

DePauw University

Scholarly and Creative Work from DePauw University

Honor Scholar Theses

Student Work

Spring 2021

The Relationship Between Grassroots Activism and Government Agencies Confronting Water Contamination in Marginalized Communities.

Hira Ahmad
DePauw University

Follow this and additional works at: <https://scholarship.depauw.edu/studentresearch>



Part of the [Environmental Studies Commons](#)

Recommended Citation

Ahmad, Hira, "The Relationship Between Grassroots Activism and Government Agencies Confronting Water Contamination in Marginalized Communities." (2021). *Honor Scholar Theses*. 171.
<https://scholarship.depauw.edu/studentresearch/171>

This Thesis is brought to you for free and open access by the Student Work at Scholarly and Creative Work from DePauw University. It has been accepted for inclusion in Honor Scholar Theses by an authorized administrator of Scholarly and Creative Work from DePauw University. For more information, please contact bcox@depauw.edu.

*The Relationship Between Grassroots Activism
and Government Agencies Confronting Water
Contamination in Marginalized Communities.*

Hira Ahmad

DePauw University

Honor Scholar Program, Class of 2021

Dr. Christina Holmes

Dr. Dana Dudle, Dr. Salil Benegal

Acknowledgement

I would like to formally acknowledge the individuals who made this project both enjoyable and possible over the course of the past nine months. Firstly, my incredibly supportive committee members: Dr. Holmes, Dr. Dudle, and Dr. Benegal for remaining so very patient and committed to my success throughout this learning process. Your input and encouraging words were greatly needed and appreciated. Secondly, my mom and dad; thank you for remaining my first and loudest cheerleaders in everything I do, whether I'm falling on my face or racing across the finish line you both have always been there with open arms. Thank you to my friends (Diana Borse, Sydney Majka, Mia Manney, and Ellie Reece) who provided the empathy, hugs, and caffeine necessary to finish this paper. To Jimmy John's Freaky Fast Delivery Drivers for not making any comments regarding my haggard appearance and always supplying the emergency carbs required throughout my writing process. A ginormous thank you to Dr. Kevin Moore and Amy Welch for welcoming me into this program and your obvious love for DePauw students; I appreciate everything you have done for us. And finally, a deep heartfelt thank you to all of the trailblazing grassroots environmental activists (Beverley Wright, Dollie Burwell, Ben Chavis, Vernice Miller-Travis, and Peggy Shepard, and many others) who inspired me to begin and finish this project.

Table of Contents

1. <i>Introduction</i>	6
2. <i>Methodology</i>	9
3. <i>Water Contamination Background</i>	12
4. <i>Science as Violence or Community Empowerment</i>	17
5. <i>Responsive and Unresponsive Policy</i>	27
6. <i>Protest for Survival</i>	31
7. <i>Remediation not Mitigation</i>	47
8. <i>Moving Forward Together</i>	55
9. <i>Conclusion</i>	58
10. <i>References</i>	61

1. Introduction

“Water is Life” became a reverberating chant and the mantra repeated by Dakota Access Pipeline protesters, whether, screamed at the top of their lungs or plastered on poster boards raised in defiance. Reporters asked tribal members what kept bringing them back to protest and that very phrase seemed to rest at the tip of their tongues. Scholars argue that environmental justice has been achieved when “everyone has access to environmental amenities, including clean air, unpolluted land, water, and all other life supporting systems for a healthy productive existence” (Adeola 2017). In order to achieve this goal of a healthy equitable society that provides all of its citizens the right to a healthy living space, the environmental justice movement has concerned itself with ensuring that all people regardless of nationality, community affiliation, and/or racial identity have the same protections from environmental degradation and pollution.

However, due to the influence of systemic racism in creating and defining American society, historically marginalized communities and individuals are at heightened risk of experiencing environmental injustice in comparison to their white counterparts. While there are a plethora of environmental hazards that such communities face one incredibly detrimental hazard is industrial water pollution and contamination. The Safe Drinking Water Act defines water contamination as, “any physical, chemical, biological, or radiological substance or matter in water... Some drinking water contaminants if consumed at certain levels may be harmful while others may be harmless” (U.S Environmental Protection Agency, 2016). Toxic water is even more dangerous due to the fact that oftentimes groundwater and larger water body contamination may go unnoticed for longer periods of time, with health effects becoming more evident the longer exposure continues at which point the lasting effects can double in severity. Minority

communities facing water contamination often engage in conversation, mobilization, and active protest in order to achieve recognition for their cause and ultimately gain the resources and aid necessary to mitigate the danger within their community.

In order to fully understand the ways in which current environmental justice movements differ from the popular environmentalist movements of the past, a recognition of the vastly different experiences of communities in the United States is necessary. An expansion of environmental concerns that originally existed as a medium for white middle class Americans to advocate for ecological preservation shifted into a medium through which people of color voiced their fears about environmental degradation and hazardous waste contamination as Dorceta Taylor expresses. This statement contextualizes environmental concerns as heavily influenced by contributing factors such as race and class, “While the white working class was able to start advocating for a radical working-class environmental agenda at the turn of the century, people of color saw their biggest problem in the community and the workplace as racial oppression” (Taylor 1997). Depicting that the ability and desire of a specific demographic group to advocate and utilize resources in order to address environmental concerns was heavily dependent upon that community’s collective upward mobility. These individuals have been historically underrepresented in the environmental justice movement however, activism in the 21st century has seen an influx of people of color fighting environmental injustice both within their own communities and in larger coalitions.

Community organized grassroots movements are critical in bringing awareness to cases of pollution and contamination in communities of color and seeking remediation efforts on the part of state and federal agencies. The relationship between these community members and those subsequent government agencies, however, remains incredibly complex. A clear pattern of calls

to action from individuals are met with either neglect or minimization by government officials. The subsequent frustration on the part of citizens experiencing the negative health impacts of exposure to contaminated water results in a cyclical process of harmful actions and minimal or non-existent mitigation¹ that ends up significantly harming public health in already underserved communities. There are a multitude of important factors to consider when addressing the structure, history, and effects of this relationship in order to understand its roots. This study contributes to a larger conversation concerned with dismantling systemic racism. In order to work towards substantial policy change in regions which deserve recompense for harm to their physical and mental health. Identifying facets of the existing relationship between marginalized community members and government officials whether at the local, state, or federal level by studying precedent and discerning how the government may consciously reject bias to both provide aid to communities affected by pollution and also prevent pollution initially.

In order to do so, I have divided the following study of environmental injustices specifically, water pollution into multiple sections beginning with background into water contamination, delving into responsive and unresponsive policy in the following section, science as violence to explore the contribution of environmental science in bias, community empowerment to witness the methodologies that citizens employ to fight contamination in their regions, remediation not mitigation as a way to understand how simply cleaning up contaminated sites is not enough to reduce risks to public health and meet the demands of grassroots movements.

Lastly, looking to the future an evaluation of the risks of a damaged relationship between government officials and their constituents particularly those from marginalized communities

¹ Mitigation in this context refers to the reduction of the severity of an environmental hazard on community health.

can have a detrimental effect on public health in these regions in addition, to environmental hazards which can only become more severe following neglect. Shifting the burden from communities of color to the governments meant to represent them is critical in moving forward and preventing such forms of racist neglect from occurring in the future. Overall, this research project seeks to understand the relationship between the grassroots movements fighting against corporate induced water contamination and government agencies responding to their concerns. How do these parties communicate currently and what factors provide context into how this flawed system can be modified in order to recognize and remedy the effects of environmental injustice in the United States?

2. Methodology:

In order to evaluate the existing dynamics between grassroots organizations and government agencies, a thorough literature review was conducted on a variety of papers pertaining to cases of water contamination, grassroots activism by marginalized communities, corporate interests and behaviors, as well as scientific methodologies designed to quantify the risks of exposure to contaminated water. Including a variety of types of sources as well as, those from a diverse range of perspectives was of central importance to this work. Incorporating a combination of academic research papers, government databases, news articles and personal accounts diversified the range of perspectives and voices utilized to create a broader picture of these multi-party relationships between citizens, government officials, and industrial organizations. Reading these pieces and summarizing their primary objectives emphasized important findings and general takeaways which were then compiled into a collective annotated bibliography.

- agencies themselves.
- "Political motivations can weight scientific testing... if politics and economics can substantially influence the evaluation of a community's environmental risk, it is no surprise that we see significant disconnects between a community's risk perceptions and the official risk assessments"
 - Unsurprisingly, Hyde Park residents did not accept the results of the EPA's tests and filed multiple complaints.
 - Residents are in no way involved in the development of testing protocols and Hyde Park community members fought back stating that this fact skewed test results.
 - One example of this evident skew is the fact that assessors often sampled top soil but they were actually only sampling the top layer of soil that residents had bought and placed over their old contaminated dirt.
 - The Hyde Park activists found their own independent testing agency and reconducted the tests and found much more dangerous levels of toxic chemicals in groundwater and soil and were determined to be hazardous to human health. **"Here activists recognized the limitations of scientific objectivity and accuracy; yet they recognized that science is often best contested on its own terms"**
 - By allowing a dualistic approach and combining local perceptions of the hazard to human health with scientific expertise they hoped and succeeded in improving the accuracy of these tests.
 - There was also a clear bias of the health officials against these activists as many Hyde park activists described tones of hostility and officials behavior

Fig 1. Example of a coded section of the annotated bibliography

Illustrates one section of the annotated bibliography in order to depict the manner in which it was utilized and coded. This strategy helped to ensure that the objectives and themes of each paper were logged immediately after reading and thus worked to mitigate the effects of bias on the literature review holistically.

While it remains difficult to create an all-encompassing literature search, I had the assistance of three faculty advisors who provided guidance throughout this process and helped to identify holes in my research, this in addition to a significant time constraint defined the cut off for the literature review portion of this project. After compiling each of these research papers and summarizing key findings a code was identified in order to assess themes related to grassroots movement action/ characteristics, government agency response or lack of response, coalition building between individuals within the same community or different communities, and then finally background/definitional information that could be utilized in order to frame the topic.

Coding Legend:

Blue- Grassroots movement action/Characteristics

Pink- Government Agency Response *Light Pink *Dark Pink- Lack of response

Green- Coalition building between individuals in a community + between communities

Yellow- Background/ Definitional Information

Fig 2. Depiction of the coding legend utilized to discern themes

The code above was produced after reading background literature and then further utilized in order to identify and visualize themes between papers.

Each of these larger themes was designated a highlighter color and the existing annotated bibliography was coded on a Google Document employing those themes as a model for determining patterns between sources/cases/ and behaviors. This methodology illustrated similar occurrences between case studies and placed themes at the forefront of understanding precedent and providing recommendations for repairing the systemic racism inherent within the fight for environmental justice. Limitations of this strategy include the analysis of potentially

unrepresentative sources of information in addition to, an over emphasis on one particular facet of the relationship whether that be grassroots activism or government agency responses. In order to combat these issues, investigating specific water contamination cases through a combination of academic journals and news reports solidified the overarching concept, while individualized accounts and quotes provided important context into how the effects of this relationship manifested within citizen's daily lives.

3. *Background on Water Contamination:*

Although environmental pollution has remained the cause of considerable stress amongst Americans throughout the past 20 years. A Gallup poll studying the level of this concern about various types of pollution depicted water as a top environmental concern, heightened in importance above air pollution and climate change combined. 63% of Americans expressed that they are concerned "a great deal" by water pollution as a widespread issue (Philip 2017). Water contamination can have a variety of causes whether as a result of naturally occurring chemicals such as radon or arsenic, or through a variety of land use practices which could result in pesticides and fertilizers entering water sources through run-off. Manufacturing practices, sewer overflows, and wastewater release into local water bodies are other potential sources of contamination. The latter remains a substantial cause of groundwater contamination in marginalized communities as reports of the dumping of harmful chemicals into water sources has threatened drinking water reservoirs nationwide for decades. The specific chemicals which are making their way into drinking water at the hands of manufacturing and waste disposal companies include arsenic, lead, mercury, and chromium; all of these are detrimental to human health in predetermined quantities (Schneider 2017). It is important to note that although safety

regulations on manufacturing and other companies exist, they are not heavily enforced and as a result harmful actions on the corporate side can continue unhindered by government agencies for many years before being identified. An additional gap exists in the designated contaminants that the Environmental Protection Agency currently regulates and those which are causing major harm to communities (Schneider 2017). The lack of set standards for the array of contaminants that affect people's health contributes to a significant gap in the methodology currently employed to protect those very same constituents from corporate malpractice.

The widespread nature of contaminated water cannot be underestimated as a 2017 news report by USA today includes an EPA estimate that 63 million Americans or a fifth of the entire nation's population were exposed to unsafe drinking water at some point during the past decade. (Philip 2017). The health implications of such contamination are varied based upon the chemicals infiltrating water systems and can include but are not limited to the following...

- Rashes
- Multiple forms of cancer
- Burning eyes
- Lead poisoning (which can cause developmental and intellectual problems in children)
- Legionnaires disease²
- Mercury Poisoning
- Reproductive difficulties
- Kidney and liver problems
- Birth defects

² Legionnaires disease refers to pneumonia caused by legionella bacteria that produces shortness of breath, fever, muscle pains, nausea, vomiting, and diarrhea. It can be treated through the use of antibiotics.

- Bacterial infections

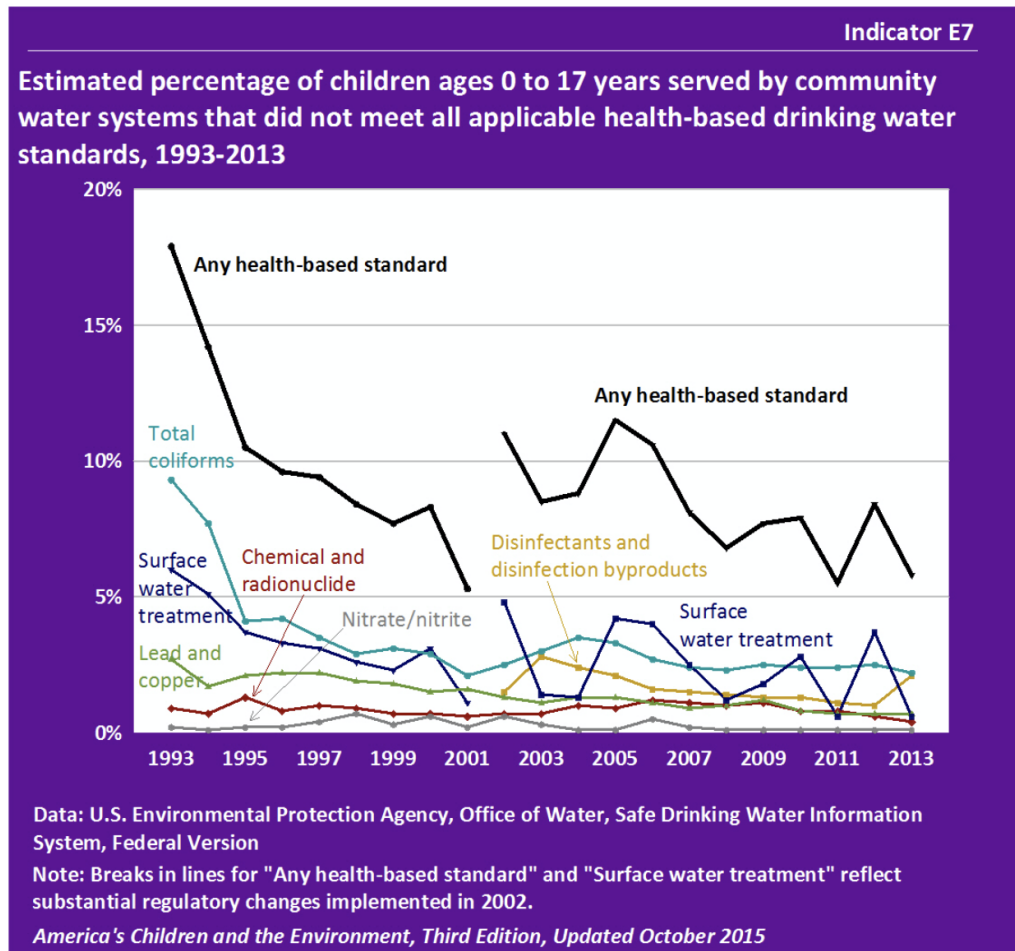


Fig 3. EPA depiction of US community water standard violations from 1993-2013

This figure from an EPA report on the accessibility of safe drinking water across the United States depicts that community water systems have during this period faced a myriad of violations in standards. In addition to depicting estimations of what percentage of American children specifically have been served by water systems not up to EPA standards.

It is important to note that while water contamination adversely impacts the entire community the harms to younger children are heightened due to an increased sensitivity attributable to their less developed immune systems (Woodruff 2006). Additionally, the

developmental effects of toxic exposure have not been researched extensively and as a result, the exact consequences lack clarity, however, preliminary findings describe associations between arsenic and abnormal pregnancy outcomes and post birth complications including but not limited to, childhood cancer, reduced cognitive function, circulatory problems, reduced birth weight, and higher incidence of infant mortality (Woodruff 2006). The importance of discerning the unique effects on young children as compared to adults reemphasizes the urgency of remediating environmental contamination and providing communities the aid necessary to get residents the medical attention and continued care necessary to alleviate health concerns. In order to achieve this, the EPA has designed indicators of water contamination which serve the purpose of identifying and quantifying the risks associated with public water system violations reported by individual states. However, while all violations of these standards are technically “required” to be reported to the EPA’s database, the EPA themselves reports that “it is known that not all violations are reported, and the magnitude of underreporting is unknown” (US Environmental Protection Agency 2017). The considerable limitations of current reporting strategies combined with statistics that illustrate a rapidly growing percentage of children served by community water systems which do not meet EPA standards has fluctuated between 10-22% over the past 20 years (US Environmental Protection Agency 2017). Furthering the importance of identifying well-grounded standards for drinking water in order to avoid adverse health effects and enforcing those standards broadly.

Coming into contact with such contaminants can happen through a variety of means, especially when the contaminants have infiltrated groundwater. Seeping into the surface water by dispersion through an aquifer, the now contaminated water is toxic and unsafe for both human and animal consumption (Knobeloch 2000). Hazards to public health may take years to be

identified and remediation efforts even longer. It is also important to note that while many of the negative health effects mentioned above can be reversed with proper medical attention, the communities in which such contamination risk occurs have less access to high quality health care or health insurance to pay for such care. Not to mention, some of the above health risks can become chronic conditions with continual exposure. As a result, limiting non-naturally occurring pollutants at their source remains one of the most effective forms of remediation that agencies designed to protect public health and the environment can engage in.

The effects of systemic implicit bias within land allocations systems within the U.S have had an incredible impact on where such harmful facilities are located as it is noted that “Three out of every five African Americans, Hispanics, and 50% of Asian/Pacific Islanders and Native Americans live in communities containing at least one uncontrolled toxic waste site” (Checker 2005). It is important to note that although these symptoms and health ramifications are incredibly serious and life threatening on their own, communities that are suffering from contaminated water are not facing it at only one point of contact. Drinking the water, bathing in it, and eating fish from those same contaminated bodies are all significant contributors to compromised physical health. These can also affect women who are nursing or currently pregnant and their babies (Taylor 2014) . Exposure through multiple mediums only exacerbates the threat of such toxins to individual’s well-being in these communities, and this means that any risk management or government issued recommendations to reduce risks are weak in their ability to only account for one particular exposure at a time. Additionally, a lack of cultural awareness creates a problematic barrier for government agencies attempting to provide recommendations to community members. Without considering cultural practices for example, the importance of

fishing as an economic and communal practice, officials are unable to understand why individuals may be resistant or ignore recommendations set in place.

4. *Science as Violence or Community Empowerment* :

Science, which is often described as an objective field of study remains irrefutably influenced by deep rooted systemic racism. This, unsurprisingly, has a multitude of negative effects on the manner in which claims made by marginalized communities are investigated and analyzed by officials. There are patterns to this behavior and environmental science is frequently not employed until claims made by officials have reached the peak in a news cycle; forcing the local or state government to address concerns and public outrage head on. Such was the case in the contamination of Hyde Park. After activism in the community reached a threshold, local government officials designated EPA scientists to conduct testing of local water sources and groundwater, however, it must be noted that cumulative risk³ is not usually and was not in this case discussed. Additionally, previous research exploring risk assessments⁴ has demonstrated the idea that “political motivations can weigh scientific testing... if politics and economics can substantially influence the evaluation of a community’s environmental risk, it is no surprise that we see significant disconnects between a community’s risk perceptions and the official risk assessments” (Checker 2007). Considering this definition in conjunction with the previous quote reveals critical ramifications, as it provides an angle of doubt concerning the validity of these risk assessments and as a result, any “objective” test that government affiliated agencies conduct.

³ Cumulative risk also referred to as cumulative environmental effects are an assessment of the combined impact of environmental pollutants on human health.

⁴ Risk assessments are defined by the Environmental Protection Agency as a system through which the nature and overall magnitude of health risks to humans due to chemical contaminants or a myriad of other factors present in the environment are quantified

More often than not such assessments are not only administered during a period of tense exchanges between local/state governments and concerned constituents, but they are also seldom conducted without the input of businesses or corporations that are seeking to begin or continue hazardous practices unchecked by regulations. In order to jumpstart such practices, risk assessments are often employed in the context of clearing a path to pollution for companies with significant political and economic sway. The primary result of such explicit bias in risk assessments obviously causes distress and distrust on the part of residents who are seeking clear answers about the health risks for themselves and their families. Officials have proven an inability to separate personal interests from their responsibility concerning public health affairs and, as a result, indirectly cause many of these minority communities to take matters into their own hands.

An unexpected consequence of this violent disregard for human life and wellbeing is the empowerment which follows closely behind. Residents do not stop at pointing out obvious areas of prejudice; rather, they often utilize separate methodologies and enlist the help of scientists unaffiliated with agencies in the region to conduct comprehensive testing. This testing takes into account data collected by residents and calculates cumulative risk from various points of exposure. Reconducting testing provides the objectivity these residents crave and confirmation of claims that had been made by community members for years beforehand.

While the citizens of Hyde Park advocated for the consistent representative water sampling of their community, Checker notes that “activists recognized the limitations of scientific objectivity and accuracy; yet they recognized that science is often best contested on its own terms” (Checker 2007). The relevance of this statement cannot be overstated as it provides an influential strategy for these communities to fight bias, however, even this does not remain

consistently effective. While residents have voiced legitimate claims that validate their distrust of government officials who have long ignored their concerns, that same distrust is utilized as a scapegoat for officials in the region heavily influenced by big businesses providing economic benefits to state revenue. Constituents' distrust in local and state government responses to their concerns are employed by government officials as a method of invalidating the need for remediation efforts. Any available opportunity for officials to discredit a resident's claims is usually employed in such situations, especially when the matter becomes publicized as grassroots movements often do. The harm becomes even more significant when considering the differing levels of access and resources available to these two factions. One remains a marginalized community holding significantly less economic power and often consists of blue-collar workers with stringent work schedules and the other, a government with access to significant resources. There are a variety of options available to residents as they search for the strategies that will confirm the symptoms of widespread toxic exposure they have witnessed within their communities. The first being combining local perceptions and scientific expertise in order to confront official's scrutiny and consistent claims of invalid data collection by residents (Checker 2007). One way to do this is to appeal to public health organizations, social justice organizations, and even more generally mass media to spread the word about what is occurring in a community, accompanied by individual stories from community members.

Hostility on the part of health officials who don't live in the communities that they are performing risk assessments in, brings with it a separate set of biases that cause residents' considerable discomfort. Hyde Park residents claim that African American politicians and health officials tended to be much more supportive of their cause and understanding of the concerns of community members. Seeking out minority representation within government bodies, as well as

scientific agencies made this individual community feel more heard. The same could be implied for other marginalized groups suffering from the effects of environmental injustices even beyond the realm of water contamination. However, minority presence is not enough and also not the answer to a larger absence of cultural awareness within these state and local governments. What can help these residents get the help and remediation efforts that they are entitled to as constituents of the region is increased cultural awareness and sensitivity on the part of officials. While there is considerable bias in the “scientific” methodologies employed by such agencies, what contributes to more heightened disparity between the findings of these data collection efforts and the legitimate concern of community members are “models” utilized to represent minority bodies and behaviors. For example, cultural stereotypes have a direct effect on defining the role of bias in assessing risk. When assessors estimate the risk, they make assumptions about the age and size of a “typical” exposed individual but in order to do so they have to assume the clothing that individual wears and how sensitive they might be to a particular chemical (Checker 2007). Meaning that an American white male living in the Midwest could be the point of reference for calculations conducted to determine the risk of exposure for a Native American woman in the south. If the individuals assessing the risks are unfamiliar with the community, they are making such assumptions about, relying on cultural stereotypes tends to become the dominant strategy.

While making assumptions about clothing might not seem particularly harmful, it has a great deal of influence on how the legitimate facets of a community go unrepresented through the manner in which risk is determined. As the residents of Hyde Park expressed, “given it’s probabilistic and inexact nature, environmental science is also susceptible to the interpretations and biases of individual scientists. Indeed, much of the environmental risk assessment process

relies on the decisions of individual scientists who may be prone to a whole host of biases” (Checker 2005). While the primary concern with the methodologies currently utilized by the EPA requires the attentiveness of individuals higher up in the scale of political influence. This paper makes a point to refer to the field scientists conducting this skewed research as complicit within the larger corrupt system. Deflecting blame upwards has become a trope which while acknowledging the systemic issues conveniently removes any autonomy from individuals working within the system. Change cannot rely on solely the actions of government officials working in state, local bodies, or specific agencies; it is critically important for individuals to speak out against biased practices and institutions to contribute to cultural shifts that resist systemic racism rather than simply tolerating it.

A second example of how this could manifest is the experience of individual’s living on Native reservations in the U.S. In instances of toxic contamination, officials have often recommended that residents cease drinking from their primary water source or consuming fish. Without cultural awareness of that particular community these may seem like common sense recommendations, however, what is not considered is the cultural significance of fishing as a heritage practice that individuals view as a continuation of long-standing customs. Simply acknowledging this as relevant and providing alternatives may have positive effects on community members already anxious about government officials as acknowledgement provides a sense of understanding between the two parties. Even this cannot fix all of the structural problems that make it easier for government officials to ignore or undervalue the health of the residents of their state in favor of the economic benefits of burying those complaints and allowing polluting industries the free reign to continue harmful practices. Until that relationship can be mended and corporations face more of an economic detriment in polluting these regions

and the selection process for the location of such facilities is not rooted in racism, much of these issues will remain prevalent.

A toxic dump in a majority-Black county

In 1982, against the protest of residents, North Carolina chose a site in Warren County to dispose of PCBs (a class of toxic chemicals) that had been illegally dumped.

Black percentage of population

0 25 50%

Source: 1980 decennial census via IPUMS

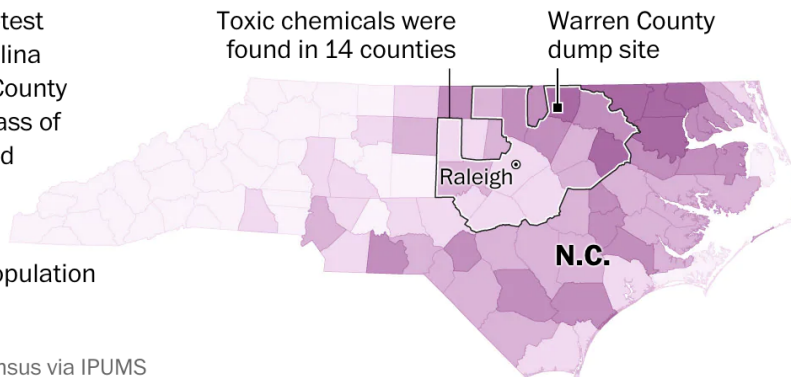


Fig 4. The Washington Post illustrates toxic waste dumps in North Carolina counties (Dennis and Fears 2021).

The above figure draws a correlation between the percentage of Black American population in all North Carolina counties with the occurrence of toxic chemicals and their proximity to a toxic dump site. Evidently, the higher the percentage of the Black population the closer the proximity to the Warren County dump site as well as, the frequency of toxic chemicals in the region.

Removing bias from science requires the same practice of eliminating the ability of corporations and private entities to use science in a skewed fashion to suit the needs of their companies, rather than as an objective force to settle disputes with hard fact. Methodologies must be rectified in order to account for the uniqueness of each individual community and provide

them the most accurate information possible about their risk level in a cumulative sense. Doing so, puts health before profit and acknowledges the issue at hand.

A first step in this effort must be recognizing the current distrust, its origins, and the specific goals of marginalized communities in order to appeal to agencies that have long ignored their pleas. Then establishing a line of communication between advocates and their representatives in state and local governments--whether these are direct or with the help of a mediator-- can be evaluated based upon the needs of each community individually. Direct communication can only improve the current lack of trust between residents and officials. Creating that relationship may even have a positive effect on efforts to remove systemic biases--the very fact that representatives hardly ever live in the communities that they represent only exacerbates the lack of cultural understanding. Improving connections between constituents, government officials, and scientific agencies that provide the risk assessments and other testing required to ensure resident safety should be of paramount importance.

While previous examples of risk assessments and biased methodologies demonstrate the weaponization of environmental science by third parties, community members have the potential to reinvent science as an asset rather than a detriment. Flint⁵ residents sampled water in their homes and compiled data in order to depict the startling amount of lead present in their tap water. Collecting, compiling, and analyzing 269 samples required the cooperation of the ACLU of Michigan⁶, the Democracy Defense League⁷, and Concerned Pastors for Social Action⁸. The

⁵ Flint, Michigan has a population of 102, 434 and experienced a water crisis beginning in 2014 due to the persistent neglect of local government officials.

⁶ The American Civil Liberties Union of Michigan allocated significant resources to both investigating the lead poisoning occurring in Flint as well as, holding leadership accountable.

⁷ The Democracy Defense League is composed of individuals committed to developing plans for combating “plummeting water quality” by organizing meetings with city officials in addition to giving away bottled water to Flint Residents (ACLU Michigan).

⁸ Concerned Pastors for Social Action is a nonprofit association of religious leaders from over 30 African American churches in Flint and other surrounding communities (ACLU Michigan).

combined effort of these organizations worked to ensure that the maximum number of sample kits were distributed, collected, and returned to residents in a timely fashion (Flint Water Study 2015). The report utilized these samples in order to make recommendations to Flint residents as well as, confronting assessments made by the Mississippi Department of Environmental Quality which ascertained that lead levels were much lower than the resident reported samples. Even more concerning is the degree to which the lead levels exceeded the EPA designated standards, the 90th percentile value of lead was 25ppm (parts per million) which is 10ppm over the allowed 15ppm for avoiding high risk health effects (Flint Water Study 2015). This example further illustrates the detrimental impacts of unrepresentative sampling and skewed methodologies. The above risks to community health were influenced by a myriad of factors however, the relevance of science as a potential equalizer remains centrally important.

5. *Responsive/Unresponsive Policy:*

Responding to the activism of marginalized communities who demand government intervention often becomes a matter of publicity rather than concern for public health. This is most evident in mitigation efforts offered by government agencies after significant public attention has been provided to a case of toxic contamination. Individuals bring forth evidence they have collected only to be ridiculed by officials who then offer up their own services to “investigate” any complaints of water contamination. As mentioned previously, the so-called scientific efforts employed by such agencies are usually far from objective. Systemic bias infiltrates the data collection methodologies utilized in addition to the ways in which that data is analyzed and then used to disprove the claims of people actually living in these affected communities and being exposed to contaminants on a daily basis. The claims made by officials

within state/local or federal governments usually engage in a combination of responsive and unresponsive policy initiatives⁹ and historically have been heavily dominated by a disinterest in meaningfully engaging with community members' health concerns. Flint is a prime example of willful ignorance due to the presence of both unresponsive initiatives including the lack of re-negotiation of a clean water source in the form of the Detroit River. After General Motors brought their complaints about the corrosiveness of the Flint River water to Flint officials, the officials refused to intervene. Refusal to take initiative in protecting the well-being of constituents is an act of policy in itself and should be regarded as such. Notably, such refusals do not go unnoticed and often spark the fire of activism within communities that have been underrepresented and whose voices are not amplified very often. In this way unresponsive policy can have a redundant effect on the same officials, their refusal to engage becomes a rallying call for government engagement which often forces them into a strategy of diffusing tensions and providing the assistance that should have been an immediate reaction when the initial evidence was presented.

⁹ Responsive and Unresponsive policy initiatives refer to government agency responses to grassroots movement demands by either action-oriented policy or a lack thereof.



Fig 5. Residential tap water sampled in Flint Michigan

The above image depicts water sampled from one home in Flint in January of 2015. Each of the above samples was collected only days apart (Sanburn and Tweeten 2016).

Previous research¹⁰ on government policy initiatives related to environmental hazards were found most likely to be adopted based upon risks that are most consequential to a particular state or region. There is also a significant trend towards environmental remediation and protection policies in areas with democratic majority state legislatures, however, this does not suggest that protective environmental policies are always passed or drafted in those politically favorable arenas (Bromley and Holman, 2020). This point is essential due to its ramifications for passing policies that would halt harmful polluting behavior from regional industries before it occurs. Additionally, drafting legislation that would induce remediation efforts and support community public health during and after the process was completed. While Democratic

¹⁰ Trujilo and Holman explored trends of policymaking in the United States particularly legislation which was climate related. Their research on environmental risks and hazards depicted the incredibly partisan nature of state and local policy initiatives.

leadership may be beneficial to these efforts it cannot always be relied on as an unfailing strategy for rectifying environmental injustices. Bipartisan and non-government involvements are also critical to the remediation endeavor as a whole and can maximize support and increase the amount of individuals working on addressing communities' immediate concerns. Despite the current political landscape these collective efforts will require some effort to mobilize since nearly half of Americans believe that the existing environmental regulations are not enough to protect air and water quality¹¹ while the other half believes that it is still possible to maintain these air and water with fewer regulations (Pew Research Center 2017). This clear split in opinion is not unique to the American public; politicians seeking reelection would be hard pressed to refute the importance of clean air and water and how to achieve the latter remains a hot button discussion. The adoption of the EPA's Clean Water Rule¹² was met with significant push back from Colorado Republicans who contested this increase in federal control over state and private water rights that in their view set a dangerous precedent for federalized water control (Richardson 2015). Back and forth between these two political parties attempting to balance private interests with common sense practices that ensure the health of their constituents points to a deeper issue caused by profit business models that commodify natural resources and the individuals they serve. While public attention is usually what throws officials into action and can often be seen as a negative motivator it can also be utilized to the advantage of representatives or other officials. Serving community members facing a public health crisis can create a false

¹¹ The Pew Research Center conducted an in-depth survey analysis of Americans' opinions on government regulation and energy policy related to safeguarding water and air quality in the United States. This survey was distributed during the early period of the Trump administration and amid heated debates concerning environmental policy changes.

¹² The Clean Water Rule refers to a drafted regulation introduced in 2015 by the EPA which reevaluated the scope of federal water protections specifically over streams and wetlands. It is also sometimes referred to as the Waters of the United States rule (WOTUS). In 2017 the Trump administration announced its intention to rescind or revise the rule and successfully repealed it in 2019. Currently, the Biden administration is working on proposing an even broader water protection rule similar to the original Obama era WOTUS rule (JD Supra 2021).

“savior” complex while incredibly problematic from a variety of standpoints, is a beneficial facet for those looking to be reelected into their current positions.

Altead Gardens¹³ is a housing project located in the southside of Chicago which has been enveloped by hazardous waste landfills, sewage treatment facilities, and steel mills in addition to a plethora of other polluting industries. There are 50 active or closed hazardous waste landfills including 100 factories, 7 chemical plants and 103 toxic waste dumps, a community organizer from the area describes it as a “toxic doughnut” (Bullard 1999). Cumulative risk was not considered in this area despite the staggering amount of possible exposure sites. While environmental activists have consistently organized and demanded leaders address their multitudinous concerns, there was no direct action taken to mitigate the issues or acknowledge the threat to residents' health. While a lack of policy action is incredibly harmful to the affected community other methods can also do considerable harm to the continued fight for accountability and remediation. As environmental policy researchers¹⁴ note stricter regulations on factories releasing toxic waste also has the effect of driving production to poorer and underdeveloped communities where less stringent or completely non-existent policies prevail instead. A simple way to avoid this issue is to invoke stricter policies regardless of community demographic, across the board policies will hold companies to a higher standard and limit the preference for marginalized communities. One agency must take responsibility in organizing such efforts and holding polluting industries accountable for their actions when policies are not followed. Such an agency must also have the ability to receive complaints from residents and

¹³ Altead Gardens is a housing project built in 1945 located on the far south side of Chicago and is governed by the Chicago Housing Authority. According to the census the residents are 97% African American and has nearly 2,000 living units.

¹⁴ Bullard argues that there are a variety of governmental actions which can further exacerbate or create further inequities in the fight against environmental racism. He also argues that the EPA has further enhanced this process of poor treatment of marginalized communities through the unequal enforcement of environmental protections.

conduct assessments which consider cumulative risk in a timely fashion. One point of contact for reporting environmental hazards is not only effective but it also increases access to communities already disadvantaged in a multitude of ways. While one umbrella agency should be able to conduct all of these functions simultaneously the collaboration of other independent agencies is still required in this long-term effort of correcting and preventing environmental injustice. Agencies must also hold each other to high standards, one facet which will make this more attainable is promoting diversity in the individuals working and representing such organizations. As research has depicted¹⁵ grassroots movements felt most heard when bringing their concerns to people of color, increasing the number of minorities in representative and community outreach positions can only improve relations and rebuild the trust between government officials and individuals from marginalized backgrounds.

When beginning to plan for such systemic change it is critical to never underestimate the power of the trickle-down effect of representation and equity in our highest levels of government and how it will impact all of the proceeding branches and sublevels. While the Trump administration had a central role in reversing protections for marginalized and low-income communities that are currently suffering from the effects of toxic environmental contamination and pollution due to a myriad of harmful industrial activities¹⁶. While community organized advocacy has paved the way for the recognition of environmental contamination within marginalized communities and policies that seek to limit industrial polluting behaviors including air pollution/emissions, drilling and extraction, water pollution, toxic substances and safety, and

¹⁵ Bullard (1999) as well as, Gibbs (2002) emphasize underrepresentation as a key issue facing the existing relationship between grassroots organizations and government agencies. A lack of diversity in positions of authority within state and local governments remains detrimental to supporting marginalized community health concerns in relation to environmental contamination.

¹⁶ The Trump administration had a historic number of environmental rollbacks exceeding 100 critically important regulations which worked to protect air, water, wildlife, and control the release of toxic chemicals.

infrastructure planning limitations. All of the above have been dismantled or rolled back by the Trump administration in addition to many others which outlined standards for governing clean air, water, and protecting wildlife (Popovich 2021). Not only were these rollbacks detrimental to existing protections they also had a significant negative impact on maintaining the legal justification for restricting harmful polluting behaviors. The rationale for these actions was described by the administration as an effort to deliver on the President's promises of "providing cleaner air, water, and land to the American people". It is important that while the initial Obama era policies were reversed many of them were eventually reinstated due to the multitude of legal challenges that resulted.

Despite these challenges, an immense amount of damage was done over the course of the past four years including a clear top-down disregard for safeguarding communities and revised thresholds that only exacerbated the effects of water and other types of environmental contamination and pollution. These policies represent an federalized responsive stance that politicizes environmental protections and reinforces a partisan approach to environmental responsibility and public health concerns. These policy reforms speak to the administration's priorities concerning the neglect of marginalized communities and are further inflamed by a policy addition which "proposed a rule limiting the ability of individuals and communities to challenge EPA issued pollution permits before a panel of agency judges" (Popovich 2021). Arguing that the Trump administration engaged solely in neglectful policy behaviors is simply unrepresentative of the deep implications of their forceful decision to legally restrict marginalized communities' voices and consequently results in a narrative that federal policy decisions and rhetoric are not influential on state and local guided efforts. Congressman Edmund Muskie of Maine said in a speech appealing to override Nixon's veto of the Clean Water Act,

“Can we afford clean water? Can we afford rivers and lakes and streams which continue to make life possible on this planet...? Those questions were never asked as we destroyed the waters of our nation and they deserve no answers as we finally move to restore and renew them. These questions answer themselves” (Ehrlich 1996). This quote exemplifies one of the cornerstones of environmental rhetoric within the executive branch of the United States government- complicity.

6. Protest for Survival:

Investigating case studies of industrialized water pollution on marginalized communities, the resulting grassroots activism, and the response from government agencies and officials is key to illustrating the cyclical relationship posited above. Not only is exploring the existing relationship in its current state important, it also provides a starting point for officials to create bridges in the communities they have failed to protect from environmental hazards year after year. Protest and advocacy may have been initiated through a desperate need for policy reform from state and federal agencies, however, as is witnessed through the stories of these community members; it has grown to heightened importance due to the relevance of advocacy in creating bonds between individual communities. Gender has played a substantial role in this shift as the historical demographics of environmental movements have diversified over time, women have taken a central role and brought new meaning to a movement traditionally reserved for upper class white men.

The dynamics within the organizing efforts of residents within communities affected by environmental hazards is certainly influenced by inaction although it is also much more complex than that. Women as central organizers and coalition builders have been noted in a multitude of cases across the U.S especially as the concern for children’s welfare due to industrial

contamination has become a heightened priority. Women of color specifically are vital to grassroots movements and alter traditional organizing techniques by utilizing their unique experiences to inform the manner in which they advocate for their communities (Pardo 1990). As we see in various examples, such as, the organizing by Mothers of East Los Angeles (MELA), coalitions between women, particularly those who are mothers that are concerned about their children's health, has proven to be a unique and incredibly powerful sphere of influence in the fight against environmental racism (Pardo 1990). Additionally, diversifying the manner in which advocacy is engaged in between residents depicts a reliance on family units and female friendships in order to drive participation and garner public support from media outlets, as well as larger social justice-oriented organizations.

A solid foundation of familial relationships has provided a stable foundation for the more labor-intensive portions of advocacy¹⁷. However, these techniques are not the sole factors influencing a grassroots movement's success in achieving acknowledgement and environmental remediation from government agencies. There are multiple other facets to a successful movement including the consistent support of the media, support from interest groups and organizations, political allyship at multiple levels of government, and the current political environment. Observing and studying the levels of action and how traditionally underrepresented groups gain political influence through this process of collective action and advocacy occurs at three distinct levels identified as, (1) The local grassroots movement; (2) The social movement level; (3) The cycle of protest (Almeida and Stearns 2020). These levels define grassroots

¹⁷ The labor intensive facets of advocacy refers to significant paperwork, organizing and attending meetings both between residents and with city officials, phone calling, door to door communications, and significant amounts of research.

movements in their far-reaching abilities for policy change under a set of predetermined conditions.

An incredibly important asset to those conditions are allies of these causes in mass media, politics, science fields, students, organized labor unions, religious institutions, and other social movement organizations (Almeida and Stearns 2020). It is also essential to distinguish grassroots movements in their individuality as well. Each movement contains unique differences including the demographics of the community as a whole, their political influence and ability to garner the necessary media attention to promote their case can both have drastic effects on the success and methods they employ to reach their intended goals. Unsurprisingly, each community fighting environmental contamination is seeking remediation and the removal of the threat to their and their families' health. But there are concerns beyond the initial threat removal/cleanup such as, how will communities be compensated for the damage? Will there be access to healthcare services in order to receive the care necessary and mitigate any damage done? What about those who lost family members to illness, how will they be taken care of by the government which put them in this danger initially? Many of these questions cannot be answered until the most basic level of concern is addressed which is what is the exact risk of the contaminated site in a specific community? Residents already know that there is an obvious threat with such sites being located in their living spaces; what they want to know is to what degree they will be affected and how they can mitigate the risks while a clean-up and remediation effort is being carried out by the agency or agencies that created the problem. As Sterling Gologergen from Savoonga, Alaska states, "My two sons are being taught by their elders and uncles how to hunt to provide for the community... but today my family and community is in grave danger of losing not only our traditions, but our lives" (Adamson 2002). Sterling's insight raises an important point, the phrase

protesting for survival refers to both maintaining one's livelihood and also references the need to preserve for Native communities specifically, the culture for future generations.

Beyond those predetermined facets of grassroots movements one theme which characterizes much of the fight against environmental injustice is an overarching distrust in government agencies both in terms of their lack of ability to consider community concerns as well as, historically poor communication and concern for minority communities. Illustrating the rationale behind such perceptions of state and federal government officials is best understood through the lens of specific environmental case studies in the United States.

Beginning with the case of Flint, Michigan¹⁸ which remains an important starting point in order to frame the relationship between government officials and local community members as deeply flawed. Stories of lead poisoning within the city dominated the news cycle for a few months of 2014, as images of brown muddy looking water rushing out of the taps and showers of residents' homes spread across the internet (Denchak 2018). However, as quickly as the story began it started to lose airtime incredibly quickly even though the concerns of residents were not mitigated and the water remained unfit for human consumption, public interest waned. Investigating how the water came to be of such unhealthy quality is key because it emphasizes what neglect of marginalized, in this case predominantly Black Americans, can do to public health in a region. Deindustrialization in Flint has shifted the racial demographic and resulted in white flight, urban renewal, fiscal crises, and heightened rates of crime. This shift is important to note when identifying why and how such a substantial level of neglect on the part of the state and local government took place (Pulido 2016).

¹⁸ Flint, Michigan is the seventh largest city in Michigan located centrally within the state it has a population of 102,434.

Flint City has utilized the Detroit River as its municipal water source for many years, however, in 2013 a new deal to secure this source was not negotiated and as a result, the city officials sought a new water source. It was determined that switching to Lake Huron would take upwards of two years to coordinate and, as a result, Mayor Darnell Early resorted to using Flint River as the primary water supply until that transition could be mediated. It is critical to acknowledge the fact that Flint River was known to be notoriously polluted due to the industrial activities of GM Motors whose factory in the area had been dumping waste unchecked for many years (Pulido 2016). Beyond the fact that this water supply was toxic it was also very hard to treat making it an obviously dangerous choice for human usage. Even more disturbing was the manner in which the harshness of this water source was brought to the attention of government officials in the region numerous times, but first, by GM Motors themselves. GM had switched their water supply along with the city to the Flint River and not long after their transition noticed that the corrosiveness of the water was actually causing the engine parts they were producing to rust. The company brought this evidence to the Flint government as a way to advocate their plant be allowed to switch back to the Detroit River as their water supply and unsurprisingly, they were allowed to do so (Pulido 2016). Even after this statement about the corrosiveness of the Flint River water by GM, officials in Flint did not intervene in switching the city's supply.

The abandonment of residents at the local level is indisputable in both this instance and all that follow it. This can be attributed in part to a myriad of regulatory failures that influenced federal water drinking regulation, interpretation, and standardized enforcement as Butler et al. describes these regulatory failures in relation to lead poisoning in Flint and other demographically similar areas. One example of a detrimental failure on the part of the EPA was

their lack of action in asserting control of the violations of the Safe Drinking Water Act¹⁹ in Flint despite their duty to step in and enforce the law (Butler 2016). Negligent behavior did not occur in solely this instance, the National Primary Drinking Water Regulations set by the EPA includes a list of over 80 unique contaminants whose levels in drinking water are legally enforced by clear standards otherwise known as the Maximum Contaminant Level (MCL)²⁰. Conveniently, lead and copper are omitted from these standards due to the fact that they are regulated by water technologies after leaving the treatment plant (Butler 2016). Flint, Michigan was sampled over the course of 6 months in order to determine whether and to what extent lead and copper had infiltrated the residential drinking water. Although guidance from Michigan officials where pre-flushing²¹ prior to collecting the sample caused the first round of samples to depict much lower levels of lead than was factually correct. Not only was this a heinous disregard of power on the part of the Michigan Department of Environmental Quality²² but it had serious consequences for the health of Flint residents as the Flint Water Study was then disqualified from further testing due to the inaccurate sampling results. The clear limitations of these methodologies in protecting the best interests of public health in Flint reiterates the importance of clear and swift enforcement of contamination regulations and the role of federal agencies like the EPA stepping in immediately when such violations take place. Combining the consistent regulatory violations of

¹⁹ The Safe Drinking Water Act is the primary federal law in the United States which was created in order to ensure safe drinking water for the American public. Set forth by the Environmental Protection Agency this act applies to every public water system but does not cover private wells (20% of Americans according to the EPA are served by private drinking wells). Not only does the EPA not regulate private wells they also do not provide recommended criteria or clear standards for these individual wells.

²⁰ Maximum Contaminant Level refers to water quality standards that are set by the EPA. The MCL is the defined legal threshold for the amount of substance that can be present in a public water system and still meets health standards set in place by the Safe Drinking Water Act.

²¹ Pre-flushing is a methodology in which an individual sampling water flushes or runs a tap prior to taking a water sample rather than doing so immediately after turning the water on.

²² The Michigan Department of Environmental Quality created in 1995 is the primary department of the state of Michigan for environmental issues specifically. In terms of water quality they oversee public water supplies, regulate wastewater discharge, monitor water quality, and develop relevant policy.

multiple agencies with the concerns of Flint residents depicts a form of blatant indifference that represents a much more widespread manifestation of environmental racism.

Flint residents brought their concerns about the foul tasting, cloudy, and smelly water to officials and were consistently told by those holding the privileged information about the contamination that the water was fine and safe to consume (Pulido 2016). Their abandonment of their constituents is evident in both the lack of policy or remediation action and repeated dismissal of resident claims. This disregard is not required in fact, Pulido states that “Although full knowledge is not required for environmental racism to exist, it is a critical part of this story” (Pulido 2016). Therefore, emphasizing both the relevance of the government’s intent in this specific case and noting that, as a direct result of this inaction, a lack of trust continued to grow amongst residents of Flint. In that sense it might seem like intention is largely irrelevant if the cause of inaction are chronic health conditions or the death of residents, however, recent verdicts in the Flint case prove otherwise. Criminal charges brought against Flint officials²³ including the ex-governor Rick Snyder made way for charges including but not limited to, perjury, misconduct, willful neglect and involuntary manslaughter. These charges point to the importance of intent not in excusing harmful behavior, rather, it’s critical role in prosecuting it.

The importance of advocacy through media networks and other means as the sole methodology remaining for community members to voice their fears about contaminated water and garner the public support necessary in the fight for government interference is disheartening. Interestingly, while Flint residents fostered cynicism about the government and their disinterest in resolving this health crisis, they continued to advocate for that very same intervention.

²³ The other individuals indicted in the Flint Water Crisis include, Jarod Agen, Gerard Ambrose, Richard Baird, Howard Croft, Darnell Early, Nicholas Lyon, Nancy Peeler, and Eden Wells on a variety of counts of misconduct, perjury and willful neglect of duty.

Illustrating that no matter the distance and autonomy of marginalized communities in gathering support from the public for their respective causes in the end, acknowledgement and action from governing officials remains. Publicizing the lack of action from the state government has in this case only resulted in amplifying the voices of Flint residents; a similar theme is noted amongst other cases of water contamination in marginalized communities. Resulting in the realization that calling out inaction from powerful officials is also an effective methodology employed by grassroots movements that can shame legislative bodies into systemic change due to public outcry. Injustices without a clear perpetrator are not so easy to rally against as we evaluate a myriad of other similar cases.

The case of Hyde Park in New York state remains principal in evaluating environmental organizing efforts and a distancing from traditional understandings of advocacy in this context. The residents of Hyde Park have voiced concerns about the air, water, and soil contamination infiltrating their living space for decades. Defining collective action within these communities and activism even in its least public forms is only one of the achievements of the Hyde Park residents. The inception of such public health concerns began due to contaminated run-off from a wood preserving factory that infiltrated local groundwater in the region introducing chemicals such as dioxins²⁴, wood treatment chemicals, and chlorophenols²⁵. An environmental justice paper acknowledged the centrality of race as a contributing factor to the location of this hazardous waste facility and the lack of communication and remedial effort on the part of the local and state government (Checker 2005). This case emphasizes the persistent question of why

²⁴ Dioxins refer to a class of primarily highly toxic compounds that are persistent environmental pollutants. They are usually byproduct of industrial activities and tend to accumulate in the food chain where human exposure is most likely to occur.

²⁵ Chlorophenols are environmental pollutants introduced to the surrounding environment through chemical industrial activities such as waste management, pesticides, and insecticides. They can cause a wide array of health issues in humans including cancers (Igbiosa 2013).

these facilities exist where they do and also the manner in which environmental science introduces a uniquely detrimental bias to this conversation.

A national law journal investigation noted that, “it took 20% longer to put hazardous waste sites on a national priority list in areas with predominantly minority populations than it did in white areas and the penalties under hazardous waste laws were 500% higher at sites having the greatest white population in comparison to sites with the greatest minority population” (Checker 2005). How to address such discrepancies and navigate a system inflicted with significant bias remains of utmost concern for those participating in organizing activities in communities like Hyde Park.

Activists’ mirrored tactics utilized during the civil rights movement and focused on identifying specific barriers in current scientific methodologies that limited a truthful assessment of their communities’ risk of toxic exposure and physical harm. It is important to note that such action results from lengthy periods of disregard on the part of officials in the area or “scientific” testing that claims to have found no significant exposure concerns. As mentioned previously, distrust permeates marginalized communities nationwide particularly, those living near contaminated waste sites. Taking testing into their own hands is one strategy they can use in order to confirm the data they have been collecting for years through untraditional means. Doing so, often and in this case created a significant gap in the calculation of cumulative risk in terms of exposure to toxic contaminants in the environment. This caused the residents of Hyde Park to experience the health ramifications of toxic exposure at a degree left unaccounted for by the government due to implicit bias permeating the data collection methodologies.

Advocating for systemic change can take on a multitude of forms, however, Checker notes that it is essential to acknowledge periods that seemingly lack social action as equally

influential on the more public manifestations of activism, stating that quiet periods are, “often powerful scenarios where activism is taking place within communities” (Checker 2005). This is an interesting statement, particularly, as the relevance of media attention often becomes confused with depicting grassroots activism holistically and accurately. The moments caught on camera represent a culmination of community organizing efforts rather than the inception of them, which is often how these events circulate news narratives. The time needed to garner local support much less, national attention is not widely recognized and as a result, it can often appear to outsiders that these activists have cropped up out of nowhere. Further delegitimizing their hard work and the historical precedent of environmental racism in the United States remains a critical issue facing reporting of grassroots organizers and their causes.

Visibility is central to many of these causes in attaining the environmental remediation they seek for the health of their families; however, visibility is not advocacy and often the periods of heavy groundwork and organizing occur behind the scenes where the cameras don't tend to reach. Thinking about the extensive research, coalition building, and labor-intensive efforts that consume many of these grassroots movements not only provides a sense of the immense urgency amongst residents but also the success of such movements in creating change relies on close family units and personal connections to drive the work forward. This also differentiates local grassroots movements from the larger environmental preservation societies and organizations that came before.

Considering cumulative risk and its pertinence in situations of industrial contamination and exploring the impact of environmental hazards on the health and way of life for Native communities should also be of primary concern. Fishing in particular is both a means of sustenance for these communities in addition to being a practice with accompanying cultural

significance. As a direct result of that generational importance any negative health effects caused by eating fish from contaminated waters will require significant cultural understanding to meaningfully address. Native American populations have been disproportionately affected by mercury contamination as a paper published in the *Bulletin of Science, Technology and Society* expresses. The source of such heightened levels of mercury emission back into the environment can be attributed to a combination of fossil fuel combustion and the incineration of solid waste. Chronic exposure to this contamination can cause a myriad of health issues including but not limited to kidney damage, genetic abnormalities, and serious nervous system damage (Roe 2003). This exposure is particularly harmful to young infants and babies in the fetal stage of development, continued harm can be transferred through the mother's breast milk. One of the pressing concerns in Native communities is how to balance the impact of pollution on members' health and simultaneously maintaining cultural practices that have defined their community's way of life for many generations (Roe 2003).

Cumulative risk plays an important role in these decisions with many residents taking matters into their own hands when government issued practices fail to account for multiple levels of toxic exposure, by conducting their own risk assessments. Evaluating the manner in which environmental science can be adopted by marginalized communities rather than as an opposing force causing detriments to their health is best expressed by the following insight, "Within this cultural context, environmental resources can be seen as essential for cultural survival. The relationship one has with the environment as in fish consumption, may be critical for cultural conceptions of good health" (Roe 2003). This passage introduces a significant claim in regard to how environmental science is capable of evolving and meeting the needs of community members even if utilized outside the bounds of trained "professionals".

Specific examples of this barrier to fully understanding environmental hazards as they relate to public health, include the Florida Seminole people²⁶ who are impacted by pollutants in the Everglades in comparison to non-native South Florida Residents. The rationale for such heightened levels of exposure is due to differing relationships with the land and water in these regions and between these individuals. While the Centers for Disease Control indicated that there was a direct correlation between the fish consumption out of local water sources and heightened levels of mercury in the bloodstreams of residents, The Seminole People continued to rely on those contaminated water bodies for their daily requirements (Roe 2003).

Models for such risk commonly utilize the average white male as the model for determining percentages of risk in communities where the demographics do not mirror the model. Beyond the obvious detriment in using an individual of a different race and ethnic background, it is also chiefly important to note the daily behaviors of the individuals whom you are seeking to represent in the data. The average fish consumption is notably different for a white male living in the suburbs compared to a Native American male living on a reservation. As a result, stating that risk is low for those Native individuals without addressing the number of fish they are consuming is ignorant and a form of scientific violence inflicted on that community as a whole.

In order to illustrate the effect of contrasting efforts on the part of government agencies and the people living in areas with contaminated sites the Chippewa people of the Midwest²⁷ provide further insight. Cultural rituals amongst individuals on multiple reservations have

²⁶ The Florida Seminole People are Native American people originally from Florida and currently live in both Oklahoma and Florida. They are a part of three recognized tribes including the Seminole Nation of Oklahoma, The Seminole Tribe of Florida, and The Miccosukee Tribe of Indians of Florida.

²⁷ The Chippewa, Ojibwe, Ojibwa, or Saulteaux People live in Southern Canada, as well as areas within the northern Midwestern United States. These individuals make up the fifth largest populations of Native American peoples and are the second largest First Nations Peoples in Canada.

identified fishing as a community driven activity. Rallying for their own fishing rights has become a balancing act between preserving the importance of community values and the serious risks of mercury exposure due to consuming the fish from contaminated waters. Efforts for the cooperative union of both federal and state governments on comprehensive initiatives that will protect members of Native communities has been one of many methods employed to address such huge concerns (Roe 2003). Environmental and cultural identity as witnessed through this example cannot and should not exist independently in such situations especially when working to address hazards affecting public health. Ignoring the cultural factors influencing group behavior does not do any favors to agencies proposing bans on fishing or efforts to avoid contaminated sources in search of new fishing locations. Instead, taking this significance into account can help to provide more common-sense reforms that ensure the health of the community whilst also making a serious effort to address the root cause rather than recommending resident risk mitigation strategies that are unsustainable.

Representing the power of community to rise up amongst insurmountable odds in the pursuit of environmental justice and relief from contamination is exemplified by the case of Love Canal²⁸. The movement has been identified as one which is unique in its ability to address systemic racism in its variety of structural forms. Instead, of solely focusing their efforts on achieving legislative and regulatory strategies from the government, these individuals were able to acknowledge the role of political and economic disadvantages in how they were treated by authority figures and how this contributed to harm of community members. Defining the uniqueness of such actions and the specific goals which differ between traditional

²⁸ Love Canal is a neighborhood in New York state; infamously known for being the location of a 70 acre landfill that caused a massive environmental catastrophe in the 1970s. Toxic chemicals were dumped in the landfill for decades causing health conditions including but not limited to leukemia in residents.

environmentalist movements and local grassroots efforts like Love Canal provides the ability to distinguish them in their success and overall process.

While the larger movements run by national or even international organizations are concerned about public health in relation to such contamination, their focus remains on preservation rather than the remediation and mitigation of threats to ecological and human health (Gibbs 2002). Beginning at the local and state levels allows grassroots organizations to project upwards and eventually, “influence federal level policies and representation as a whole... and focus on the preventative measures which ask a broader question of why?” (Gibbs 2002). This attentiveness to the root cause provides residents with a sense of urgency as they advocate for change that will undoubtedly affect current resident’s well-being, in addition to, the health of future generations. Focus on the present and foreseeable future increases the stakes of their advocacy efforts and also the manner in which federal and state policy shifts can have a significant impact.

Often the complicity of the federal government in influencing state and local policies that actively discriminate against the interests of minority populations is understated. However, environmental justice research conducted during the years of the Trump administration depicts that not only are racist and classist policies detrimental to defining the priorities of agencies within the executive branch, but key policy reversals also make such neglect easier for government officials and polluting industries. Beyond efforts to disband resources to threats of environmental contamination and corporate responsibility, these authors suggest that the Trump administration has “explicitly and implicitly reversed course on environmental policies to the detriment of low-income communities of color” (Outka and Warner 2019). By influencing manner in which law can be applied to issues of water and other natural resource contamination,

the influence of Trump's policies and policy reversals are far reaching and demonstrate a heightened responsibility of the federal government in recognizing and supporting efforts to increase environmental protections specifically as a precursor to guarding public health within low-income communities of color.

An illustration of how such policies have real world implications to the health of residents living in high-risk areas is best represented through one of the first policy initiatives of the Trump administration; the continued construction of the Dakota Access Pipeline despite widespread and longstanding disapproval. The pipeline was placed less than one mile from a tribal community that as a result faced serious threats to their water resources (Outka and Warner 2019). The resulting #NoDAPL movement²⁹ made waves through a combination of physical protests and online solidarity campaigns with support trickling in from all across the United States. In addition to harsh weather conditions protestors endured verbal and physical torment at the hands of law enforcement and private security including but not limited to: pepper spray, violent dogs, rubber bullets, denial of proper supplies and food, legal threats, and buckets of cold water thrown on or around them. (Whyte 2017). The solidarity building actions of both Native people and allies in withstanding this treatment by law enforcement illustrates an important element of such united action- integrated coalition building is clearly an influential mechanism in gaining public support and representing a united front.

This is one limitation of organizing efforts, the power and sway of the federal government if it refuses to acknowledge the importance of environmental preservation and environmental justice in protecting biodiversity and as a result, public health. This is not to say

²⁹ #NoDAPL was a hashtag utilized on social media platforms like Twitter in order to spread awareness about the approved construction of the Dakota Access Pipeline in early 2016. It became so widespread that the grassroots movement as a whole is popularly referred to by this hashtag.

that such grassroots movements cannot have a significant impact in local and state legislation to preserve their living spaces and the health of their families. Coordinated efforts amongst individuals have proven capable of garnering the attention and support of the general public. However, when appealing to the executive branch it seems advocating for voter mobilization towards candidates and parties which will support their causes whilst in office is the most influential strategy to combat administrations unresponsive to their causes.



Fig 6. Image of protests at Standing Rock Reservation in North Dakota in opposition to the construction of the Dakota Access Pipeline (photo cred. Rob Wilson).

The photo above showcases the immense preparation and coordination of standing rock protests in addition to the emphasis on protecting water as a fight for survival.

7. Remediation not Mitigation

There are a variety of ways that science can be misused or effectively employed to benefit community health not just in the short term, but also when considering mitigation versus full remediation. Grassroots movements consistently demand that officials completely remediate the contamination, however, what occurs more often as a response is merely the fencing of a toxic waste site or a short-term cleanup effort that may reduce the number of pollutants in groundwater and other water sources but does not entirely eliminate it. This clean-up effort does not traditionally include restrictions on the polluting company that may continue to release toxic waste into water sources despite the simultaneous actions being taken to mitigate the infiltration into residents' bodies. Considering the "how" of toxic site cleanup has dominated much of the legislative realm of remediation conversations brought to the table by grassroots activists. There are a variety of methods to jumpstart cleanup efforts however, many of them take a significant amount of time depending on the scale and overall toxicity of the site, this also means that evacuating residents would be necessary while such cleanup efforts are being conducted in order to avoid further detrimental exposure.

These strategies differ depending upon the exact type of contamination a community is experiencing, for example, nitrate contamination in a New Mexico community (Mountain View) and the subsequent examination of its effect on the majority Hispanic population. Not only was the groundwater in this area contaminated with high levels of nitrates, there were also multiple contaminated sites in a close vicinity that were in different stages of remediation by the EPA (Mohr 2009). Testing of the local drinking water was conducted and while the safe standard for nitrate concentration in water has been identified as 10mg/L of nitrates maximum, the data collected from the Mountain View community had an average of 275 mg/L with the very worst

area measuring in at 525.5 mg/L (Mohr 2009). This represents at its worst a level of nitrate contamination 50 times more than the safety limit the EPA defined. Despite the severity of this contamination and the obvious health ramifications for these residents who are already at heightened risk of pre-existing conditions, due to the lower average income of the community as a whole, policies regarding this issue have not been addressed or fully resolved in 25 years. When a child became severely ill the state government transitioned Mountain View to a neighboring community's water source, while avoiding addressing the root cause of the issue entirely (Mohr 2009). This response is incredibly problematic in how it waits for the death of one or multiple individuals in order to justify action, if even then. Also, once action is taken, precedent shows that agencies are unwilling to compensate all of those affected rather, they prefer more public acts of fabricated goodwill for example, switching the water source while avoiding talk of cleanup is a common occurrence.

A newly developed technology called in situ bio denitrification³⁰ can be utilized in order to completely remediate groundwater nitrate contamination and has been employed recently in regions like Mountain View; through the injection of naturally occurring bacteria which are fueled to convert nitrate to nitrogen gas. While this is a promising technology it cannot go unacknowledged that when looking at communities in a comparable situation and demographic makeup to the Mountain View area, those which have fully completed the remediation process are primarily composed of non-Hispanic whites or located in areas where the community does not have to be considered³¹. Also, while supporting further innovation in this area of study is compelling it cannot exist independently of increased education and subsequent awareness of the

³⁰ in situ bio denitrification is a process employed in order to reduce nitrate concentration by facilitating the transition of nitrate and nitrite to gaseous forms.

³¹ In reference to remediation efforts carried out on military bases or other similar non-residential areas.

inherent racism present within water contamination issues in the United States. Training on this topic has the potential to alter the valuation of clean water as a human right secondary to its identity as a central economic asset (Cosgrove 2000). Increasing investment in water supply project development and innovation will according to researchers, have a direct benefit by freeing up public funding that grants loans and other resources to lower income men and women (Cosgrove 2000). These findings illustrate an important reflection on the manner in which a top-down priority shift can alter the funds available to communities affected by contamination and reiterates the argument that technological advancements cannot fix the root of this issue. What is required is far more multifaceted and demands a combination of innovation, education, and significant dollar investment in order to achieve equity that will last regardless of the current political administration.

As mentioned throughout this paper, multi-modal understandings of contamination are both significantly more accurate and also critically important in understanding public health risks to the affected community. While water contamination itself can exist in a variety of forms and cause exposure from multiple sources, this community and many others have multiple types of environmental pollution to contend with. Mountain View particularly has severe air pollution due to factory emissions in the region, as well as groundwater contamination due to oil spillage from petroleum storage tanks (Mohr 2009). These separate practices cause their own unique host of health detriments to community members. Consequently, understanding how to get these issues addressed by legislative bodies and larger advocacy networks causes problems for residents advocating for change, this, due to the fact that there is not one single agency to which community members can bring their concerns about environmental issues and complaints about living conditions in their region. Structural racism in the manner such agencies are organized

creates these issues and defines an American governing system that makes a significant attempt to avoid responsibility for environmental injustices. This responsibility would mean taking on the coordination of remediation efforts of environmental hazards in already vulnerable communities.

These health detriments are not one size fits all in fact, the manner in which these pollutants affect the body are even further influenced by the sex of the individual. The exacerbation of health impacts due to environmental hazards is explored within a law review article that seeks to provide a metric for acknowledging and protecting women's susceptibilities to environmental pollutants. Studying the fact that the same toxic exposure manifests in unique ways, exists as a critical reminder to standardized risk assessments failing to acknowledge the physiological differences between men and women. One of the more obvious examples being physical size differences with women being on average smaller than men and additionally having higher percentages of body fat that cause environmental pollutants to become more highly accumulated in their fatty tissue (Krupp 2000). Additionally, if pregnant women face a risk of those already heightened risks being further exacerbated due to increased food consumption during pregnancy, which thereby only multiplies the number of contaminants entering the body. Hormonal fluctuations when combined with existing environmental hazards can also have an effect on women's health, for example, during menstruation progesterone levels vary and can cause women to become more susceptible to air and water pollution in their immediate environment (Krupp 2000). While these are only a few of the potential impacts further research within this field is required in order to discern exactly how pollution affects women specifically. This research could subsequently inform scientists and policymakers how to best protect the

health of all of their constituents effectively and provide community members the data necessary to educate themselves on existing risks to their own individual health.

Another larger issue that must be addressed in order for such remediation efforts to be long-lasting solutions rather than short term band-aids is the regulation of pollutants released as discharge from industrial factories that seep into the surface and groundwater of regions, such as Mountain View. Currently, the EPA website regulations cite the Clean Water Act³² as a primary marker of policy initiatives despite the outdated nature of such a provisional stance when facing the modern age of environmental pollution. Also, the Clean Water Act does not protect or have any legal ramifications for groundwater contamination, which remains one of the primary issues facing marginalized communities with industrial caused water pollution. Lastly, the EPA states plainly, “The standards [the industrial effluent guidelines] are technology based (based on the performance of treatment and control technologies); they are not based on risks or impacts upon receiving waters” (US Environmental Protection Agency 2021). This statement has huge impacts on the control of run-off from polluting industries and illustrates the point that there is a national crisis in how we are currently considering the priorities of agencies that should be far more interested in the people affected by harmful industry behaviors.

Grassroots organizations can bring attention to such discrepancies and receive short term mitigation efforts from their local or state governments however, if federal action is not taken to address the vast structural inequities that put business interests before public health, we risk magnifying an already very serious disaster. Priority shifts that put people first are central to the

³² The Clean Water Act enacted in 1948 is a federal law in the United States that governs water pollution specifically. Maintaining and restoring “the chemical, physical, and biological integrity of the nation’s waters; and recognizing the states responsibilities in addressing pollution and providing assistance to the states to do so, improving wastewater treatment, and maintaining the integrity of the wetlands” are the primary goals of the act. It remains one of the most influential federal environmental initiatives in American history with the majority of the laws and provisions being administered by the Environmental Protection Agency.

argument made by Cosgrove et al. as they describe a list of goals that they hope the world will reach by 2025 in order to achieve water security globally. One of these strategies is to alter the valuation of existing ecosystem services³³ in order to emphasize the manner in which sustainable practices that reduce the potential of contamination manage water for human uses; this can also have a favorable impact on ecosystems as a whole (Cosgrove 2000). This is a long-term strategy and will require the cooperation of multiple sectors including stakeholders, researchers, innovators, and investors, in addition to, a system of reporting that encourages people at the local level working intimately with government and non-profit organizations to manage water systems that serve basic needs. Cost benefit analysis is popularly brought up in political discourse surrounding this topic as Scott Harrison who heads the non-profit organization “Water” which is dedicated to ensuring clean water on a global scale states “We’re arguing for higher government spending on water because it provides health, better education, more income, you talk about bang for buck, water is a great way to get that” (Soon 2019). While taking into account the problematic nature of this statement in referring to a natural resource as a commodity, especially, in relation to concerns for the health of millions of individuals, the root of Harrison’s argument points to a contradiction on the part of governments. Pushing water contamination concerns to the background of legislative efforts only harms the very capitalist system they are working within, in this sense, doing the right thing for marginalized community members will also provide a direct benefit to the economic interests at the root of the issue.

Another short-term strategy includes containing the polluted site in order to decrease the output into community water sources and avoiding a costly and time-consuming comprehensive clean-

³³ Ecosystem services are defined by the National Wildlife Federation as the myriad of benefits provided to humans by the natural environment and healthy ecosystem functioning. Some examples include natural pollination of crops, clean air, weather mitigation, waste decomposition, and human physical and mental wellbeing.

up effort. Toxic PCB (polychlorinated biphenyls)³⁴ water pollution on the Saint Regis Mohawk Reservation³⁵ caused by run-off from a General Motors factory nearby created toxic water pollution in four nearby lagoons and soil used by individuals living on the reservation. PCB's are highly toxic industrial compounds that are a direct result of the aluminum cylinder heads manufactured for Chevrolet cars by GM. These chemicals are known to cause serious harm to the health of fetuses, babies, and young children especially in the case of repeated or continued exposure where developmental and neurological problems become more common. Most concerning was the data which illustrated that, "Mohawk women's breast milk had a significantly higher percentage of PCBs in it than did the breast milk of white women in the area" (Taylor, 2014). After being fined half a million dollars for violations of the EPA's hazardous waste guidelines, GM attempted to contain the toxic site for multiple years by building walls around the area, they proposed that this would prevent the spread of pollutants into the neighboring reservation. However, GM's activities in this case once again ignore important culturally significant practices, including, respecting the Mohawk peoples wishes for agencies to remain off of their land unless given express permission, which, was never asked for.

The community's demand of GM was "to excavate the toxic sludge from the reservation and the factory site and remove it from the area" (Taylor, 2014). Removal is a critical and entirely reasonable demand from a community affected by toxic waste pollution. Nonetheless, it is not a popular strategy for both holding industries accountable for harmful practices and also providing the most long-lasting and helpful strategy for improving resident's health and

³⁴ Polychlorinated biphenyls which are highly toxic industrial compounds and have been known to cause a wide array of detrimental health impacts. Repeated and prolonged exposure to contaminated water can cause neurological and developmental problems (Illinois Department of Public Health 2009).

³⁵ The Saint Regis Mohawk Reservation is located in Franklin County, New York state. The 2010 census reported a population of around 3,288 individuals.

wellbeing. Containment has been marketed as a temporary fix while larger clean-up efforts are being “organized” by officials however, what is lacking from such a strategy is the promised follow through. More often than not containment represents the end of a restoration effort rather than its beginning, one more point of reference when considering improvements to such a process. Government involvement in remedial attempts should be considerably more pronounced and organized with clearly set guidelines that prioritize a full clean up rather than a temporary containment that fails to address root causes.

Organized action by government agencies with guidelines created specifically for pollution caused by industrial behaviors would be incredibly beneficial to public health and environmental protection in affected regions. While grassroots organizations and individual activists traditionally advocate for change in their own communities, coalition building between affected communities can bring more attention to systemic change rather than simply addressing environmental injustice on a case-by-case basis. An example of this are relationships built between individuals belonging to different demographic groups within the same geographic region who build larger networks, capable of expanding outreach and broadening influence on state and local agencies.

Native American and Hispanic women in villages and towns across the state of New Mexico created such a coalition, while empowering residents to fight for systemic change in preserving their cultures, reaching gender equality, and also fighting for environmental conservation (Prindeville, 2004). Not only, are such relationships strong in their makeup but the influence of that cohesiveness and common interest can also be incredibly beneficial in fighting back against unjust rulings by officials and simultaneously garnering higher levels of attention from mass media. Educating and strengthening the movement as a whole through these means

expands its scope and could inspire a reckoning on the part of officials who have been complicit in neglecting these communities for decades, proving that individual action can create enduring change if employed in a unified manner.

8. Moving Forward Together:

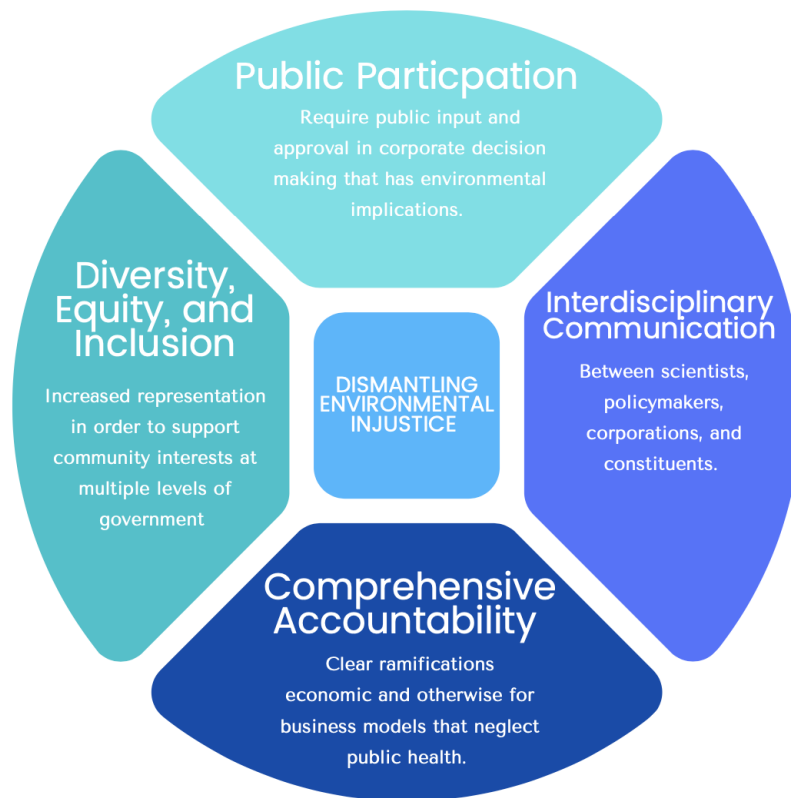


Fig 7. Depicts the necessity of interdisciplinary approaches to dismantling environmental injustice

The above illustration exemplifies an interconnected relationship between communication, public participation, representation, and accountability as centrally important to achieving environmental justice for marginalized communities affected by water contamination.

Acknowledging current practices that continue to create and exacerbate existing environmental injustice is critically important. In order to identify productive strategies for improving the existing structural issues, an evaluation of best practices, which, if employed by government agencies and corporations can help to reduce the harm of environmental injustice in marginalized communities over time. One such strategy is explored by Johnson who argues that the importance of public participation in mitigating environmental injustice cannot be understated. The current regulatory framework for public participation was created to diminish participation and collaboration rather than encouraging it, as a result, this provides corporations the ability to define public opinion as merely a formality. Exploring the current constraints on maximizing community participation are clearly evident in corporate practices for example, the lack of transparency, resources and collaborative tactics further perpetuate the already guarded corporate practices (Johnson 2019). A direct result of such practices is community members feeling unheard and unacknowledged because they are not consulted about agency decisions or if they do participate and their voice is still not taken into account in final decision making. Further contributing to the distrust and a lack of communication between these two parties.

The community outcry due to construction of the Dakota Access Pipeline illustrates the effect of such agency neglect; resorting to protest and litigation is a product of consistent disregard and can be mitigated with as these authors express, participatory processes; developed with marginalized communities in mind. Not to mention, the continued trauma of Native communities, such as, the Sioux consistently defending their native homeland from government interference and violent disregard. Research has depicted the clear benefit of diversifying BIPOC representation in both government and scientific agencies. However, this is not enough to reform these issues long term. Structural racism will continue to influence which communities are

prioritized for toxic waste cleanup and determining where preventative measures to protect against water contamination are implemented. Without a reckoning concerning the multitude of ways institutional and internalized racism are causing marginalized communities to experience water contamination, environmental pollution, and detrimental health effects at significantly higher proportions, we cannot move forward. Confronting those discrepancies is the first step in creating a more environmentally just society but it cannot be the last.

Identifying the root of the issue which in this case is where industrial water pollution is most prevalent, points to racism and colonial understandings of land ownership. Once that root is widely understood and acknowledged as a plethora of grassroots movements across the United States have made clear, pinpointing the consequences becomes simpler. Obtaining acknowledgement from state and local governments has consumed far too much of national grassroots movement resources previously. In order to achieve lasting change, the focus from individual site cleanup or monetary compensation must evolve into policy shifts and new clear standards for corporate practices that force behavioral shifts at a risk of economic detriment. Profit currently guides corporate behavior, as a result, it can be utilized in favor of environmental and public health especially in communities that are already struggling with one or both of these issues.

Due to the flawed nature of the existing system of addressing and mitigating environmental hazards, the areas for improvement are vast and often overwhelming to conceptualize. However, evaluating strategies based upon their potential positive trickle-down effects is one method of ensuring the highest net benefit to communities in dire need of relief. Consistent communication between parties is one such strategy as a text outlining environmental rhetoric in the United States addresses the existing disconnect, “Newer groups like the deep

ecologists, wilderness preservationists, eco-anarchists, and green politicians: have been unable to create communicative links with the mass public, links that would support a strong power base for reformative actions” (Killingsworth 2012). Interdisciplinary approaches that incorporate multiple fields of study are the best hope for simultaneously acknowledging the history of environmental racism and the biological, cultural, and sociological impacts on affected communities across the country today.

Coordinated efforts by officials within local water systems, in addition to, environmental scientists and political leaders are required, in order to, account for existing inequities and allocate the funds/resources necessary to ensure the safety of drinking water for years to come. An EPA estimate predicts that an investment of around 384 billion dollars is required to sustain clean water, not to mention, the additional cost in reference to small rural communities when compared to large towns and cities (Philip 2017). Mobilizing support for this spending will inevitably require the input and labor of more parties than solely community organizers. The influence of mass media and non-profit organizations will only increase in importance as a shift in priorities begins with garnering public support and consistent attention to the cause. “The best hope for success occurs when the citizens, activists, experts, and officials work together to address these problems in a systematic fashion. The coordination of efforts is essential to retain and improve public health no matter the jurisdiction” (Mohr 2009).

9. Conclusion

Clearly, systemic change requires the alliance of multiple factions of government as well as, grassroots organizers and their allies. While there are no simple solutions to rectifying systemic environmental racism, implementing commonplace strategies in order to amplify the

voices of community members rather than disparaging them is one of the ways government officials can work to confront their biases. This paper investigated the relationship between grassroots activism and government agencies in confronting water contamination within marginalized communities and depicts the clear relevance of a top-down approach to remediating this deeply flawed relationship. In order to mend the existing distrust between marginalized communities and their government representation, authorities must make their commitment to constituents' public health clear both verbally, as well as, through consistent political discourse.

Systemic change is not solely policy shifts, a lasting effort requires the widespread confrontation of current inequities by all individuals, especially those in positions of heightened authority. Additionally, fostering a cultural priority shift that emphasizes human life and health as far superior to corporate profit will require the coordination of multiple factions of American society, particularly, education. Racist misconceptions concerning land ownership, cultural practices, and community behaviors are deeply rooted within scientific methodologies created to protect business and government interests and consequently require the immediate attention of policymakers. Accountability for previous misdemeanors, as well as reparations for communities that have been suffering from the adverse impacts of environmental contamination require compensation for chronic physical or mental health conditions, as a direct result of neglect. Finally, extensive environmental remediation efforts in conjunction with the monetary awards to residents have the potential to begin the process of both acknowledging previous neglect and creating a system of accountability for corporations and governments. Overall, these recommendations are no small feat and will call on passionate committed individuals within all realms of society to challenge the status quo and continue pressing for enduring change.

References

- Adamson, J., Evans, M. M., & Stein, R. (Eds.). (2002). *The environmental justice reader: Politics, poetics, & pedagogy*. University of Arizona Press.
- Adeola, F. O., & Picou, J. S. (2017). Hurricane Katrina-linked environmental injustice: Race, class, and place differentials in attitudes. *Disasters*, 41(2), 228-257.
- Almeida, Paul, and Linda Brewster Stearns. "Political Opportunities and Local Grassroots Environmental Movements: The Case of Minamata." *Social Problems*, vol. 45, no. 1, 1998, pp. 37–60. *JSTOR*, www.jstor.org/stable/3097142. Accessed 14 Nov. 2020.
- Booker, B. (2021, January 14). Ex-Michigan gov. Rick Snyder and 8 Others criminally charged in Flint water crisis. Retrieved April 03, 2021, from <https://www.npr.org/2021/01/14/956924155/ex-michigan-gov-rick-snyder-and-8-others-criminally-charged-in-flint-water-crisi>
- Brady, D., & Fears, D. (2021, April 06). 'This is environmental racism'. Retrieved April 10, 2021, from <https://www.washingtonpost.com/climateenvironment/interactive/2021/environmental-justice-race/>
- Bromley-Trujillo, R., & Holman, M. R. (2020). Climate change policymaking in the states: A view at 2020. *Publius: The Journal of Federalism*, 50(3), 446-472.
- Bullard, Robert, ed. 1999. Confronting Environmental Racism: Voices from the Grassroots. Cambridge, MA: South End Press.

- Butler, L. J., Scammell, M. K., & Benson, E. B. (2016). The Flint, Michigan, water crisis: A case study in regulatory failure and environmental injustice. *Environmental Justice*, 9(4), 93-97
- Checker, M. (2005). *Polluted promises: Environmental racism and the search for justice in a southern town*. NYU Press.
- Checker, M. (2007). "But I Know It's True": Environmental Risk Assessment, Justice, and Anthropology. *Human Organization*, 66(2), 112-124. Retrieved November 23, 2020, from <http://www.jstor.org/stable/44127105>
- Cosgrove, W. J., Rijsberman, F. R., & Rijsberman, F. (2000). *World water vision: making water everybody's business*. Earthscan.
- Dakota access Pipeline. (n.d.). Retrieved March 30, 2021, from <https://www.honorearth.org/dapl>
- Denchak, M. (2018). Flint water crisis: Everything you need to know. Retrieved March 30, 2021, from <https://www.nrdc.org/stories/flint-water-crisis-everything-you-need-know>
- Ehrlich, P. R., & Ehrlich, A. H. (1996). *Betrayal of science and reason: How anti-environmental rhetoric threatens our future*. Island Press.
- Flint Water Study. Lead testing results for water sampled by residents. (2015, September). Retrieved March 30, 2021, from <http://flintwaterstudy.org/information-for-flint-residents/results-for-citizen-testing-for-lead-300-kits/>
- Gibbs, L. (2002). Citizen Activism for Environmental Health: The Growth of a Powerful New Grassroots Health Movement. *The ANNALS of the American Academy of Political and Social Science*, 584(1), 97–109. <https://doi.org/10.1177/000271620258400107>

- Igbinosa, E. O., Odjadjare, E. E., Chigor, V. N., Igbinosa, I. H., Emoghene, A. O., Ekhaise, F. O., ... & Idemudia, O. G. (2013). Toxicological profile of chlorophenols and their derivatives in the environment: the public health perspective. *The Scientific World Journal*, 2013.
- Johnson, T. N. (2019). The dakota access pipeline and the breakdown of participatory processes in environmental decision-making. *Environmental Communication: A Journal of Nature and Culture*, 13(3), 335–352. <https://doi.org/10.1080/17524032.2019.1569544>
- Killingsworth, M. J., & Palmer, J. S. (2012). *Ecospeak: Rhetoric and environmental politics in America*. SIU Press.
- Knobeloch, L., Salna, B., Hogan, A., Postle, J., & Anderson, H. (2000). Blue babies and nitrate-contaminated well water. *Environmental health perspectives*, 108(7), 675–678. <https://doi.org/10.1289/ehp.00108675>
- Krupp, S. J. (2000). Environmental hazards: Assessing the risk to women. *Fordham Environmental Law Journal*, 12(1), 111-139.
- Mohr, B. (2009). Feeling blue in the south valley. *The Bulletin of Science, Technology & Society*, 29(5), 408–420.
- Outka, Uma and Warner, Elizabeth Kronk, "Reversing Course on Environmental Justice under the Trump Administration" (2019). *Utah Law Faculty Scholarship*. 172. <https://dc.law.utah.edu/scholarship/172>
- Pew Research Center. (2020, August 21). U.S. public Divides over environmental regulation and energy policy. Retrieved April 03, 2021, from <https://www.pewresearch.org/science/2017/05/16/public-divides-over-environmental-regulation-and-energy-policy/>

Philip, Agnel, et al. "63 Million Americans Exposed to Unsafe Drinking Water." *USA Today*, Gannett Satellite Information Network, 15 Aug. 2017,

www.usatoday.com/story/news/2017/08/14/63-million-americans-exposed-unsafe-drinking-water/564278001/.

Prindeville, D. M. (2004). 5 The Role of Gender, Race/Ethnicity, and Class in Activists' Perceptions of Environmental Justice. In *New Perspectives on Environmental Justice* (pp. 93-108). Rutgers University Press.

Popovich, N., Albeck-ripka, L., & Pierre-louis, K. (2020, October 16). The Trump ADMINISTRATION rolled back more than 100 ENVIRONMENTAL Rules. Here's the full list. Retrieved March 30, 2021, from

<https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks-list.html?mtref=www.google.com&assetType=REGIWALL>

Pardo, M. (1990). Mexican American Women Grassroots Community Activists: "Mothers of East Los Angeles". *Frontiers: A Journal of Women Studies*, 11(1), 1-7.

doi:10.2307/3346696

Pulido, Laura (2016) Flint, Environmental Racism, and Racial Capitalism, *Capitalism Nature Socialism*, 27:3, 1-16, DOI: 10.1080/10455752.2016.1213013

Reilly, K. (2016, May 05). Flint photo shows discolored water amid crisis. Retrieved March 30, 2021, from <https://time.com/4189116/flint-michigan-water-study-photo/>

- Richardson, V. (2019, March 19). EPA's clean WATER Rule meets with outrage from republicans, praise from Democrats. Retrieved April 03, 2021, from <https://buck.house.gov/media-center/in-the-news/epas-clean-water-rule-meets-outrage-republicans-praise-democrats>
- Roe, A. (2003). Fishing for Identity: Mercury Contamination and Fish Consumption Among Indigenous Groups in the United States. *Bulletin of Science, Technology & Society*, 23(5), 368–375. <https://doi.org/10.1177/0270467603259787>
- Sanburn, J., & Tweeten, L. (2016, January 24). The flint water crisis and how lead got in the water. Retrieved April 09, 2021, from <https://time.com/4191864/flint-water-crisis-lead-contaminated-michigan/>
- Schneider, N., Staff, N., Spearing-Bowen, J., & Schneider, K. (2017, August 17). Industrial waste POLLUTES america's drinking water. Retrieved March 30, 2021, from <https://publicintegrity.org/environment/industrial-waste-pollutes-americas-drinking-water/>
- Soon, S. (2019, August 16). Investing in clean water is a great way for governments to get 'bang for buck,' says ceo. Retrieved April 03, 2021, from <https://www.cnbc.com/2019/08/16/governments-must-invest-more-in-clean-water-ceo.html>
- Taylor, D. (1997). American Environmentalism: The Role of Race, Class and Gender in Shaping Activism 1820-1995. *Race, Gender & Class*, 5(1), 16-62. Retrieved March 30, 2021, from <http://www.jstor.org/stable/41674848>

Taylor, D. (2014). *Toxic communities: Environmental racism, industrial pollution, and residential mobility*. NYU Press.

United States Environmental Protection Agency. (n.d.). Drinking Water Contaminants. 2016.

Retrieved March 30, 2021, from https://www.epa.gov/sites/production/files/2015-10/documents/ace3_drinking_water.pdf

United States Environmental Protection Agency. Water contamination topics. (2021, March 09).

Retrieved March 30, 2021, from <https://www.epa.gov/environmental-topics/water-topics>

Whyte, K. (2017). The Dakota access pipeline, environmental injustice, and US colonialism. *Red Ink: An International Journal of Indigenous Literature, Arts, & Humanities*, (19.1).

Woodruff, T., Kyle, A., & Daniel, A. (2006). America's Children and the Environment:

Children's Environmental Health Indicators for the US. *Epidemiology*, 17(6), S420.