatives that have been tried so far to address environmental injustices are insufficient, as evidenced by this Note's conclusion that low-income communities and communities of color are still experiencing disparate rates of fine particulate matter pollution.¹⁸⁸ For example, the Obama EPA promulgated a regulation in 2016 regarding State Implementation Plans for fine particulate matter

¹⁸⁴ Terrell & James, *supra* note 7, at 7.

¹⁸⁵ See Ann E. Carlson, *The Clean Air Act's Blind Spot: Microclimates and Hotspot Pollution*, 65 UCLA L. REV. 1036, 1057–58 (2018).

¹⁸⁶ See 42 U.S.C. § 7410(a).

¹⁸⁷ See 42 U.S.C. § 7410(a)(2).

¹⁸⁸ See discussion *supra* pp. 24–33.

NAAQS.¹⁸⁹ This regulation included extensive suggestions for states that were interested in creating a State Implementation Plan with appropriate protections from fine particulate matter exposure for overburdened populations.¹⁹⁰ EPA emphasized in this regulation that “states have sufficient flexibility and discretion under the [Clean Air Act] in implementing their attainment strategies to focus resources on controlling those sources of emissions that directly and adversely affect low-income and other at risk populations.”¹⁹¹ EPA perhaps intended to encourage the states to do so by arguing that a State Implementation Plan that focuses on environmental justice could help states maximize health benefits in a cost-effective manner.¹⁹² The regulation provided a series of recommendations to help states monitor environmental injustices annually, create emissions reductions in low-income communities and communities of color, and meaningfully include these populations in the entire process.¹⁹³ Environmental justice organizations like WE ACT for Environmental Justice created additional materials to help states incorporate environmental justice considerations into their State Implementation Plans.¹⁹⁴ To better understand the impact of these suggestions on environmental justice outcomes, future research could analyze how many states addressed environmental justice in their state implementation plans and how these states did so. In the meantime, a change to the regulatory framework that would require the use of these tools would be an important first step towards a solution.

CONCLUSION

This Note’s analysis of the relationships between race, socioeconomic status, fine particulate matter pollution, and mortality rates from COVID-19 shows that there is an intolerable environmental justice crisis in the United States. The pandemic has created an even greater sense of urgency to turn to existing environmental laws and begin to address this inequity. One of the few benefits of

¹⁸⁹ See Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, 81 Fed. Reg. 58,010, 58,010 (Aug. 24, 2016) (to be codified at 40 C.F.R. pts. 50, 51, 93).

¹⁹⁰ See *id.* at 58,137.

¹⁹¹ *Id.*

¹⁹² See *id.*

¹⁹³ See *id.*

¹⁹⁴ See WE ACT FOR ENVIRONMENTAL JUSTICE, CLEANER AIR CLEANER COMMUNITIES (2018), <https://www.weact.org/cleaner-air-cleaner-communities>.

COVID-19 is that it has created such a massive disruption in how we live and how we govern ourselves that we are all left questioning the status quo and daring to make drastic changes. It is absolutely critical that society takes advantage of this unusual moment in history to make the country a safer and more equitable place.