



H.R. 516

THE ENVIRONMENTAL JUSTICE MAPPING AND DATA COLLECTION ACT OF 2021

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Tables of Contents

1.Executive Summary 3

2.Introduction..... 4

3.The Environmental Problem 7

4.The Science Behind the Problem 11

5.The Proposed Solution..... 15

6.The Science Behind the Proposed Solution.....18

7.The Scientific Issues and Controversies 21

8.Measuring the Successes of the Solution 25

9.Conclusion 29

10.References..... 30

Executive Summary

In this report, we will be analyzing H.R. 516, The Environmental Justice Mapping and Data Collection Act of 2021. The report will begin by establishing the substance of the bill. Next, the report will introduce the environmental injustices and the science behind these environmental injustices. Then, the report will introduce the solutions of H.R. 516 and the science of these solutions. Lastly, the report will address the controversies and scientific issues of H.R. 516 and its measures of success. Throughout the report, we will refer to a case study of Hurricane Katrina at the end of sections, applying the section's main concepts in a localized context.



Introduction

The Environmental Justice Mapping and Data Collection Act, hereafter known as 'H.R. 516' and 'The Bill', establishes an interagency committee to identify and connect environmental justice communities to 40 percent of relevant federal investments as outlined in President Biden's Justice40 Initiative. Building on the environmental justice (EJ) movement – championed primarily by African-Americans, Latinos, Asians and Pacific Islanders, and Native Americans (H.R. 516, 2021) – President Biden's Justice40 Initiative bolsters Executive Order 12898¹(Skelton & Miller, 2016). The Bill models itself after New York's Climate Leadership and Community Protection Act of 2019, which stipulated 40 percent of relevant investments go to “disadvantaged communities” (Federal Register, 1994). Given historical and current environmental injustices, the Bill has been introduced to pinpoint the locations of eligible environmental justice communities and ensure they receive investment.

Sponsor and Status

Introduced to the House by Representative Cori Bush in April 2021.

The Interagency Committee will include the:

- EPA
- USDA
- Department of Commerce
- Department of Interior
- Department of Health and Human Services
- Department of Housing and Urban Development
- Department of Energy
- Department of Transportation

Legislative Summary

The Interagency Committee will consult with an advisory council of stakeholders, and half of the council members will be members of communities experiencing environmental injustice and representatives. An environmental justice advocate will chair the advisory committee.

¹ The groundbreaking 1994 federal directive explicitly focused on environmental justice in minority and low-income populations.

Findings (Section 2): Historically there has not been, nor is there currently, a consistent measure of environmental justice communities across the country, though it is acknowledged that environmental justice communities are affected by health issues caused by environmental hazards at a disproportionately higher rate than other communities. It is necessary that the federal government allocate funds and responsibilities to particular agencies in order to create a methodology to identify factors present in particular environmental justice communities and to correct for racist and unjust practices which have led to these vulnerabilities. The data collected through this methodology will help identify environmental justice communities based on collected effects of socioeconomic factors, pollution burden and public health factors. The data collected will be used to target investments in environmental justice communities and promote pollution reduction.

Establishment of Committee (Section 4): The Bill defines the foundation of the “Environmental Justice Mapping Committee” (the Committee) and the membership, the selection of representatives, and the responsibilities of the co-chairs and administrative support. For membership on the committee, the bill posits the engagement of specified offices and departments within the:

- Environmental Protection Agency
- Council on Environmental Quality
- Forest Service
- Federal Energy Regulatory Commission
- Departments of Commerce
- Department of Health and Human Services
- Department of the Interior
- Department of Housing and Urban Development
- Department of Energy
- Department of Transportation
- Department of Justice
- Department of the Treasury

The representatives are to come from the aforementioned agencies and individuals who have expertise in demographic indicators. Co-chairs are to be representatives of the EPA, serve for a maximum of three years, and be responsible for the determination of the agenda, consultation, overseeing the public engagement process and convening meetings of the committee. Alongside the chairs, the administrative support aids the committee and plays a role in the funding of the project.

Duties of Committee (Section 5): The Committee is responsible for establishing a tool for the methodology and identification of environmental justice communities. The first objective will be satisfied through a consultation with relevant stakeholders. Meanwhile, the second objective - establishing a tool - takes a couple of methodological approaches, from extending the analysis beyond demographic factors, to ensuring the tool is accessible to all. The Committee will conform to promises of transparency in hearings and notices, as well as endeavor to update the report regularly and in a manner that is accessible to the public.

Environmental Justice Data Repository (Section 6): A data repository must be created to maintain all of the data collected; beyond storing the data, this maintenance entails regular updates, every year if possible (and at least once every 3 years). The repository must be accessible by regional, State, local and Tribal governments - which also have the ability to include their pre-existing data in the repository. The Committee is responsible for ensuring that the data cannot be used to discriminate against environmental justice communities, partially by safeguarding the downscaled data to protect the identification of individuals.

Authorization of Appropriations (Section 7): The Committee is authorized to use 20 million dollars for 2021 and 2022, and 18 million dollars for the following three years.

Case Study: Introduction to Hurricane Katrina in New Orleans

Hurricane Katrina, a category 3 storm, touched down in New Orleans on August 29th, 2005. Hurricane Katrina was the most deadly storm to hit the Gulf Coast in recorded history. According to FEMA, over 204,000 homes in Louisiana were destroyed with the majority located in New Orleans. The effects caused an estimated \$23 billion dollars worth of infrastructure damage. Over 900 people died in the storm or from injuries sustained from it (Brunkard, 2005). More than 105, 000 citizens did not have a car, 60% of which were African American (Allen 2007). Additionally, nearly 70% of the people affected by the storm were African American while communities of color made up over 80% of the population in flooded neighborhoods (Allen 2007).



The Environmental Problem

Background of the Modern Environmental Justice Movement

The modern environmental justice movement began in the late 1960's, starting with the Memphis Sanitation Strike in 1968 (Environmental Protection Agency). The Memphis Sanitation Strike was the first time that African Americans organized on a national scale against environmental injustice (Environmental Protection Agency). Then, in Houston in 1979, Black communities began to organize and protest against the Whispering Pines Sanitary Landfill, zoned to be located next to a school and residential buildings (Environmental Protection Agency). In 1987, the United Church of Christ's Commission for Racial Justice issued a report that concluded that race was the strongest indicator to the zoning and location of hazardous facilities (Environmental Protection Agency). This report provided surmounting evidence that dominant culture stakeholders perpetuate environmental injustice by upholding social and economic structures that oppress marginalized communities (Faber, 2018).



Protest at Warren County PCB Landfill in 1982, Photo by Greg Gibson, AP

The growing legitimacy of the environmental justice movement led to former President Bill Clinton signing Executive Order 12898 in 1994 as part of a federal effort to incorporate environmental justice into national governmental policy (Skelton & Miller, 2016). Despite national recognition of the EJ movement, government systems have failed to record and update data regarding environmental impacts on marginalized communities. This neglect has led to inaction which has spanned centuries.

Environmental Burdens and Public Health Impacts

Environmental injustice can take many forms such as air pollution, water contamination, land contamination, climate change, and poor infrastructure. Acts of environmental injustice are not singular in nature and are inflicted as part of the systemic process of oppressing marginalized people.

Air Pollution

- Across America, more than half of the 9 million people living near hazardous waste sites are people of color (Bullard et al., 2007). Moreover, African Americans are three times more likely to die from exposure to air pollutants than their white counterparts (Di et al., 2017). It must be noted that the reason behind this trend is not purely based on location. A study in the Annual Review of Public Health found that environmental injustice is highly correlated with other factors that link poverty to poor health, such as inadequate access to medical and preventative care (Brulle & Pellow, 2006). Adverse impacts of air pollution inhibit the ability of community members to attend work and school, exacerbating social vulnerabilities such as poverty and pre-existing health conditions (American Lung Association, 2021).

Water Contamination

- EPA data from 2016-2019 shows that drinking water systems that have constantly violated the law for years are 40% more likely to occur in places with higher percentages of residents who are people of color (POC) (Fedinick et al., 2019). Overall, 9% of community water systems nationally violated health-standards in 2015, with an estimate of 95,754 health violations from 1982 to 2015 (Allaire, Wu, and Lall, 2018). These health violations are felt through large-scale health impacts. Across the United States, 16.4 million cases of acute gastroenteritis are caused by community water systems (Allaire, Wu, and Lall, 2018).

Land Contamination

- Expansion of industrial areas, land application of fertilizers, and pesticide use constitute important sources of heavy metal-related soil contamination. High exposure to contaminants such as lead, arsenic, cadmium, and zinc can cause cancer, decreased cognitive function and birth deformities among other negative health impacts.

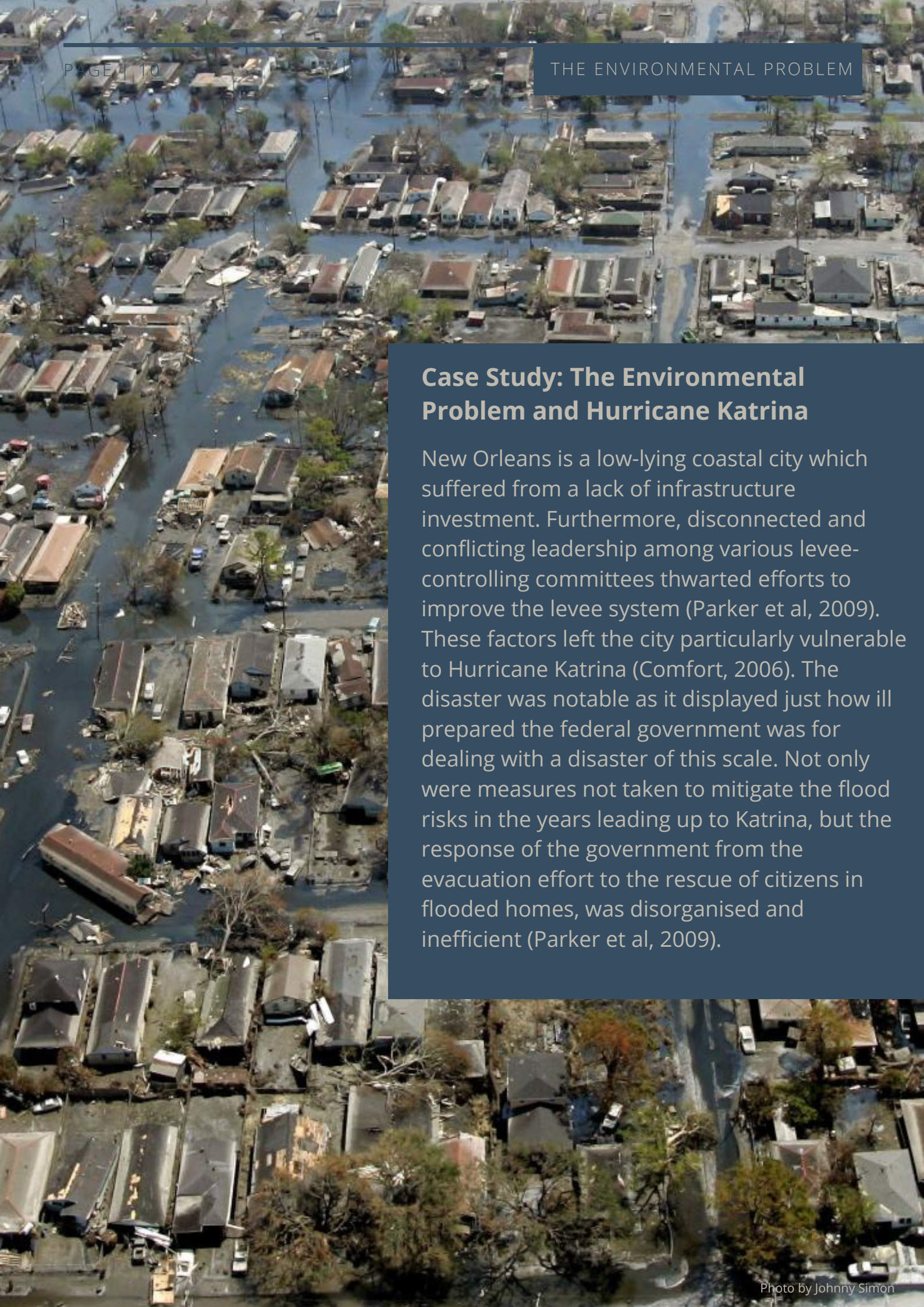
- Researchers found that children from low-income and POC families spend more time playing on contaminated soils than children from high-income families (Gochfeld & Burger, 2011). Another study found that the exposure of nitrogen oxides, pollutants and greenhouse gasses found in soil, was 37% higher in people of color than in non-white people. Researchers concluded that if exposure for both groups had been the same as the exposure to white-people, 5,000 deaths of people of color could have been prevented (Clark et al., 2017).

Climate Change

- Increased concentration of greenhouse gases have raised average global temperatures, thus exacerbating current environmental risks, such as flooding, natural disaster intensity, and drought. The urban heat island effect causes ambient temperatures of urban areas to significantly increase burdening urban and especially low income communities. In a national study of 175 different cities, research showed that in 97% of cities studied, race was a stronger predictor than income for living near the highest urban temperatures (Hsu et al., 2021). People who die from heat waves are often unhoused people and low-income elderly people without access to air conditioning or transportation to public cooling centers. The urban heat island effect is an example of a larger trend for climate change in which vulnerable populations disproportionately experience higher environmental risks.

Why is Federal Government Action Needed?

Since environmental justice first gained traction in the political sphere, the federal government has struggled with national data collection, regulation of negative externalities in the market, and financial investment in EJ communities. Clinton's 1994 executive order called for the establishment of national screening tools to identify and serve EJ communities on a national scale. Since then, the EPA has developed a series of information management systems to display geographical connections among various indicators, but has yet to develop a federal mapping system that defines potential EJ communities with respect to minority and poverty status. Without identifying such areas, stakeholders involved in policy implementation are unable to assess whether communities are disproportionately burdened with health consequences and environmental hazards so as to allocate funds and undertake regulatory action (Liang, 2016).



Case Study: The Environmental Problem and Hurricane Katrina

New Orleans is a low-lying coastal city which suffered from a lack of infrastructure investment. Furthermore, disconnected and conflicting leadership among various levee-controlling committees thwarted efforts to improve the levee system (Parker et al, 2009). These factors left the city particularly vulnerable to Hurricane Katrina (Comfort, 2006). The disaster was notable as it displayed just how ill prepared the federal government was for dealing with a disaster of this scale. Not only were measures not taken to mitigate the flood risks in the years leading up to Katrina, but the response of the government from the evacuation effort to the rescue of citizens in flooded homes, was disorganised and inefficient (Parker et al, 2009).

The Science Behind the Problem

Understanding the science behind environmental problems and injustices is crucial when allocating resources to solve them. In this section, the report will delve into different types of environmental problems and the scientific ways in which they result in environmental injustices.

The nature of these problems include point-source and non point-source pollutants, structural disparities, and spatial disparities. The severity of health effects from pollutant exposure is dependent on dose, however even low-level exposure to highly toxic pollutants can have severe and permanent negative impacts.

Lead

- Lead (Pb) is a heavy metal that is toxic to humans and disrupts a multitude of cellular processes. Lead sources include the production of gasoline, ceramics, and batteries (Sun et al., 2006). While no longer used in household fixtures, lead can be found in old paint and pipes (Garza et al., 2006).
- Older lead pipe infrastructure and corrosive water can lead to serious lead contamination in drinking water and eventually to lead poisoning. Both low-level and high-level exposure affect multiple body systems and is particularly harmful to young children (Garza et al., 2006). Lead exposure can result in anemia, kidney and brain damage, and death. In pregnant women, exposure can result in miscarriages and stillbirths (Hu et al., 2006).
- It is estimated that nearly 400,000 Americans die each year from complications due to lead exposure; primarily in communities of color (Lanphear et al., 2018).

Particulate Matter

- Particulate Matter (PM) are microscopic particles that are delineated by particle diameter size (PM₁₀ (<10µm); PM_{2.5} (<2.5µm)). PM is released into the air as dust, soot, and smoke produced from natural and anthropogenic processes (Tessum et al., 2019).
- When inhaled, PM can reduce lung function, resulting in asthma, acute bronchitis, and increased susceptibility to respiratory infections (Tamagawa et al., 2008).

- It is estimated that PM pollution causes between 85,000 and 200,000 premature deaths in the U.S. annually (Bowe et al., 2019). PM exposure is not uniform across races in the United States, with blacks experiencing 1.5 times more PM exposure than whites and Hispanic experiencing 1.2 times more than non-Hispanic whites (Mikati et al., 2018).

Climate Change

- Climate change is a multi-disciplinary investigation into the increase in Earth's temperature. The burning of fossil fuels and other industrial processes are the main drivers of increased temperature (Höök & Tang, 2013). This rapid warming is destabilizing many natural systems, resulting in global sea level rise and increases in intensity and frequency of extreme weather events (Woodward & Samet, 2018).
- In the US, temperatures are expected to increase 2.5 °F by 2050 (Wuebbles, Fahey, and Hibbard, 2017). Additionally, there is a predicted 40% increase in precipitation over the Northeast United States (Wuebbles, Fahey, and Hibbard, 2017). Coastal flooding in large cities along with heat waves, droughts, forest fires, hurricanes and monsoons will occur more frequently and severely (Wuebbles, Fahey, and Hibbard, 2017).

Urban Heat Islands

- Urban heat islands is a term that refers to how urban city centers often get 1 or more degrees warmer than nearby rural areas. This results from urban surfaces absorbing more heat than vegetation, causing urban centers to warm more than their rural counterparts (Morini et al., 2016).
- Urban heat islands disproportionately affect the elderly, outdoor workers, unhoused people, disabled people, and pregnant women. For low-income communities, avoiding the heat with air conditioners is a larger relative financial burden (US EPA, 2014a).
- In 1995, 700 Chicago residents died during a heat-wave, with a disproportionate impact on older people, Black communities, and low-income communities (US EPA, 2014a).

Cultural and Ecological Severance

- Cultural severance from the environment is a problem in which people are separated from and lose cultural identity and connections to the natural environment, either forcibly displaced or through urbanisation and rural depopulation. This environmental severance leads to the loss of indigenous knowledge and the failure to maintain local ecologies (Rotherham, 2013).
- Cultural and ecological severance is an environmental justice issue, because there is a disparity on who has access to land, who enjoys natural environments, and who can maintain their cultural identity (Rotherham, 2013).



Native American protesters and supporters gather at the Black Hills, now the site of Mount Rushmore, on July 3, 2020, in Keystone, South Dakota. **Micah Garen/Getty**

Continued Research and Potential Shortfalls

Increased sensitivity for identifying EJ communities will seek to be improved by standardizing methodologies (Mohai et al., 2009), introducing new metrics (Ash & Fetter, 2004), and increasing the data available for analysis (Emanuel, 2017). Identifying EJ communities will require more localized data and community-based participatory research (CBPR) to create a complete map (Petersen et al., 2006). Minority or low-income communities could then use the data to organize, educate, and litigate for environmental justice (Bullard & Johnson, 2000).

Case Study: The Science behind the Problem and Hurricane Katrina

The warming effects of global climate change are predicted to increase the frequency and intensity of severe weather events. Additionally, hurricanes have increased rainfall production, which is devastating to low-lying or flood-prone areas (Oldenborgh et al., 2019). When Hurricane Katrina made landfall in 2005, it dropped nearly 2.3 trillion gallons of rainwater, enough to fill Lake Pontchartrain four times over (Samenow, 2019). Hurricane Katrina and its negative impacts are illustrative of the risks and consequences of climate change. For Hurricane Katrina, the levy infrastructure failed as a result of bureaucratic neglect and environmental racism (Eccleston, 2010). For coastal cities, understanding how to create and upkeep resilient levies, sewer systems, flood walls and other risk management infrastructure in the face of climate change. Additionally, the preservation of wetlands is vital for absorbing flood shocks and wave energy.

The Proposed Solutions

H.R 516 proposes to create an interagency EJ Mapping Committee tasked with the development of a comprehensive EJ community mapping tool. The map will identify EJ communities based on a wide range of social, environmental, and economic indicators. Indicators include, but are not limited to, race and ethnicity, employment status, education level, food security, health insurance status, membership to an indigenous tribe, access to energy, green space, transportation, health issues, and proximity to environmental contamination.

The responsibilities of the EJ Mapping Committee include:

- Compiling data layers and ensuring existing data gaps are confronted.
- Updating indicators and methodology of the tool at least once in three years.
- Collaborating with local organizations to develop best practices for data collection and tool education for EJ communities.
- Providing public updates about the map and the mapping tool through the Environmental Protection Agency (EPA) website.

Mandatory implementations written in H.R 516 include the establishment and structure of the Mapping Committee, the creation of the map, consultations with relevant stakeholders, and funding between 2021-2025. However, there is no mention of how the funding will be distributed between creating the tool, filling the data gaps and community response. Indicators used to create the map are not final and can change to more accurately reflect the identities of EJ communities.

Furthermore, there is ambiguity regarding which communities closely collaborate with the committee. Marginalized groups are often excluded from policy design, leading to biased policy outcomes that exclude the most vulnerable (OECD, 2015). The solution proposed in H.R 516 stipulates that EJ communities will have a major role in the EJ Mapping Committee and the creation of the mapping tool through the creation of an advisory council.

Challenges of the Proposed Solution

Sociopolitical, financial, and environmental challenges of creating and using the mapping tool include:

- *Short funding period.* This bill will only allocate funds towards the screening tool and EJ advisory committee needs between 2021-2024 (H.R. 516, 2021). This leaves little time for EJ communities to receive direct aid from H.R. 516. Most pollution control projects, such as the dredging of the polluted Gowanus canal, require many years of planning and an additional decade of implementation (US EPA, 2021).
- *High costs of confronting existing data gaps in regional tools.* There are data gaps in local/regional EJ tools that require significant funds to remedy. California's tool, CalEnvironScreen, is flawed in its omission of race and ethnicity indicators and its inability to capture the impact of climate change threats on communities (Barnes et. al., 2021). Filling gaps in regional data will require an extensive network of stakeholders and data collectors, and all of which need to be adequately compensated.
- *Infrequent updating of the mapping tool.* The current consensus between mapmakers and politicians is that mapping tools should be updated annually (Arriens et al., 2020). Requiring updates every 3 years could lead to greater risk for inaccuracies in data and data doubling, and outdated data being used for decision-making.
- *Difficulties in stakeholder cooperation.* The EJ Mapping Committee and advisory council consists of government agencies, EJ community members, advocates, and data collectors (H.R. 516, 2021). The interests of more vulnerable stakeholders could be deprioritized or made more vague to appeal to more powerful actors, creating room for error and loopholes that would further exacerbate EJ issues (Beckman et. al., 2016).
- *Parameter subjectivity.* Identifying environmental injustices is a complex process as each combination of pollutants of environmental parameters will affect the community differently. The subjectivity of the parameters leaves plenty of scope for interpretation which may be a disadvantage with a large number of stakeholders.

Benefits to the Proposed Solution

Benefits of H.R. 516 in advancing environmental justice efforts include:

- *Creating a visual aid for environmental injustice.* Being able to visualize, quantify and analyse what communities are affected, where they are and the environmental hazards associated with them through this map will therefore be an aid in and of itself.
- *A national standard for identifying EJ communities.* H.R. 516 proposes to create a national standard to identify, characterize and operationalize EJ issues across the US. This will be beneficial for the federal government to identify and prioritize EJ communities (Lee, 2020).
- *Incentive for future investments & federal programs.* Once this tool is complete, it will be used in the screening of policies, permitting processes, and investments for environmental and climate justice impacts. The tool may also be used to assess communities for pollution reduction programs.
- *EJ community inclusion and procedural justice.* H.R. 516 proposes to engage with EJ communities and activist leaders and provides a mechanism for them to self-identify in case they were not identified in the tool (H.R. 516, 2021). This will ensure that adequate input and consent is obtained from marginalized communities, and which will allow for procedural justice — or increased fairness, transparency, and opportunity for voice — in the decision-making process.
- *Empowerment of EJ communities.* The proposed solution will empower EJ communities to hold their local, state and federal leaders accountable and ensure the betterment of their communities.

The Science Behind the Proposed Solutions

The EJ Mapping Tool proposed by the H.R. 516 aims to quantify, visualise and analyse social, environmental, and economic parameters to identify EJ communities. The tool will be created using data analysis and geographic information. Modern cartography employs data manipulation, data capture, and image processing using aerial photography, sensors, and Global Positioning Systems (GPS). The mapping tool will be created using Geographic Information Systems (GIS) based software to bring together cartography, modern technology and information sets. The environmental and demographic data indicators will then be used to identify environmental injustices. Through the EJ Mapping Committee, successful mapping of this data will enable users to see patterns and to proactively propel funding for EJ communities. However, technical challenges, such as modifiable areal unit problem (MAUP), which alter conclusions based on study scale (e.g. partisan gerrymandering), must be addressed to obtain accurate results.

Existing Data

Data indicators provide a comprehensive outlook on a community's social, economic, and environmental parameters (Arriens et al., 2020). These indicators are critical to identify EJ communities and have been collected by various governmental and private agencies, such as the EPA and NASA. Recently, data has been used to develop EJ GIS screening and mapping tools (EJSM) to analyze important socio-economic factors and vulnerability to weather events (Arriens et al., 2020). For example, it is possible that mapping tools that showed the high flooding risk of minority and low-income communities in New Orleans could have informed decisions to protect these communities from serious flooding events, such as Hurricane Katrina.

Existing mapping tools include:

- *EPA's EJSCREEN*: a federal EJ mapping and screening tool that provides the EPA with a nationally consistent dataset of socio-economic indicators (US EPA, 2014b).
- *CalEnviroScreen*: a state level EJ mapping tool for the state of California that divides environmental indicators into exposure, and demographic indicators into sensitive populations and socioeconomic factors (Arriens et al., 2020).
- *MD EJSCREEN*: a state level EJ mapping tool for the state of Maryland. It's development offers a valuable model for gathering community input via stakeholder meetings and electronic surveys (Arriens et al., 2020).

Mitigating Data Limitations

Overcoming the following data limitations is critical for making the solution a success.

- **Scale** - Collection methods may vary based on different spatial or temporal scales. To ensure consistency in data, the proposed map must balance data quality with coverage (US EPA, 2014b).
- **Race and Ethnic granularity** - Data is rarely disaggregated based on race or ethnicity and even when it is, only coarsely (e.g. white, black, Hispanic).
- **Data** - Data collection frequency is important to get an accurate picture of a problem, but data is often out-of-date. For example, Environmental Justice for New York state uses an EJ mapping system that is based on 2000 U.S. Census data. There will be funding concerns associated with the integration of data sets to be comparable.
- **Uncertainty** - Existing data relies on estimates with substantial uncertainty. In census blocks, demographics are estimated; derived from surveys, not a census of all households. These estimates about the percentage of low-income individuals could be 30%, however the actual number may be 20-40%.

GIS will enable visualization, analysis and interaction with environmental justice issues across the nation, therefore propeling decision-making and investment to alleviate the crisis. However, the inconsistencies with respect to data need to be addressed to maximize the potential of the map. Appropriate management of resources as well as justified allocation of funding to disadvantaged communities is another major part of the solution. Overall, the bill proposes a science-based approach that, when implemented efficiently, will be a step towards resolving environmental justice issues in the nation.

Case Study: The Proposed Solution and Hurricane Katrina

As an after effect of Hurricane Katrina, maps were built to reduce the extent of the disasters and impacts on various communities. However these maps contained multiple issues:

- Data gaps
- Absence of a consistent scale for analysis
- Differences in data collection methodology

Through the creation of a nationally consistent environmental justice definition, the map proposed in the bill will clearly identify EJ communities on a publicly accessible map. The utility of the map in policy making can vary based on the layers used to create it and an example of the layers that can be seen in Figure 1. The map created by the bill will enable relevant investment and empower vulnerable communities by giving them the ability to hold the appropriate agencies accountable.



Figure 1. Showing various layers that can be used to create a map of New Orleans. From left to right; Base map, impaired rivers, public and subsidized housing, hazardous waste sites and Superfund sites.

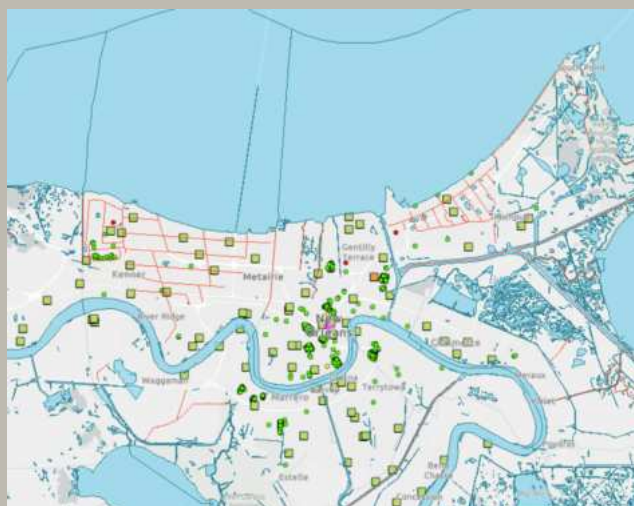


Figure 2. Map of New Orleans showing all the layers in Figure 1 above.

The Scientific Issues and Controversies

H.R. 516 is far from a perfect policy, and there are scientific issues and controversies related to the bill and the environmental problems that it seeks to address. In this section of the report, these issues will be split into four sections: the committee, the map, the data, and the funding.

Environmental Justice Mapping Committee and Procedural Justice

- *Ej Community Representation.* The bill proposes the establishment of an advisory committee with at least 50% of its members representing EJ communities. However, the EJ Mapping Committee does not have such a criteria. Another drawback is that the EJ Mapping Committee is required to consult with the advisory committee only once per fiscal quarter (H.R. 516, 2021). This infrequent engagement is a barrier especially if urgent issues arise or if the schedule is not ideal. Also, the suggestions presented by the advisory committee may or may not be upheld by the EJ Mapping Committee. The extent of engagement with the advisory committee and EJ communities by the EJ Mapping Committee is controversial since the EJ communities may not feel empowered and included in the decision-making process.
- *Stakeholder Interests.* Government decisions are historically prioritized based on profitability and favor rich, powerful and white communities.
 - *Committee structure.* Involvement of multiple agencies and stakeholders in the EJ Mapping Committee can potentially result in conflicting opinions and therefore, inefficient management and decision-making which ultimately delays resolving EJ issues.
 - *Industry influence.* Environmental injustices have occurred when industrial sites are established in minority neighbourhoods. For example, 85% of air pollution in St James Parish is due to industries present in Convent, Uncle Sam and other neighbouring towns with a predominant (91%) minority population (Mullin, 2020).
 - *Urban vs Rural.* Urban EJ communities have better access to resources than rural communities. Additionally, development projects are prioritized in urban settings. For instance, waste produced in cities tends to be transported and dumped into surrounding rural areas, thus exemplifying a prioritization of city clean up projects at the expense of the surrounding countryside (Kelly-Reif & Wing, 2016).

Map

- *Identification of EJ communities.* A lack of quality and representative data may fail to recognize EJ communities. The failure of the map to identify EJ communities will result in a lack of funding and help to those communities – which is another form of injustice.
- *Accessibility.* The map must be interactive, informative and user-friendly to ensure its desired use by experts and citizens. Neglecting the long-term maintenance of the map could lead to a failure in properly identifying these communities (Ringquist, 2005).
- *Misuse and coverage of map.* Data from all available sources, including census and economic data, will be used in the map. As a result, communities may feel singled out and push back on their inclusion on the map. For example, many census tracts are under-represented due to hesitation amongst undocumented individuals for fear of being targeted by the government (Brown, 2020; Berry-James et al., 2020).

Data

- *Lack of consistency in data.* EJ data has been collected by several federal agencies such as the EPA and the Department of Health and Human Services, but some of this data may not overlap as they were collected at different times or used different parameters of measurement and collection that don't align. Such inconsistencies will make the dataset redundant and could contribute to stakeholders opposing the bill. Issues such as modifiable areal unit problems which affect the spatial phenomena such as population density are a concern.
- *Method of data collection.* There is no clear method for data collection stipulated in the bill which is an issue since it could lead to misrepresentation of data. There are differing views on the methods. It should ideally be based on a scientific approach such as community-based participatory research (CBPR). This method will ensure community participation, grievance redressal, agency to communities as well as replicability.
- *Lack of clear definitions for EJ communities.* Lack of uniform and specific threshold that delineates EJ communities from surrounding communities in the definition is an issue. Covering only some EJ communities causes further inequity to be perpetuated; a broad and inclusive definition, including BIPOC, economic and situational, could reduce the attention required by the critical EJ communities.

- Therefore, criteria for defining EJ communities must be evidence-based. For example, a bill passed in New Jersey defines overburdened communities as those regions with over 40% minority households, where the state-wide non-white only population is 45% (Minovi, 2021).

Investment

- *Ambiguous allocation of funds for EJ communities.* According to the proposed solution in HR 516, the funds are to be used for the work of the committee and the collection of data and development of the map. There is a lack of clear demarcation of funds for the EJ community use and this creates an uncertainty over the effectiveness of this bill in reducing EJ issues.
- *Influence of politics.* The priorities of using funds may vary due to changes in administration. This results in an uncertainty over the extent of relief funds present for EJ communities.

Probability of Consensus/Summary:

Despite the controversies and uncertainties associated with environmental justice communities and the proposed solution in H.R. 516, the bill is a necessity in getting a step closer to correcting environmental injustices. However, there are several controversies like the functioning of the committee, the credibility of the map and dataset, and especially the opinions on EJ communities which are deep-rooted and require substantial efforts to reach a consensus. Consensus on any matter will be difficult to attain as issues regarding environmental concerns and EJ communities bring new controversies to the table. Historically, legislators push these issues aside rather than address them. Therefore, an effort to transition and find a common ground to resolve EJ issues is essential.

Case Study: Scientific Issues and Controversies and Hurricane Katrina

Flooding from Hurricane Katrina breached superfund sites, oil storage tanks, and the walls of drainage canals. This in turn caused sediments to resurface and release hazardous substances (Allen, 2007). Many of the issues associated with the management of this disaster highlight the environmental justice inequities:

- *Differing standards.* The contaminated sediments from waste disposal sites in the region violated the permissible limit for arsenic in Louisiana, with the state limit already being much higher than the federal limit. This created data distortions, giving the public the impression that the arsenic content is much lower and hence, less toxic. For example, in the Lower Ninth Ward, arsenic levels were 74 times greater than the EPA standard but only 2.5 times higher than the state limit (Allen, 2007).
- *Effects of debris disposal.* In Cancer Alley, an old landfill reopened to receive the residential and industrial debris after the hurricane. This resulted in local residents inhalation of noxious odors and particulate matter (Allen, 2007).
- *Unequal access to repatriation and rebuilding.* Low-income communities had less access to resources for registration and planning for repatriation than wealthier communities (Allen, 2007). This perpetuated the cycle of inequities EJ communities face by causing further displacement.

Measuring the Success of the Solutions

H.R. 516 seeks to address environmental injustices through the implementation of a mapping committee, a mapping tool and funding. To properly determine the scale of success, specific performance indicators must be used to measure the effects of the bill against the existing baselines of current practices. These indicators will need to be unique to the EJ mapping committee, data collection standards and funding allotments. This section will go into further detail on the intended indicators for each proposed solution.

Performance Management Indicators for the EJ Mapping Committee

- *Committee participation.* Previous federal EJ mapping tools include the Environmental Justice Strategic Enforcement Assessment Tool (EJSEAT) (Industrial Economics, 2016), which used federal databases to identify areas with high potential public health burdens, and EJVIEW, which allowed users to produce maps in a geographic area of their choice using public/environmental health indicators (Zellmer, 2013). EJSCREEN, the EPA's current tool, utilizes national data to highlight places that may have higher environmental burdens and vulnerable populations (US EPA, n.d.). While all of these tools were developed and updated exclusively by the Environmental Protection Agency (EPA) and the National Environmental Justice Advisory Council, H.R. 516 asserts a multi-agency committee be created to develop the new mapping tool (Lardy, 2020). Interagency participation and discussion can be measured through self-evaluations that assess effectiveness in fulfilling agency requirements (Shultz, 2005). By doing this, the committee will be successful in working together to develop the map while also addressing inequalities in their own policies and actions.
- *Participant representation.* Only 22-33% of experienced, high-ranking federal agency employees are people of color compared to a national average of 40%, and minorities are underrepresented in all ranks of environmental organizations (US EPA, 2019). To ensure that members of the H.R. 516 mapping committee are diverse and that at least 50% of the advisory council is made up of EJ community members, nominated candidates should be identified based on demographic indicators, their organization affiliation, and their personal stake in environmental justice.

- *Member responsibility to data collection and contribution.* The integration of 28 different federal agencies on this bill will combine the data collected through each to create an easily accessible map for both the federal government and EJ communities. In addition to current EPA environmental data, the offices within the Department of Health and Human Services have data on asthma rates, childhood leukemia rates, rates of lead poisoning, and other public health data that is indicative of sensitive populations. Additionally, smaller agencies like the Department of Transportation and the Department of Housing and Urban Development could contribute current data on access to transportation, average length of commute, rent burden, and home ownership. If each agency is held accountable for contributing their own data to the EJ map through routine audits, the mapping committee can ensure indicators are diverse and a more comprehensive definition of environmental justice is achieved.

Indicators of Success for Data Collection

- *A national standard for identifying EJ communities.* Currently EJ mapping tools include the EJSCREEN, six additional federal tools and five state EJ mapping tools that analyze different areas of EJ concerns (US EPA, 2014c). These tools use percentiles, grade scores, and other factors to measure disproportionate impact. However, none are intended to identify EJ communities on a nationally consistent scale. Annual baseline data on demographic indicators and health status, along with added socioeconomic pollution burden indicators, can decide appropriate levels of severity and develop a score to identify EJ communities (Maantay, 2002) (US EPA, 2016).
- *Compensating for existing data gaps.* EJSCREEN includes 11 environmental indicators (ie. ozone concentration, proximity to polluted sites, etc.) and 6 demographic indicators (ie. percentage of non-white/low-income population). The data is from National Air Toxics Assessments, the Census Bureau, and more, and are usually updated once every three years (Arriens et al., 2020). However, data is often unavailable at the same scales, at finer resolutions, in rural areas where data is less likely to be collected, or for indicators like indoor pollution concentration (Institute of Medicine, 1999). Progress in understanding and compensating for data gaps can be measured by creating an inventory of all existing data, identifying priorities to focus initial efforts, and producing a report that identifies and analyzes the quality of updates (ie. regression models, extrapolations) (NCEI, 2006).

Indicators of Success for Funding Allocation and Social Outputs

The proposed funding is to be given to the EPA and other member agencies to aid in data collection and for the creation of the proposed mapping tool.

Therefore, EJ communities will see success if:

- The committee identifies the percentage of funding that will be divided between committee members, community outreach, data collection, and map development, and realized budgets are within the percentage originally allocated to each of these groups.
- The progress of projects where there has been no action for four or more years with the help of outreach programs and maps produced by the mapping tool (US EPA, 2015).
- Since 1994, EJ small grants Program has awarded approximately \$29 million in funding to 1400 community-based organizations and tribal governments. Annually, it funds projects up to \$75,000, depending on the availability of funds (US EPA, 2017). The bill's success would mean an increase in this number by a target percentage decided by the EJ committee.

Additionally, social indicators measuring H.R. 516's success such as investor and EJ community satisfaction and outreach and engagement must be measured. This can be accomplished via:

- A survey that measures stakeholder satisfaction to ensure how H.R. 516's map compares to already-existing ones, as well as the extent of the map's impact on EJ community engagement and action. Monitoring online traffic and user engagement, and tracking community outreach and education projects can also be useful in assessing the map's legibility and success.

Difficulties in Measuring Success

Vagueness in H.R. 516's language (ie. "significant", "more adverse," etc.) makes the identification of a national standard, and the development of methodology to measure committee progress towards this goal, increasingly difficult. For instance, it has been debated whether EJ communities should be identified based on whether the majority of the community, or just a higher percentage than the national average, should be nonwhite/low-income (Holifield, 2013). Challenges also exist with agreeing to a set of measurement indicators amongst the EJ mapping committee itself, as there are 28 different federal agencies involved in the process.



Before: St. Claude Street

Case Study: Measuring Success and Hurricane Katrina

If the mapping tool suggested in the bill was built, the map produced could be used by government officials to better prepare an emergency response system while preventing resource allocation issues through accurately identifying EJ communities. As a result of standardization and a more complete data collection, investments into areas that require environmental remediation could be made prior to such emergencies as the data collected would not be skewed across agencies. Further success could be measured by the empowerment of vulnerable communities as the map would provide them the ability to hold the appropriate government agencies accountable.



After: St. Claude Street

Conclusion

H.R. 516 The Environmental Justice Mapping and Data Collection Act of 2021 seeks to identify, address and invest in environmental justice communities across the United States. Through the creation of a publically accessible mapping tool, an environmental justice mapping committee, and an environmental justice advisory council, the disproportionate burden that has been placed on people who are low income, people of color or tribal and indigenous populations, aims to be corrected. The environmental justice mapping committee composed of 28 relevant federal agencies will synthesize existing data, fill in data gaps and analyze localized issues to create a national consistent standard. Aided by the environmental justice advisory council, relevant federal investments will be allocated accordingly to affected communities. While the mapping tool and investments have the potential to be retroactive, the goal in identification is ultimately to be proactive and equitably address the affected community's needs. Performance indicators will be used to measure the success of the bill- specifically the goals and actions taken by the mapping committee, the advisory council, the spending and the overall effectiveness of the bill.



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