Environmental Justice Tools for the 21st Century

by

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Executive Summary

Introduction

This research study sought to address the question, "What are the lessons that Michigan can learn regarding EJ screening tools?" As local environmental justice (EJ) issues have become increasingly prevalent in tandem with our growing global climate crisis, the Michigan Environmental Justice Coalition (MEJC) seeks to advance the use of online EJ screening tools and establish EJ policies for the state of Michigan. These screening tools typically combine socioeconomic data with data on environmental hazards and pollutants to visualize areas with the greatest environmental injustices, and to identify areas in policy that are in the most need of resources (Lambert, 2015:7).

There are two objectives of our research: a) to identify states that use state-specific EJ screening tools and understand how these tools are used in state-level decision-making; and b) to utilize data from our informational interviews to roadmap best practices of development and implementation to serve communities in Michigan. Building from the research of a previous master's project report from the University of Michigan School for Environment and Sustainability (SEAS) by authors Laura Grier, Delia Mayor and Brett Zeuner (referred to as Grier et al., 2019), we identified a number of states that have created EJ screening tools. Following initial review of reports within their respective agencies, we conducted a series of semi-structured interviews with EJ advocates, university academics, state officials and others from the states of Washington, New York, New Jersey, Minnesota, Maryland, and California. We additionally interviewed EJ advocates and state officials from Michigan to gain an understanding of how the practices of other states can be applicable to the needs of Michigan.

The data acquired from these interviews were examined using the qualitative analysis software NVIVO 12 Plus. From our analysis, we derived several themes concerning EJ screening tools that were common between states, including: a) understanding of EJ; b) current and future use of screening tools; c) limitations; d) resistance to the use of these tools; and e) metrics of success. The results of this research will inform the most efficient and inclusive processes of developing EJ screening tools in Michigan.

Literature Review

We first present a literature review to provide a basic framework of understanding EJ. This section starts with a brief history of EJ in the United States, including historic instances of EJ and studies that led to the development of EJ scholarship. Next we provide some background of EJ in Michigan, including overviews of three current and highly publicized EJ concerns in Michigan: Enbridge's Line 5, the Flint Water Crisis, and Mighigan's "most polluted" zip code, 48217.

Additionally, this literature review provides a brief background of the screening tools in the United States: California, Washington, Minnesota, Maryland, New Jersey, Connecticut, Illinois, Massachusetts, New York, Pennsylvania, and New Mexico. Through extensive literature review of each respective state's screening tools, we found that California, Washington, Minnesota, Maryland and New Jersey had screening tools with extensive features as discussed by Grier et al.

(2019). From this portion of our literature review, we selected the states of California, Washington, Minnesota, Maryland and New Jersey for our analysis and developed our qualitative methods.

Qualitative Research Methods

Our qualitative research sought to address the following questions: (1) For states that currently have a screening tool, what was the process of developing their tool?; (2) What were the barriers that these states faced and how did they overcome them?; (3) How are EJ screening tools currently being used?; (4) How do we measure a tool's success?; and (5) What are the lessons that Michigan can learn from these other states?

In order to research how existing EJ screening tools are used to inform and influence state-level policymaking, we believed that it was important to learn through the perspectives of those in local communities, policymakers, and members of Michigan legislature, by conducting semi-structured interviews. Following the initial review of reports within their respective agencies, we conducted 26 semi-structured interviews with EJ advocates and activists, university academics (graduate students and professors), as well as professionals, who were involved with state agencies and nonprofit organizations in the efforts of developing an EJ screening tool at the USEPA and in the states of California, Washington, Minnesota, Maryland, North Carolina, New Jersey, and Michigan. Our interview guide consisted of a set of main questions and follow-up questions pertaining to the development and use of the screening tool and how it was incorporated into state EJ laws, movements, and attitudes.

Our initial list of interviewees was formed after consulting with our research advisor and project client on people and organizations to contact. To find additional interviewees, we initially conducted a snowball methodology where we asked our initial interviewees if they had knowledge of other individuals who were involved with the creation of a screening tool, knew about an EJ screening tool being developed in their state, or if they knew of others who were interested in utilizing cumulative impact approaches for policy. To supplement these lists, we also incorporated a key informant sampling methodology, in which individuals who we believed were most knowledgeable about EJ screening tools or who were potentially involved in its creation process based on online research, were contacted for an interview. Specifically, these individuals were state officials in state agencies related to the environment or public health, academics, experts in EJ and cumulative impact screening tools, grassroots or EJ organizations, and community representatives.

To analyze the interview data, a codebook was developed on a qualitative analysis software program, NVIVO 12 Plus, using deductive codes based on the literature reviews, and inductive codes based on emerging themes from the interviews. The codebook consists of main codes used to distinguish the different sections in the interview guide, and of subcodes that emerged from the data. The seven main codes are:

1) Understanding of EJ
2) Development of screening tools

3) Use of screening tools (current and future)
4) Limitations of screening tools
5) Resistance
6) Overcoming resistance; and
7) Metrics of success.

Results and Key Findings

Through synthesis of our main findings, we analyzed state processes that could be used as precedent or guidance from which Michigan can develop its own screening tool.

Understanding of EJ

Based on our interviews and literature review, we have come to find that many states have their own respective definition of EJ that is consistently used between state agencies, state administration, as well as community stakeholders. These state-based definitions are consistent with USEPA's definition of EJ, which focuses on the concepts of "fair treatment" and "meaningful involvement," but goes further to incorporate the needs of stakeholders who are impacted by state-level decision-making. Through this consensus in understanding EJ based on a common definition, the capacities of EJ screening tools can be more readily assessed in how they address environmental injustices.

As Michigan engages in the process of developing its own state-specific definition of EJ, we advise that it follows the precedent of other states and builds upon the USEPA's definition of EJ to uphold national consistency. Additionally, Michigan should engage with the Michigan Environmental Council on EJ, whose membership was announced in March 2020, in developing its definition. Furthermore, engagement with community members and other stakeholders by state agencies and legislators is imperative to ensure continued collaboration and understanding of EJ in Michigan.

Development of Screening Tools

As EJ screening tools have developed in other states, community engagement has been a critical tenet. Continued collaboration with community members allows for the tool to be developed to serve community concerns, incorporating relevant pollution monitoring and tool layers. Additionally, regularly scheduled public hearings and workshops are necessary to provide the greatest extent of community engagement. The housing of the tool is also critical, as more resources can be devoted to the tool if it is housed in a state agency versus a nongovernmental institution.

As Michigan develops its own state-based tool, we advise that Michigan initially uses similar infrastructural frameworks of a screening tool to their counterparts in California and Washington. Over time, Michigan may further orient its tool to a framework that is unique and relevant to state needs. Although engagement with the community takes priority in development of the tool, collaboration with representatives from polluting industries may add to the credibility of the tool. However, the representation must be equal and power dynamics have to be acknowledged to ensure equity in the process. Additionally, academics may also be consulted; at

least through an informative capacity, for they have in the past and continue to shed light on additional concerns through their scholarly work.

Use of Screening Tools

Many states use their respective screening tools for education, advocacy, and/or the incorporation of EJ in their state policies and programs. Through educational frameworks, screening tools can inform the general public on environmental health disparities in their neighboring communities. Further political decision-makers have access to visualized data that may corroborate constituent testimonies of environmental hazards within their district. From a community advocacy lens, screening tools corroborate community testimony, and may create greater awareness among community members as to what health concerns are most pressing to their communities. Michigan has the capacity to use the screening tool for all of these purposes as well, especially as it may help incorporate EJ into its state policy is the most powerful way we view this tool being used for the state of Michigan.

Limitations of Screening Tools

A major limitation that usually affects the content of these screening tools is the availability of the data itself, and whether that data are specific enough to address EJ issues. Over time, Michigan should include more state-specific data pertaining to environmental hazards and environmental health. There are also various examples of environmental injustice that deserve as great or even more critical attention from the state that are not necessarily measured by an EJ screening tool. This is not to say that these tools will not be able to one day seamlessly incorporate examining these other injustices, but Michigan must be more proactive in linking data on these issues from studies, community experiences, as well as cumulative impact information.

Further, the existence of these tools may create critical linkages in how one environmental injustice may inform or exacerbate another. In understanding that communities in Southeast Detroit also experience vulnerability in food access, air quality measures have limited their capacities for resilience planting their own food sources. As EJ screening tools may identify hotspots of cumulative impacts in air pollution, there may also be recognition of how interventions to reduce air pollution in these areas may provide innumerable forms of relief and benefits to communities. By finding and documenting as many of these injustices as possible, we can further enrich our understanding of the greater cumulative impact of these injustices and how they contribute to the well-being of people in Michigan.

Resistance and Overcoming Resistance

From our interviews, we identified possible actors who may be resistant to using an EJ screening tool, both internal and external. In this case, internal actors refer to state agencies and legislators, as the tools typically reside within state government. External actors are those outside of state governments. Industry actors and lobbyists are most commonly recognized as being external actors resistant to screening tools in that they see it as a possible barrier to their business practices. They are also considered resistant actors in that they have great influence on internal actors like state legislators.

To overcome these resistant groups, many of our respondents suggested changes in how a tool is framed or presented as it is developed in state agencies. For Michigan in particular, framing the tool as educational or informative rather than regulatory addresses the concerns of many of these possibly resistant groups. State agencies, for example, can see the tool as a way to better inform their regulations and codes. Moreover, giving the tool an educational backing removes the argument from industries and state legislators that the tool will be used to create or enforce state laws.

Metrics of Success

None of the interviewees of our study could identify concrete metrics of success for EJ screening tools (e.g. timelines or goals) at the state level. However, our respondents described general goals of community building, allocation of funds, changes to policy or decision-making processes, and overall reduction in pollution as linked to screening tool information. We assert that Michigan state officials can build from this list, but they should also have legal goals and metrics that they use. For example, Michigan can use the tool to inform a five-year timeline for particulate matter (PM) emissions reduction in the top five percent of affected regions in the state. When deciding these goals and metrics, community residents must be genuinely consulted, for their ideas of success from the tool may differ from those of state officials.

Conclusion and Recommendations

We conclude by reiterating that Michigan should follow the example of other states only to the point of relevance and efficiency. There should be a collaborative process between representatives from marginalized communities and state officials in Michigan to help determine the following: 1) a definition of EJ; 2) the criteria that describes an affected community; and 3) what pollutants, socioeconomic or health factors will be measured by the state. This collaboration needs to occur at the beginning of the tool's development, continue throughout the process, and extend into future iterations of the tool. Additionally, an EJ screening tool should exist to reinforce community testimonies of their current unjust situations, rather than replace them.

From our findings, we feel that we can give a series of informed recommendations to Michigan community activists and state officials, whom we hope will work collaboratively on an EJ screening tool in Michigan. Our recommendations are as follows:

1. **Michigan must establish a state definition of environmental justice in law (meaning through state legislation), as well as specific criteria to define an "EJ community."**
    a. We suggest that the state first build from the US EPA's definition of EJ, as many other states have done. Defining EJ, as well as the criteria that comprise affected communities, should be an in-depth collaborative process with community members, and this collaboration should continue as these definitions alter over time.
2. **State officials must conduct multiple public hearings, workshops, and roundtables to ensure community involvement in the tool's development.**

a. These community outreach efforts should be held in multiple languages, with the assistance of language services, to ensure input and understanding from all communities.

b. These events should also be held while keeping in mind principles of diversity, equity, and inclusion (i.e. disability access, etc.). Many of these community members come from low-income households with less resources available at their disposal. These events should be carefully planned so that they are not held at obscure times (e.g. standard work hours).

3. **State officials must also incorporate other stakeholders into development decisions, such as tribal communities, academics, and industries.**

    a. All stakeholder representation must be equal (e.g. industry representatives cannot outnumber community members), and power dynamics (e.g. disparities with political clout) must be acknowledged.

4. **The EJ screening tool must be housed in a state agency rather than an outside institution.**

    a. This is to allow for the most stable infrastructure and access to resources.

5. **Multiple state agencies (e.g. DEGLE, DHHS, etc.) must collaborate on the tool's creation and use.**

    a. While we envision the tool to exist within the Department of Environment, Great Lakes, and Energy (DEGLE), we encourage multiple state agencies to collaborate on the tool's creation -- specifically sharing relevant data -- and to use information from the tool to inform better practices.

6. **Michigan should follow the examples of other states (specifically California) to create a screening tool more efficiently (in a shorter amount of time).**

    a. We assert that Michigan communities need a tool urgently, and thus state officials can use California's methodology for the first draft of the tool, as seen in the tool created by Grier et al. (2019). We acknowledge that in future iterations of the tool, Michigan should make the tool more state-specific.

    b. In the interim, we recommend the State continue to use the draft tool created by Grier et al. (2019) to inform definitions of EJ and criteria of EJ communities.

7. **Michigan must increase community monitoring efforts so that more data can be collected for the tool over time.**

    a. As more information is collected for the tool, the community must be regularly consulted as well as be transparent in what major updates are being provided to the tool so that the public is aware of what has changed in respect to their community.

8. **Michigan can, and should, use an EJ screening tool for education, advocacy, and regulatory purposes statewide.**
    a. To address potential resistance of this tool, Michigan may frame the screening tool as serving an educational or informative purpose in addition to serving its regulatory purpose.
9. **The tool should be used at different levels of governance (e.g. statewide, county-wide, city-wide) to ensure all affected communities are identified for their specific needs.**
10. **All governance levels must communicate health and safety concerns to community members, and provide resources (e.g. financial assistance, greater access to healthcare facilities) for affected community members to respond to such concerns.**
11. **Michigan state officials must consult communities as to the goals and metrics of success for the tool, and create timelines to reach those goals.**
12. **Michigan should aim to implement both local and state EJ policies, as they approach EJ problems at different scales.**
    a. Having EJ policies set at both the state and local level will strengthen overall accountability.

Abstract

As local environmental justice (from here on EJ) issues have become increasingly prevalent in tandem with our growing global climate crisis, the Michigan Environmental Justice Coalition (MEJC) seeks to advance the use of online EJ screening tools and establish EJ policies for the state of Michigan. This research study sought to address the question, "What are the lessons that Michigan can learn regarding EJ screening tools?" There are two objectives of our research: a) to identify states that use state-specific EJ screening tools and understand how these tools are used in state-level decision-making; and b) to utilize data from our informational interviews to roadmap best practices of development and implementation to serve communities in Michigan. Following initial review of reports within their respective agencies, we conducted a series of semi-structured interviews with EJ advocates, university academics, state officials and others from the states of Washington, New York, New Jersey, Michigan, Minnesota, Maryland, and California. The data acquired from these interviews were examined using the qualitative analysis software NVIVO 12 Plus. From our analysis, we derived several themes concerning EJ screening tools that were common among states, including: a) understanding of EJ; b) current and future use of screening tools; c) limitations; d) resistance to the use of these tools; and e) metrics of success. The results of this research will inform the most efficient and inclusive processes of developing EJ screening tools in Michigan.

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We acknowledge that the University of Michigan resides on the traditional lands of the Anishinaabeg -- the Ojibwe, Odawa, and Bodewadmi. As we continue to work, play, and live on these territories, we encourage everyone to reflect on the ongoing effects of colonization on indigenous peoples and tribal sovereignty. With this statement we affirm that acknowledgment is the first of many steps and that in order to support indigenous people and be good neighbors to and stewards of their homelands, we should take meaningful action towards decolonization.

I. Introduction

Environmental justice (referred to hereafter as EJ) represents the equitable distribution of environmental risks and benefits regardless of race, color, national origin, or income, and manifests through the intersection of politics and climate. It is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. (USEPA, 2020). As local EJ issues have become increasingly prevalent in tandem with our growing global climate crisis, the Michigan Environmental Justice Coalition (MEJC) seeks to advance the use of online EJ screening tools, and establish EJ policies for the state of Michigan. These screening tools typically combine socioeconomic data with data on environmental hazards and pollutants to visualize areas with the greatest environmental injustices, and to identify areas in policy that are in the most need of resources (Lambert, 2015:7). With Michigan now regarded as a "purple" state in regard to partisan identities (Roth, 2018), we recognize the ample opportunity for the new governor's administration to implement EJ tools and policies as an asset to environmental regulation and management.

The Michigan Environmental Justice Coalition (MEJC), the client of this project, is a statewide coalition of activists, leaders, scholars and scientists working to achieve environmental, public health, and racial justice, as well as economic equity and recompense for Michigan's most environmentally vulnerable communities (MEJC, n.d.). The research we conducted in partnership with the MEJC predominantly focused on procedural justice mechanisms (regarding the involvement of community members in decision-making processes), as we reviewed the extent to which state adoption of EJ screening tools (such as those created and utilized by the states of California, Washington, and Minnesota) influences EJ policies, and

the impact those policies may have on diminishing the disproportionate burdens caused by cumulative impacts of toxic air emissions, pollution and hazardous waste.

Within the EJ movement, Michigan EJ organizations seek to lay a solid foundation of EJ practices in law. At the state level, however, conceptualizations of how EJ is defined still lacks clarity for some. Former Michigan Governor Rick Snyder and current Governor Gretchen Whitmer have both presented their respective plans to enact EJ in Michigan -- or what the results of EJ action would be at the state level -- in the forms of Executive Directives and Orders, respectively (Michigan ED 2018-03; Michigan EO 2019-02). These include a working definition of EJ (Michigan ED 2018-03), and the creation of a position in the state government designed to address state EJ issues (Michigan EO 2019-06). Yet, these ideas have not permeated an understanding EJ to the general legislature, nor have they resulted in actionable EJ laws.

This is not to say that there are no mechanisms through which EJ action may take place within the State of Michigan's Department of Environment, Great Lakes, and Energy (MDEGLE) -- formerly Department of Environmental Quality (MDEQ). However, these approaches have yet to be realized as facets of EJ research and implementation. Additionally, as the authority of EGLE has been reduced over time by state policies, its ability to assist EJ communities has become increasingly limited (Benz, 2019). In lieu of state policies and interventions, nongovernmental organizations such as the MEJC, as well as community leaders, have historically spearheaded EJ advocacy in the state of Michigan.

Contrary to this trend, there have been several public EJ crises in Michigan in recent years that have prompted state response. For example, policy recommendations were submitted to the previous Governor Snyder Administration through the Environmental Justice Work Group (EJWG) Report in March of 2018 in the wake of the Flint Water Crisis (EJWG, 2018). In July of

2018, four months after receiving these recommendations, then-Governor Snyder issued an Executive Directive to establish an EJ state ombudsperson and an Environmental Justice Interagency Working Group (EJIWG; Michigan ED 2018-03). The section below entitled "33 Policy Recommendations" explains these recommendations in further detail. However, it was only after the implementation of an Executive Order in February 2019 by the Whitmer Administration, that these recommendations began implementation.

Since her inauguration in January 2019, Governor Whitmer has implemented several Executive Orders to address the state of EJ in Michigan, while additional Senate Bills addressing EJ remain under review (Michigan EO 2019-02; Michigan EO 2019-06). Under Governor Whitmer's Executive Order, Snyder's EJIWG is now referred to as the Interagency Environmental Justice Response Team (Michigan EO 2019-02). The Response Team is composed of representatives from the state Departments of Agriculture and Rural Development, Civil Rights, Health and Human Services, Natural Resources, Transportation, the Public Service Commission and the Michigan Strategic Fund (Michigan EO 2019-02). Whitmer's Executive Orders additionally removed the role of "ombudsperson" (Michigan EO 2019-02), and established the position of "Environmental Justice Public Advocate" (Michigan EO 2019-06). On April 25 2019, Governor Whitmer appointed Regina Strong as the state's first Environmental Justice Public Advocate (MDEGLE, 2019). In practice, the Public Advocate and the Interagency Environmental Justice Response Team will work concurrently to implement more of the 33 Recommendations, among other EJ policies (Michigan state official, personal communication, Feb. 2020). As of January 2020, Governor Whitmer's administration has also announced the Michigan Advisory Council for Environmental Justice (MAC EJ). MAC EJ is composed of twenty-one Michiganders, representing a multitude of stakeholders including impacted

communities (including representatives from multiple nations of the Anishinaabe), academics, local government officials, NGO representatives, businesses, and industry (State of Michigan, 2020).

During a presentation given to the MAC EJ, the Interagency Environmental Justice Response Team and the Office of Environmental Justice Public Advocate stated that they are working on the development of an EJ screening tool for Michigan (Michigan state official, personal communication, Feb. 2020). The Response Team expressed their interest in using the draft tool created by Grier et al. (2019) until such a time when an official tool can be adopted by the state (Michigan state official, personal communication, Feb. 2020). This shows considerable momentum surrounding EJ screening tools and measuring cumulative impacts.

Continuing this momentum, Dr. Charles Lee, Senior Policy Advisor at the USEPA, recently published a report titled, "*A Game Changer in the Making? Lessons from State Advancing Environmental Justice Through Mapping and Cumulative Impact Strategies"* (2020). In the report, Lee conducts a review of federal and state EJ mapping tools, as well as state efforts to assess cumulative impacts in policy. Using California as a model for future state EJ screening tool development, Lee discusses several lessons that states currently lacking an EJ mapping tool can use in their tool development (Lee, 2020:10204). We wish to mention Lee's work because it coincides very closely with our own. For instance, we also review existing screening tools and EJ policies in the United States, and discuss best practices from other states' examples. However, our research differs from Lee's in several ways. First, our research is largely qualitative, focusing primarily on screening tool development from the perspective of state actors, academics, EJ activists, and community members. Second, given that our client is the Michigan Environmental Justice Coalition (MEJC), our report is Michigan-centric. Although we review several states in

our analysis, all lessons that we draw from these states' experiences are meant to inform Michigan's journey with a state EJ screening tool.

The objectives of this Master's project are two-fold. First, we identify states that use state-specific EJ screening tools, and assess how these tools are used in state-level decision-making. We rely on a series of informational interviews with academics, state officials, and community members to inform us. Second, we utilize data from our interviews to roadmap best practices of development and implementation to serve communities and EJ in Michigan. Our research questions include the following:

1) How did states that currently have a screening tool develop that tool?

2) What were the barriers that these states faced and how did they overcome them?

3) How are EJ screening tools currently being used?

4) How do we measure a tool's success? and

5) What are the lessons that Michigan can learn from these other states?

We first address the current literature on EJ and current screening tools used at the state level to assist vulnerable communities. The methodologies and analysis strategies we use to meet our objectives are discussed in the following sections.

II. Literature Review

A. Brief History of Environmental Justice in the United States

The field of EJ has become an increasingly critical area of scholarly work in the past few decades in the United States. Compared to the overarching environment and sustainability fields as a whole, EJ's presence in the field of scholarly review is continually unfolding, especially within the throngs of interdisciplinary research. One common definition of EJ often used by scholars comes from the U.S. Environmental Protection Agency (USEPA). The definition has been reformed several times, with its origins in the 1992 USEPA Report *Reducing Risk For All Communities.* Here is the most current definition:

> "Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work" (USEPA, 2020).

The publication of *Reducing Risk For All Communities* did not define public awareness of EJ, as environmental injustices have existed for decades in the United States. Specifically, communities of color have "known about and have been living with inequitable environmental quality for decades-most without the protection of the federal, state, and local governmental agencies" (Bullard, 2001:153). Historically, environmental injustices have been protested by these same communities against the siting of toxic facilities. However, EJ was not recognized by the general public as an issue until protests in Warren County, North Carolina brought it to the national forefront in the early 1980s (Mohai, 2018). North Carolina's state government wanted to place a hazardous waste facility in the predominantly African American community of Warren County,

and protests of nonviolent civil disobedience were coordinated in an attempt to keep the waste from being transported there.

These protests soon led to an investigation requested by then U.S. Representative Walter Fauntroy to the U.S. General Accounting Office (currently called the U.S. Government Accountability Office) to investigate the racial composition of communities surrounding the four major hazardous waste landfills in the southern region of the United States (Mohai and Saha, 2006:1). The study found that in all four cases, African Americans were disproportionately represented in these communities (USGAO, 1983). Following this line of research, the United Church of Christ (UCC) conducted a national-level quantitative study and published their report: *Toxic Wastes and Race in the United States* in 1987 (UCC, 1987). The study found that the percentage of people of color in communities containing a commercial hazardous waste facility was double that of communities not containing such facilities (UCC, 1987).

The UCC report helped bring the issue of EJ to the attention of environmental scholars, such as Dr. Mohai and Dr. Bryant of the University of Michigan's School of Natural Resources (SNRE) -- now the School for Environment and Sustainability (SEAS). In 1990, they hosted the Michigan Conference on Race and the Incidence of Environmental Hazards (Mohai, 2018:7). At the conference, participants decided to draft a letter to then-USEPA Administrator William Reilly, requesting a meeting with him and some of his USEPA associates to talk about the evidence at the time pertaining to environmental inequalities, and seek out ways for the agency to address the problem. Administrator Reilly responded to the letter and representatives from the 1990 Michigan Conference -- namely Bunyan Bryant, Robert Bullard, Benjamin Chavis, Paul Mohai, Michel Gelobter, David Hahn-Baker, Charles Lee, and Beverly Wright -- were invited to meet with Administrator Reilly that following September (Mohai, 2018:8). As a result of that

meeting, Administrator Reilly decided to create an internal USEPA Working Group, dubbed the Environmental Equity Workgroup, to investigate the evidence and draft a set of proposals for addressing environmental inequalities. This group later went on to produce a report titled *Environmental Equity: Reducing Risk for all Communities* (USEPA, 1992). This report was the first official acknowledgement by the federal government that made EJ an issue warranting federal attention (Mohai, 2018).

The USEPA chose to use the term 'environmental equity' because it most readily lends itself to scientific risk analysis. The distribution of environmental risks is often measurable and quantifiable; the Agency can act on inequities based on scientific data (USEPA, 1992:10). Following this acknowledgement by the federal government, scholars in the environmental field spent much of the 1990s discussing EJ, its many definitions and its scope as a political term. Legal scholar and lawyer Robert Kuehn distills the most important essential tenets of EJ: distributive justice, corrective justice, procedural justice, and social justice (Kuehn, 2000). In an environmental context, distributive justice involves the equitable distribution of the burdens resulting from environmentally-threatening activities, or conversely, of the environmental benefits of government and private-sector programs (Kuehn, 2000). The 1994 Presidential Executive Order on EJ focuses predominantly on distributive justice concerns by directing agencies to develop strategies for identifying and addressing disproportionately high and adverse human health and environmental effects on minority and lower income populations (EO 12898). It also calls on all federal agencies to consider the consequences of EJ in their decision-making processes (Kuehn, 2000).

The second aspect of EJ is procedural justice. This can refer to the representation and fairness of the decision-making processes that decide environmental issues (Kuehn, 2000). It is a

common observation that environmental decision-making favors those with resources and political power over people of color and low-income communities (Kuehn, 2000). Procedural justice attempts to correct this by instituting policies and procedures that level the playing field, so to speak, so that EJ can occur at a structural level.

Corrective justice deals with not only the administration of punishment to those who violate laws, but also the obligations to repair losses on the wrongful party (Coleman, 1995). For EJ advocates, corrective justice is a call for those who produce emissions and pollutants to be held fully accountable and protect victims' rights with compensation, to repair damages caused, as well as to provide quality healthcare.

The final aspect of EJ is social justice. Through the social justice lens, EJ presents itself as part of the larger problems of racial, social, and economic justice and helps to illustrate the influence of race, politics, and class on a person's or area's quality of life (Kuehn, 2000). The same underlying factors that may be responsible for significant environmental threats to communities may also play a role in why an area may suffer from inadequate community investment in schools, businesses, and infrastructure, among other things (Kuehn, 2000).

It is important to understand the history of EJ in the United States, and its subsequent definitions in order to understand our work concerning EJ in the state of Michigan.

B. Environmental Justice in Michigan

The state of Michigan is in the unique position to emerge as a national leader in addressing EJ (EJWG Report, 2018). Its recent notoriety largely stems from highly publicized and continuing public health and EJ crises such as Enbridge's Line 5, the Flint Water Crisis, and Michigan's 'dirtiest' zip code, 48217 (Benz 2019; Campbell et al., 2016).

Enbridge Line 5 and the Straits of Mackinac

There has been much controversy surrounding Enbridge's Line 5 since 2010. Enbridge is a multinational energy transportation company based in Canada and operates a number of oil pipelines across the Great Lakes region, some of which run underwater on the bottom of the Straits of Mackinac at varying depths (National Wildlife Federation, 2016:2). In 2010, Enbridge's Line 6B ruptured, causing immense detriment to the environment and communities along the Kalamazoo River. Despite warnings from their leak detection system, Enbridge did not react to the Kalamazoo River spill for seventeen hours (National Wildlife Federation, 2016:14). The environmental impact caused by this delayed reaction rendered Line 6B's rupture as the worst inland oil spill in U.S. history (Leahy, 2016:807). The spill led environmental activists and interest groups to assess the environmental risks of other oil pipelines in Michigan. Enbridge's Line 5 was identified as a significant and similar risk to the environment as Line 6B (Leahy, 2016:808).

Line 5 opened in 1953 and predates the passage of most U.S. environmental laws, including the National Environmental Policy Act of 1969. As such, Line 5 was not constructed following procedures that examined or measured its environmental impact (Leahy, 2016:808). Despite being past its intended lifespan, Line 5 is still in use and, as Enbridge notes, will remain so "indefinitely" (Leahy, 2016:808). As Line 5 sits on particularly uneven terrain on the bottom of the Straits of the Mackinac, the water's currents fluctuate quickly and unpredictably, risking oil flushing into Lakes Michigan and Huron (National Wildlife Federation, 2016:14). While the public has brought up repeated concerns of Line 5's corrosion and the impacts of its potential rupture, Enbridge refuses to release data regarding Line 5's structural integrity citing

"confidential business information, complexity of the data, and national security concerns" (Leahy, 2016:842).

In addition to its environmental impacts, Line 5 threatens indigenous sovereignty and cultural connection to the Straits of the Mackinac. The Straits of Mackinac are

> "a hallowed place in the history of the Indian and non-Indian peoples of Michigan… They are at once an iconic symbol of the State and a sacred wellspring of Anishinaabe life and culture" (Tribal Comments on Dynamic Risk Draft Alternatives Analysis, 2017).

As the Anishinaabe have significant cultural connections to the Mackinac Straits, state inaction signifies continued racial apathy toward indigenous communities, while a spill would cause drastic changes to the Anishinaabe's relationship with the Straits (Mihell, 2017). As Line 5 remains in use, community members in Michigan and the Great Lakes will continue to face environmental injustices and the threat of environmental crisis.

The Flint Water Crisis

Perhaps the most famous of Michigan's recent environmental crises is the inaction by the state during the Flint Water Crisis. The Flint Water Crisis began in April of 2014 when state-appointed emergency managers switched the City of Flint's drinking water source from the Detroit Water System (from the Detroit River and Lake Huron) to the Flint River (Bridge Staff, 2016; FWATF, 2016:2). The systemic and infrastructural conditions through which the crisis occurred are connected to histories of pervasive structural racism within Flint and Michigan (MCRC, 2017:10). The city of Flint's population is 54.3% African American, and 40.4% of its population live below the poverty line (U.S. Census Bureau, 2018). Since the 1960s, the majority of low-income black families in Flint have been relegated to substandard housing facilities that the city neglected to rehabilitate for improved living standards (MCRC, 2017:63).

The decision to switch Flint's long-term water supply contract from the Detroit Water and Sewerage Department (DWSD) to Flint's Water Treatment Plant (WTP) was made by state-appointed emergency managers, who excluded public input from Flint residents (FWATF, 2016:54; Bridge Staff, 2016). As the city was in the midst of bankruptcy, an emergency financial manager was appointed in accordance with Michigan law, believing the employment of austerity measures could restore financial and resource security in the city (Bernstein, 2016:38). By testimony of emergency managers and state officials, there was an incentive to switch Flint's water source contracts, despite on-going health concerns related to WTP's water quality, as a means of reducing cost burdens upon the city (FWATF, 2016:18-37; MCRC, 2017:46). As WTP's contract offer was significantly cheaper than that of the DWSD, emergency managers went forward with the WTP contract without conducting a sufficient water quality assessment to ensure the water would be safe for residential use, though officials assured residents of its safety (FWATF, 2016:7). This decision led to the contamination of the Flint water system from the leaching of lead and other heavy metals from city pipes, as well as a local Legionella outbreak (FWATF, 2016:24-25).

Additionally, water corrosion control measures, which are required by law, were not put in place by the emergency manager. Residents, despite reporting complaints of the water's odor, taste and discoloration, were repeatedly reassured by state officials that the water was safe to use (FWATF, 2016:16). The continued non-implementation of corrosion control measures came directly from MDEGLE (formerly MDEQ), as its staff insisted that corrosion control treatments were "not necessary until two six-month monitoring periods had been conducted" (FWATF, 2016:27). As noted by the Flint Water Advisory Task Force, several government agencies were

negligent in reacting to the Legionella outbreak that correlated with residents using and drinking unsafe water:

> "Although the definitive cause of the outbreaks is uncertain at the time of publication, the [Genesee County Health Department] and the [Michigan Department of Health and Human Services] did not notify the public of the outbreaks in a timely fashion in order to urge caution" (FWATF Report, 2016:8).

Continued inaction by MDEGLE and other state agencies, despite reports of health concerns from residents, exacerbated the breadth of impact upon Flint. This absence of government intervention exemplifies the negligence toward community members amidst one of the worst public health crises in recent memory. As a result, community members must reckon with irreparable health implications caused by lead pollutants, in addition to intergenerational trauma and distrust of government leaders (FWATF Report, 2016:1).

48217: The Most Polluted Zip Code in Michigan

In addition to the city of Flint, a community located in Southwest Detroit -- also known by its area code, 48217 -- is also of major concern for EJ activists. Regarded as the most polluted zip code in Michigan, this community suffers from high rates of cancer, asthma, and other respiratory ailments (Benz 2019; Berglund, 2018). As the population in Detroit increased in the 20th century, neighborhoods of southwest Detroit experienced the majority of the industrial expansion and increased pollution that accompanied this (Berglund, 2018). There are currently 52 heavy industry sites within a 3-mile radius of this zip code, and almost half of them handle toxic chemical waste (Schlanger, 2016; Benz, 2019). The industries in this area have technically been in compliance for their individual emissions under the Clean Air Act, yet these chemicals in combination have created toxic conditions that have increased rates of asthma and other respiratory illnesses (Schlanger, 2016; Benz, 2019). In addition to affecting public health, these conditions also affect residents' education. Michigan schools are, in general, "disproportionately

located in places with high levels of air pollution from industrial sources," (Mohai et al., 2011:857). However, prior research has shown that "schools located in areas with the highest pollution levels also had the lowest attendance rates (a potential indicator of poor health) and the highest proportions of students failing to meet the state's educational testing standards," (Mohai et al., 2011:858). The combination of health and educational disadvantage has created extreme generational injustice in 48217 and surrounding communities. Residents continue to fight for the right to clean air and demand changes from MDEGLE, but officials within the state agency continually claim that progress in negotiations with industry is slow and steady. This claim is contradictory to the approval of industry permits by the state offices that allow dangerous toxins to continue to emit (Schlanger, 2016; Berglund 2018).

These examples are by no means an exhaustive list of current and persistent environmental injustices throughout the state of Michigan. Rather, they represent three highly publicized and prolonged instances of environmental injustice that have gained widespread media, academic and political recognition. Environmental injustices occur throughout Michigan and are not limited to concerns regarding air and water pollution. EJ issues including food security, access to green spaces, indigenous sovereignty, and energy democracy are persistent concerns throughout Michigan.

As Michigan faces a number of environmental injustices, there are numerous EJ and community organizations that work to combat environmental issues and advocate for the health and wellness of Michiganders. These organizations include, but are not limited to:

- *Arab Community Center for Economic and Social Services (ACCESS)**
- *Breathe Free Detroit**
- *Center for Urban Responses to Environmental Stressors (CURES)* at Wayne State University

- *Citizens' Resistance at Fermi 2 (CRAFT)**
- *Clean Water Action*
- *Delray's Community Benefits Coalition (Delray CBC)**
- *Detroit Action for a New Economy**
- *Detroiters Working for Environmental Justice (DWEJ)**
- *East Michigan Environmental Action Council (EMEAC)**
- *Empower Michigan**
- Sierra Club's *Environmental Justice Action Group*
- *Environmental Transformation Movement of Flint (ETM Flint)**
- *Great Lakes Environmental Law Center**
- Detroit's *Green Door Initiative**
- *Michigan Environmental Council**
- *Michigan Welfare Rights Organization (MWRO)**
- *Mothers Out Front**
- *National Wildlife Federation (NWF)**
- *People's Water Board**
- *Southwest Detroit Environmental Vision (SDEV)*
- *We The People of Detroit*
- *We Want Green, Too**
- *Ford Next Generation Learning**
- *Zero Waste Detroit*
- *People's Movement Assembly*
- *Focus: HOPE*

* denotes membership in MEJC (MEJC, n.d.)

Michigan has a legacy of leadership in conservation, environmental stewardship, civil rights, industrial innovation, and entrepreneurship. However, there are many examples across the state where the state government has polluted the environment in ways that negatively affect people's health and damage the terrestrial and aquatic systems that many rely on for maintaining their economic vitality, recreational enjoyment, and cultural heritage (EJWG, 2018:8). In an effort to combat these detrimental actions from occurring in the future, an Environmental Justice Work Group (EJWG) was appointed by Governor Snyder in 2017. An official list of 33 Recommendations were sent and submitted in March 2018 to the State Governor's Office. The purpose of this Work Group, as well as its finalized recommendations to the state, are outlined below in section C.

Data Monitoring in Michigan

In many reported cases of environmental injustice, academics and government officials rely on data to corroborate the testimonies of affected communities (Grier et al., 2019:62). There are current structures within Michigan that are charged with collecting data regarding air and water quality, public health indicators, and population demographics in order to monitor health and well-being of Michigan residents.

Michigan Air Emission Reporting System

As part of the Clean Air Act, states are required to maintain an annual inventory of air pollution emissions from industry facilities (MDEGLE, 2020:5). The Michigan Air Emission Reporting System (MAERS) allows participating industries to self-report their respective emissions into an online database (MDEGLE, 2020:5). MDEGLE officials then analyze this data to track air pollution trends, evaluate current air pollution control programs, track pollution source compliance with federal standards, and evaluate the emissions portion of the air quality fee (MDEGLE, 2020:5). Participating industries report emissions on Carbon monoxide (CO), Nitrogen oxides (NOx), Sulfur dioxide (SO2), Particulate matter (PM and PM-10), Volatile organic compounds (VOC), and Lead (Pb; MDEGLE, 2020:5). However, industries are not required to report the cumulative impact of these respective emissions. Additionally, industries who self-report under MAERS are not required to have their emissions verified by outside and independent sources.

Community Air Monitoring Tools

Acknowledging that MAERS may not provide the most accurate assessment on community impact of air pollutants, there are a number of air monitoring efforts conducted in zip code 48217. From 2016 to 2017, MDEGLE officials, along with state, federal, academic and

community partners participated in The 48217 Community Air Monitoring Project. This project placed an air monitoring station at The New Mount Hermon Missionary Baptist Church, located in 48217 (Kilmer and Williams, 2018:1). Additional monitoring systems within 48217 include USEPA's Mobile Air Monitoring system and MDEGLE's Investigative Monitoring for VOCs (Kilmer and Williams, 2018:71). However there are considerable limitations to community-based monitoring, as it is highly reliant upon continued funding and working equipment. Additionally, the scientific jargon often used to explain the data also makes it difficult for community members to interpret the meaning of its results.

Public Health Monitoring

Public health data is instrumental in evaluating the extent of community vulnerabilities and health impacts of air pollution and environmental hazards. In Michigan, health data and statistics are collected and reported publicly through the Michigan Department of Health & Human Services (MDHHS). Reports include data provided at the state, county and community level and are categorized by health concerns, such as "Cancer Statistics" and "Birth Defects," or groupings such as "Community Health Information" and "Health Disparities" (MDHHS, 2020).

C. Michigan's Environmental Justice Working Group's 33 Policy Recommendations

In February of 2017, then-Governor Rick Snyder appointed the Environmental Justice Work Group (EJWG) to develop recommendations the state could implement to improve environmental justice awareness and engagement in the actions of Michigan's state and local agencies (EJWG, 2018:4). The working group arose out of the direct recommendations from the Flint Water Advisory Task Force (FWATF) and the Flint Water Interagency Coordinating Committee (FWICC) (EJWG, 2018:4). The EJWG represented a collaborative group composed

of state EJ communities, environmental organizations, academia, business entities, local government agencies, and federally recognized first nations (23 members in total). Their work concluded in 2018 following the submission of 33 Recommendations to the Governor that, if utilized, serve as an implementation scheme of short- to long-term actionable tasks that effectively address and advance EJ across Michigan (EJWG, 2018:4).

In order to measure the extent to which the state of Michigan has implemented (or left unacknowledged) these 33 recommendations, we must first identify the short-term tasks from the medium and long-term tasks. For this portion, we are not saying as to whether or not these recommendations were implemented, but as to how soon or into the future that these recommendations can possibly be fulfilled. The first nine recommendations address "Guidance, Training, and Curriculum Recommendations" to promote awareness, collaboration and institutional capacities to address environmental injustices in the state of Michigan (EJWG, 2018:6). The first recommendation within this subgroup, urges the state to "strive for Michigan to be a national and global leader in environmental justice" - considering this recommendation is more abstract and general, it can objectively be implemented through the implementation of the other recommendations, or through other EJ policies in the state (EJWG, 2018:7). This particular recommendation operates on both a short and long-term standard, as Michigan's EJ planning and policies will continue to evolve over time.

The establishment of an Interagency EJ Response Team and an EJ Public Advocate have set an institutional foundation for successful EJ implementation. This makes the 'Training and Curriculum' recommendations more feasible as these entities become more established within MDEGLE, and as they continue to work with communities. As we noted previously, the state of Michigan has already implemented some of these recommendations. Specifically, the second,

third and fourth recommendations -- to establish an EJ ombudsman in the Governor's office (now known as the Environmental Justice Public Advocate), to establish an interagency working group, and to establish an environmental justice advisory council respectively (now known as Michigan Advisory Council on EJ (MAC-EJ)) -- have already been put into effect.

The remaining twenty-four recommendations (from the original thirty-three that were submitted to Governor Snyder) are directly related to the development and implementation of EJ policy - which could also be supported by the Interagency Environmental Justice Response Team, a Public Advocate, and MAC-EJ. Within this subset of recommendations, there are five main themes to EJ policy-making tools and implementation:

1) Integration and Strengthening of Environmental Justice and Public Health Considerations in Agency Decision Making;

2) Enhancement of Tracking, Monitoring, and Metrics;

3) Increasing Funding and Aligning Tax Policy with Environmental Standards;

4) Improvement of Collaboration Across All Levels of Government and with First Nations; and

5) Creation of Tools and Resources for Residents (EJWG, 2018:6-7).

Procedural recommendations such as Recommendation 1; adopting public petition process (EJWG, 2018:16), as well as Recommendations 3 and 4; to require EJ analyses in permitting applications and in Michigan public service commission's certification of necessity applications (EJWG, 2018:17) are recommendations that are already under the purview of the Response Team (Michigan EO 2019-02; Michigan EO 2019-06).

There are also capacities through which EJ is being acknowledged outside of the 33 Recommendations and the direct work of the Interagency Environmental Justice Response Team

and an Environmental Justice Public Advocate. This is present in Michigan Executive Directive 2019-01, which establishes accountability measures to state departments should they neglect to communicate and mediate public health threats among Michigan's communities:

> "If state government has information about an imminent threat to public health, safety, or welfare, the People of the State of Michigan have a right to know. State government must be open, transparent, and accountable to Michigan residents, even when a department, agency, or state officer falls short of the duty to protect the health, safety, and welfare of the public we serve" (Michigan ED 2019-01).

Such accountability mechanisms, though not explicitly outlined in the 33 Recommendations, have a tertiary linkage to the successful implementation and enforcement of the 33 Recommendations and EJ policies in Michigan, as public health and environmental injustices are often inextricably linked.

In the case of these 33 Recommendations, the EJ Work Group provided as one possible example of an EJ area or community as: "any census tract with a 30 percent or greater minority population, or 20 percent or greater at or below the federal poverty level" (EJWG, 2018:10). However, this definition is malleable and could be further defined based on the inclusion metrics that emphasize cumulative impacts of pollutants on public health, or delineating EJ screening metrics that are state-specific. Some examples of these tools are California's *CalEnviroScreen*, Washington's *Environmental Health Disparities Map*, and Minnesota's *What's in My Neighborhood*. We will address the details of these tools in the following section.

The second policy recommendation – to "develop an environmental justice screening tool in Michigan and include cumulative impacts in decision making processes" (EJWG, 2018:16-17) – was the focus of a previous team of Master's students at the University of Michigan's School for Environment and Sustainability (Grier et al., 2019). Given the implications of their report, we feel that a brief summation of their work is necessary. Grier et al. (2019) used both qualitative and quantitative methodologies to assess the state of EJ in Michigan. In their quantitative

analyses, they used metrics of EJ similar to the state of California to display the ranking of census tracts in the state based on EJ scores, which combine environmental and demographic factors (Figure 15, Grier et al. 2019:96). Their results supported what residents of EJ communities in Michigan have always known; that environmental hazards occur in areas that typically are communities of color and low-income.

The publication of the 2019 report by Grier et al. has created renewed interest in the idea of a Michigan EJ screening tool, especially as Grier et al. created a functional map from publicly-available data (Michigan state official, personal communication, Feb. 2020). A screening tool would be applicable to the work of the Interagency EJ Response Team and an Environmental Justice Public Advocate in identifying priority areas and communities for intervention. Development of this tool remains in its early phases, as MDEGLE's Interagency EJ Response Team is still in the process of developing a state definition of EJ (Michigan state official, personal communication, Oct. 2019).

This tool would be particularly relevant for Recommendations 9 and 10, which require annual EJ reports, and enhanced community environmental quality monitoring (EJWG, 2018:18). Additionally, Senate Bill No. 60 (introduced on January 24, 2019) mentions using environmental screening tools such as the USEPA's *EJSCREEN*, to identify "Environmental Protection Communities" that would be eligible to receive benefits from its proposed Air Quality Enforcement and Mitigation Fund (Michigan SB 2019-60). As this tool would be accessible to the public, there would be ample opportunities for community knowledge sharing and action through the use of such a tool, further supporting the goals of Recommendation 10 in addition to ensuring greater community agency in EJ processes (EJWG, 2018:18). We also believe that

Michigan should learn from other states who have already created and utilized an EJ screening tool. We discuss the most influential screening tools (that we are aware of) below.

D. Screening Tools in the United States

Spatial mapping and screening tools are important in conducting EJ research, as they inform the user about the relationships between environmental quality and population demographics through Geographic Information Systems (GIS). These screening tools typically operate by combining socioeconomic data together with available data on known environmental hazards and pollutants in order to visualize areas with the greatest environmental injustice. Visually representing the data provides evidence in connecting claims of distributive injustices, where the disproportionate exposure to hazardous wastes or the unequal distribution of goods to certain populations are better identified (Lambert, 2015:7). By identifying these areas of environmental injustice, it is meant to assist with policy implementation of resources to be directed toward these areas. More recently, leading EJ scholars, such as Mohai and Saha (2006), emphasize that the application of distance-based methods using spatial data helps to examine the extent to which race and socio-economic factors determine disparities in the distribution of hazardous wastes and facilities. It should also be noted that maps are analytical tools that give people the power and knowledge to have influence and to change some decision-making processes.

It is here that we should distinguish state and federal EJ *definitions* in comparison to EJ *criteria*. We use the term 'definition' to describe a state or federal statement on the concept of EJ, its goals and aspirations. See Appendix A for a list of state EJ definitions for states included in our literature review. EJ 'criteria' describes the quantitative metrics or thresholds that characterize an environmental injustice or impacted areas. These criteria are typically present

and evaluated in an EJ screening tool. See Appendix B for a list of state criteria for EJ communities or impacted areas for states included in our literature review.

To begin our research in state-specific screening tools, we used Grier et al. (2019) to inform us of states with the most established screening tools (i.e. tools with the longest history) to study. From this report, we determined that California and Minnesota were states of interest. Following this, we learned of other states' screening tools (e.g. Washington, Maryland, New Jersey, and North Carolina) from our advisor, our client and several other informed experts in the field. These tools were not as established as California or Minnesota, but their development processes were still relevant to our study, and thus could inform our analysis. These screening tools were all similar in that they: a) served as a state-wide tool, b) combined environmental data with socioeconomic or health data to represent EJ issues; c) visualized this data on an interactive online platform; and d) made this data available to the public in some form. Visualization of the combination of factors was key, as we consider the public's access to and understanding of the tool crucial to a screening tool's success. For these reasons, we decided to focus on the aforementioned states because they could provide a framework for Michigan to develop its own EJ screening tool. In the "Other State Environmental Justice Databases" section below, we review state tools and databases that we discovered during our research, but that are not as pertinent to our study based on the limitations of their features. These features are described in further detail in the aforementioned "Other State Environmental Justice Databases" section. The following section will: a) describe the features of each screening tool; and b) discuss its role in shaping or implementing state EJ policies. First, we summarize the federal EJ screening tool used by the USEPA, *EJSCREEN*.

U.S. Environmental Protection Agency: EJSCREEN

The USEPA provides a nation-wide EJ screening and mapping tool called *EJSCREEN*, which uses publicly-available data to determine the connections between demographic and environmental characteristics of locations throughout the country (USEPA, 2016). Launched in 2015, this tool allows the user to select any geographic location and uses 11 environmental indicators, 6 demographic indicators, and 11 EJ indexes to provide information about that selected area. An important feature of *EJSCREEN* is the ability to generate standard reports that compare rankings on a national, regional, and state basis. Hence, *EJSCREEN* offers a solid set of indicators for use by states that do not have the capacity to develop their own cumulative impacts tool (Lee, 2020). Although this is an accessible tool for community members and stakeholders to identify areas where environmental injustices exist and to make state- or nation-wide comparisons, the map does not provide published risk assessments nor is it frequently updated. It is limited in the sense that "it does not include state-specific data sets that could aid in addressing local and regional issues afflicting communities" (Lee, 2020). Given these limitations, some states have developed their own state-wide screening tools that are more frequently updated and provide better state-specific information. Furthermore, *EJSCREEN* is not designed to determine the existence of environmental injustices in an area (USEPA, 2018). In fact, the EPA entirely lacks criteria to identify EJ areas (Liang, 2016).

California: CalEnviroScreen

In 1999, California became one of the first states that codified EJ in its statute (Peter, 2001:529), defining it as:

> "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (FindLaw, 2020).

Since then, the California Environmental Protection Agency (CalEPA) has implemented an EJ Program to address the inequities of environmental protection in affected communities within the state through small grants, as well as an EJ task force and an EJ screening tool (CalEPA, 2020). Between 2000 and 2001, California State Legislature established two EJ working groups, the Interagency Working Group on Environmental Justice (Working Group) and the Advisory Committee on Environmental Justice (EJ Advisory Committee), responsible for developing "a strategy to identify and address gaps in CalEPA programs that may impede the achievement of environmental justice" (CEJA, 2018a:45). The Working Group is comprised of members within CalEPA's Boards, Departments and Offices (BDOs) and the Governor's Office of Planning and Research, while the EJ Advisory Committee is comprised of grassroots community advocates and "other external stakeholders" (CEJA, 2018a:45). From 2002-2003, the EJ Advisory Committee developed over one hundred recommendations for the Working Group in developing strategies and action plans to address EJ, including a recommendation for CalEPA to create a cumulative impact assessment tool; with CalEPA adopting an Intra-Agency EJ Strategy and EJ Action Plan by 2004 (CEJA, 2018a:45).

Prior to the development of the tool, CalEPA approved a working definition of cumulative impact in 2005 (CEJA, 2018a:45):

> "[Cumulative impact] means exposures, public health or environmental effects from the combined emissions and discharges in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socio-economic factors, where applicable and to the extent data are available" (OEHHA, 2008).

Additionally, California's Office of Environmental Health Hazard Assessment (OEHHA) also began developing its cumulative impact guidance in 2005, and began developing technical methods to measure and assess its effects on community health (CEJA, 2018a:45). This work on

cumulative impacts assessment continued into 2008-2009, where the Cumulative Impacts and Precautionary Approaches (CIPA) Workgroup, represented by a number of stakeholders including community groups, academics, regulatory agencies, environmental organizations and industry, convened to further develop guidance for CalEPA's CIPA (CEJA, 2018a:45). This work eventually culminated in the OEHHA's report, written in collaboration with the CIPA Workgroup, titled "Cumulative Impacts: Building a Scientific Foundation" (released December 2010), while OEHHA also began work development on an explicit screening tool to evaluate cumulative impacts in California (CEJA, 2018a:45).

In April 2013, OEHHA released *CalEnviroScreen* 1.0 to identify communities in California by census tracts that are disproportionately burdened by, at risk, and vulnerable to multiple forms of environmental pollution (OEHHA, 2013). Since this initial release of the software OEHHA has continued to update the tool over the years, releasing the current *CalEnviroScreen* 3.0 in January 2017 (OEHHA Factsheet, n.d.). This map uses environmental, health, and socioeconomic data to provide a numerical score to each census tract in the state, where those that have higher scores experience greater pollution burdens and vulnerabilities than those with lower scores (OEHHA Factsheet, n.d.). It also includes a cumulative impact assessment, that examines the "multiple chemicals, multiple sources, public health and environmental effects, and characteristics of the population that influence health outcomes" (OEHHA, 2010:3). The map identifies 8,000 census tracts where each has a population of roughly 4,000 people. The online interactive platform of *CalEnviroScreen* shows the visual comparisons of the score-ranked census tracts using a color scheme, where darker colors represent worse environmental conditions. As seen in Figure 1, these scores are calculated based on the averages taken from 20 statewide indicators of pollution burdens and population

characteristics. Moreover, OEHHA divides the indicators into four main categories: exposures, environmental effects, sensitive populations, and socioeconomic factors. Additionally, while *CalEnviroScreen* does include several indicators, it does not include race or ethnicity, an indicator that is included in USEPA's *EJSCREEN* (CalEPA, 2013). For this reason, *CalEnviroScreen* does not explicitly call communities in their score as "EJ Communities," but rather "disadvantaged communities" (see Appendix B for detailed criteria of these communities).

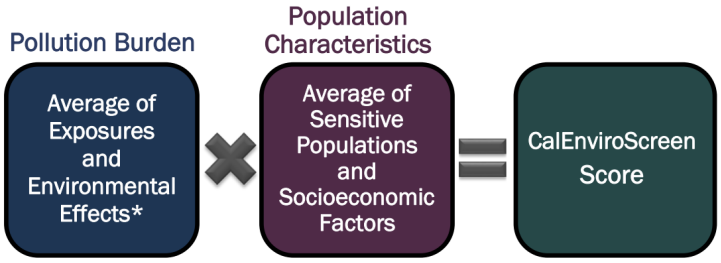

Figure 1: A visual representation of the equation used to calculate the *CalEnviroScreen* scores for each census tract. (Source: OEHHA Factsheet, n.d.)

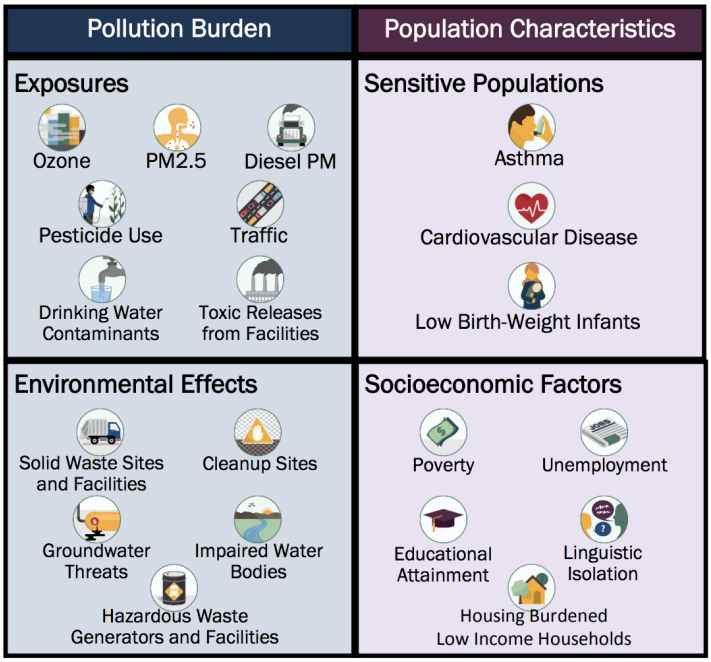

Figure 2: The four main categories used by the OEHHA to separate the *CalEnviroScreen* indicators (Source: OEHHA Factsheet, n.d.)

The California Environmental Justice Alliance (CEJA), a community-led alliance in California achieving EJ by advancing policy solutions, states that *CalEnviroScreen* is a critical tool that targets local, state and regional policies to protect their hardest-hit communities (CEJA, 2018a:5). According to CEJA, *CalEnviroScreen* is paving a new path for environmental policymaking as it emphasizes cumulative impact assessments instead of looking at point-source pollution from an individual standpoint. It also "considers socioeconomic and health-related vulnerabilities that can aggravate pollution exposure, which are not often included in environmental decision making" (CEJA, 2018a:6). As an example, in April 2017 *CalEnviroScreen* was used by the CalEPA to identify, designate, and create a list of disadvantaged communities for Senate Bill 535 and Assembly Bill 1550 (OEHHA, 2017). The Senate Bill 535, passed by the California State Legislature and signed into law in 2012, directs that 25% of proceeds from the Greenhouse Gas Reduction Fund are used for projects that benefit disadvantaged communities, while Assembly Bill 1550, signed into law in 2016, requires that 25% of the fund's proceeds be spent on projects located in disadvantaged communities (OEHHA, 2017). These two bills were created to target investment proceeds from California's cap-and-trade program to improve public health, quality of life, and economic opportunity for the state's most burdened communities (CalEPA, 2019). As such, the use of *CalEnviroScreen* in CalEPA's disadvantaged community designation process helps allocate state funds to projects that address environmental injustices.

According to OEHHA, census tracts in California that score in the top 25% applying *CalEnviroScreen* are designated as 'disadvantaged communities' (OEHHA, 2017). In their April 2017 report on designating disadvantaged communities, the challenges of identifying such communities is mentioned, due to differences in the definition and understanding of the term.

Nevertheless, CalEPA considers poverty and income statistics, negative public health effects, and disproportionate impacts of environmental pollution when identifying disadvantaged communities (CalEPA, 2017:5).

CalEnviroScreen has the additional benefit of existing state-based screening tools that complement and extend its breadth of impact by analyzing additional indicators. As noted by the California Environmental Justice Alliance (CEJA), local and regional planners in California have the capacities to use *CalEnviroScreen* for local needs by overlaying additional screening tools or indicators with *CalEnviroScreen* (CEJA, 2018b:30). CEJA has identified additional screening tools and indicators that are compatible with *CalEnviroScreen*, including:

1) California Air Resources Board's 'Low-Income Communities Map'

2) Program for Environmental and Regional Equity (PERE) at the University of Southern California's 'Environmental Justice Screening Method'

3) UC Davis' 'Regional Opportunity Index'

4) Center for Regional Change at the University of California Davis' 'Cumulative Environmental Vulnerabilities Assessment (CEVA)'

6) California Healthy Places Index, and more (CEJA, 2018:30-33).

See Appendix C for more detailed information on these additional tools and indicators. Through this extensive compatibility with additional health data frameworks, *CalEnviroScreen* has the capacity to broaden its scope of impact in the state of California.

Washington: Washington Environmental Health Disparities Map

Similar to California, the state of Washington developed its own mapping tool that compares communities for environmental health disparities. The *Washington Environmental Health Disparities Map* (WEHDP) was a collaborative project between the University of Washington's

Department of Environmental and Occupational Health Sciences, Front and Centered, Washington State Department of Health (WSDH), Washington State Department of Ecology, Puget Sound Clear Agency, and community members that took several years to develop, before it was launched to the public in December 2018 (WSDH, n.d.). The WEHDP was developed to provide new insights into where public investments should be allocated to ensure that everyone can benefit from clean air, water, and an overall healthy environment.

According to the Washington Tracking Network (WTN), the screening tool shows "pollution measures such as diesel emissions and ozone, as well as proximity to hazardous waste sites" along with socioeconomic and health measures, that provide information on poverty rates and prevalence of cardiovascular disease (WSDH, n.d.). It also has a "sensitive populations" indicator, which refers to individuals "who are at greater risk due to intrinsic biological vulnerability to environmental stressors" (UW DEOHS, 2019:16). The developers of this tool specifically refer those with "pre-existing cardiovascular disease or low-birth-weight infants" as sensitive populations that "may be more vulnerable to environmental risk factors" (UW DEOHS, 2019:18). The tool was specifically adapted from *CalEnviroScreen*, thus it uses the same 19 indicators that are divided into the same 4 categories and assesses cumulative environmental health impacts (UW DEOHS, 2019:16). Moreover, this tool ranks each census tract from 1-10 based on their relative environmental health risk factors. Again, this score is displayed on the map through a color scheme where darker colors indicate higher ranks.

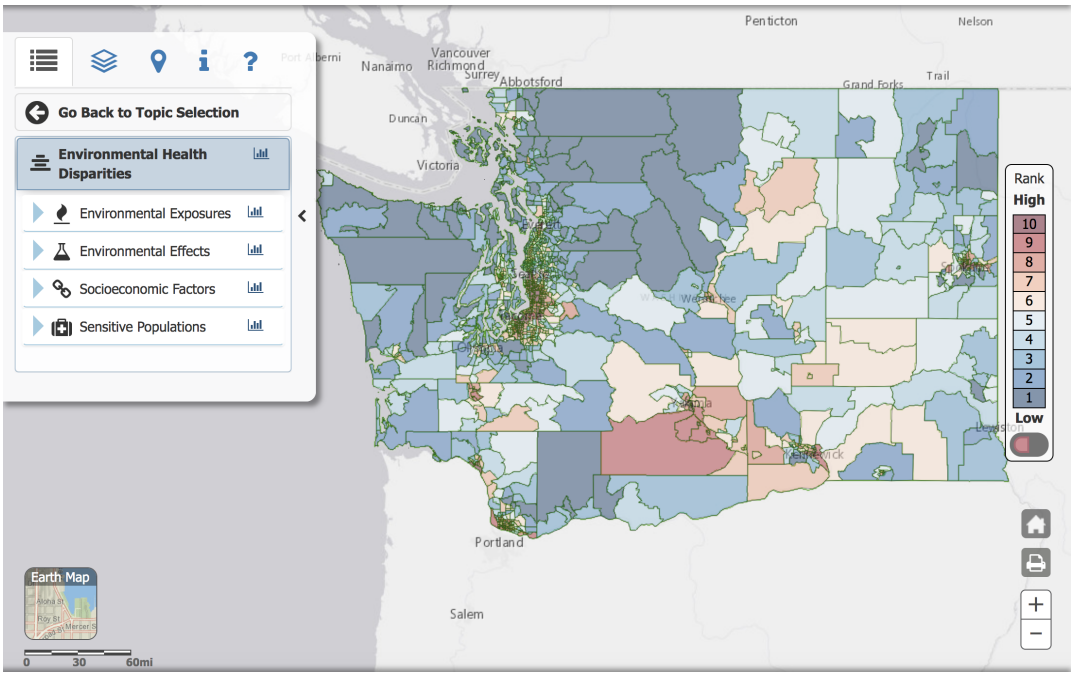

Figure 3: The WTN's *Environmental Health Disparities Map* (Source: WSDH, n.d.)

While it was launched only in December of 2019, Washington's legislature passed Senate Bill 5489 in March 2019, which specifically incorporates this screening tool to conduct cumulative impact analysis (Gentzler, 2019). The Senate Bill, known as the Healthy Environment For All (HEAL) Act, defines EJ in Washington as:

> "The fair treatment of all persons, regardless or race, color, national origin, ethnicity, language disability, income or other demographic or geographic characteristics with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Beason, 2019).

While there are no criteria of a community impacted by environmental injustices, the bill defines two closely-related terms. First, "highly impacted communities" refer to communities that are designated by Washington state agencies based on cumulative impact analyses using "[the] best practices and current demographic data" (Washington 2SSB 5489, 2019:5), and "census tracts that are fully or partially on 'Indian country' as defined in 18 U.S.C. Sec. 1151" (Washington 2SSB 5489, 2019:3). Secondly, "vulnerable populations" refer to "communities that experience

disproportionate cumulative risk from environmental burden" due to adverse socioeconomic factors, such as unemployment, and sensitivity factors, such as low birth weight (Washington 2SSB 5489, 2019:4).

This bill created a task force to make recommendations so that EJ principles are incorporated into the operations and activities of state agencies (Gentzler, 2019). One of the first assignments of this task force is to issue a report to agencies, the legislature, and the governor by October 31, 2020, which includes a guideline on how to use the WTN's analysis of the WEHDP when adopting state rules, policies, or guidelines (Gentzler, 2019). So far, eight key state agencies have been directed to target their work using this new screening tool to identify the most impacted and vulnerable communities (Pailthorp, 2019). According to Christina Twu, the communications director for Front and Centered (one of the partner organizations that developed the tool), the work of the task force and the tool can help Washington focus its investments to communities that are most impacted by pollution (Wohlfeil, 2019). As such, Washington has recently emphasized the importance of achieving environmental justice by developing this screening tool, followed by the passing of the HEAL Act.

Moreover, the Clean Energy Transformation Act (Washington E2SSB 5116), which aims to "commit Washington to an electricity supply free of greenhouse gas emissions by 2045" (Washington Department of Commerce, n.d.), was signed into law by Governor Jay Inslee on May 7th, 2019 and states the possibility of using a tracking tool to conduct cumulative impact analysis. While not explicitly referred to as the *WEHDP*, the bill mentions how:

> "The cumulative impact analysis may integrate with and build upon other concurrent cross-agency efforts in developing a cumulative impact analysis and population tracking resources used by the department of health and analysis performed by the University of Washington department of environmental and occupational health sciences" (Washington E2SSB 5116, 2019:51).

Minnesota: What's in My Neighborhood and *EJ Story Map*

Formed in 1967, the Minnesota Pollution Control Agency (MPCA) is a state agency that monitors environmental quality, offers technical and financial assistance, and enforces environmental regulations in Minnesota, where they develop state policies and support environmental education (MPCA, n.d., a). MPCA defines EJ as:

> "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (MPCA, 2015:1).

This definition is used throughout MPCA's EJ framework.

In 2008, the Minnesota Legislature passed Statute 116.07, under which Article 4(a) requires the MPCA to analyze and consider "cumulative levels and effects of past and current pollution" before a permit may be issued for industry facilities located in EJ-impacted communities, namely within Hennepin County (Minnesota Statute 116.07(4a), 2019). Hennepin County is specified as it is known for having its largest clusters of Toxic Release Inventory sites overlapping with large concentrations of communities of color in Minneapolis (Sheppard et al., 1999:3).

What's in My Neighborhood includes the location of and information about contaminated sites, environmental permits, licenses, and registrations compiled by the MPCA. Using data from 1996, the map displays information on both active and inactive sites, as well as formerly contaminated sites that have not been cleaned up. Although not specified in detail, the map indicates sites based on its zip code, township, watershed, street address, or county, where users can use the graphical search tools to draw boundaries around areas that they are interested in (MPCA, n.d., d). *What's in My Neighborhood* is used internally by MPCA officials, in addition to the tool *MNRisks*, which specifically measures the health risks of air pollution upon Minnesotans.

Similar to the *CalEnviroScreen's* 20 indicators, *What's in My Neighborhood* uses 12 different environmental indicators to determine the most polluted and vulnerable areas in the state. However, since this tool lacks demographic information for the specific sites, it is difficult to measure the extent to which racial and socioeconomic data relate to the siting of hazardous waste facilities.

As such, one possible screening tool to further investigate is MPCA's *EJ Story Map*, which identifies census tracts that are considered areas of concern for EJ based on the amount of people in poverty, people of color, language abilities, and tribal lands (MPCA, n.d.). This EJ mapping tool is community-facing, and uses data from the US Census Bureau and the American Community Survey data to evaluate the potential for disproportionate pollution impacts with three criteria: "at least 40% of the people reported income level less than 185% of the federal poverty level," "50% or more people of color," and "federally recognized tribal areas" (MPCA, n.d., d). While these two maps are available on an adjacent website tab, the two layers cannot be combined, as *What's in My Neighborhood* is not publicly available to community users. MPCA officials may compare EJ data from the latter map with the information on *What's in My Neighborhood*, to investigate the link between contaminated sites and demographic information. Meanwhile, community users may need to find additional pathways to supplement information provided in the *EJ Story Map*.

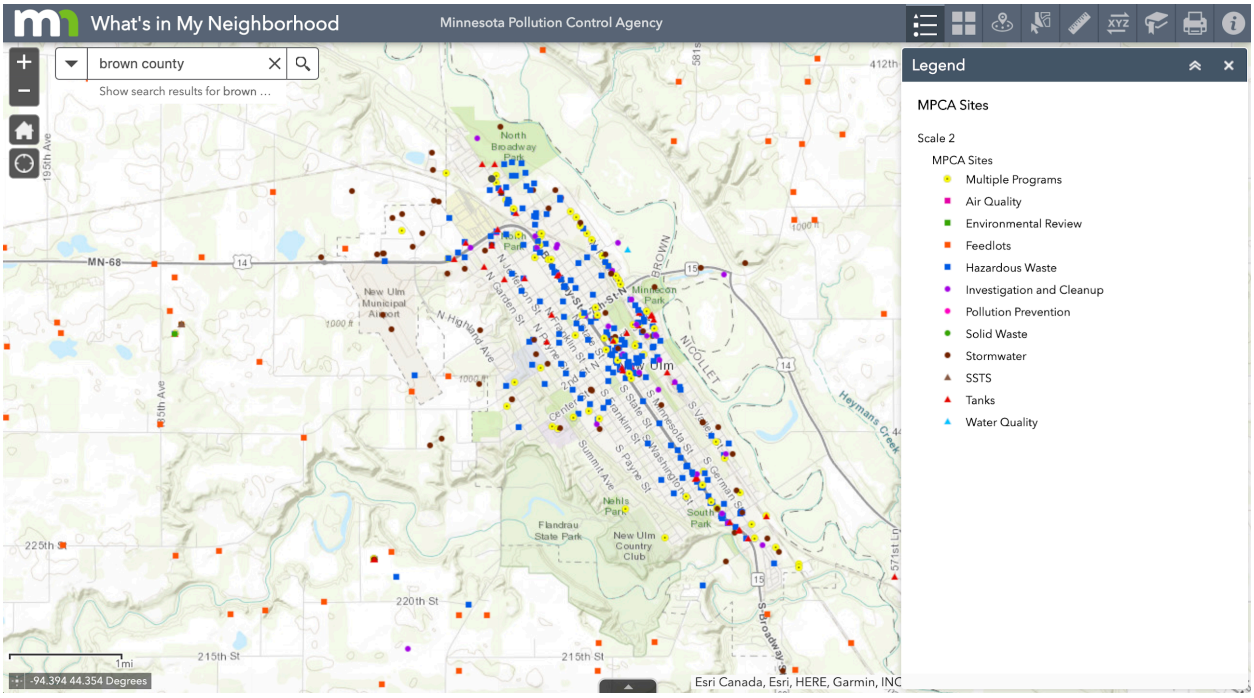

Figure 4: The online map search option of MPCA's What's in My Neighborhood. This figure shows New Ulm City in Brown County, Minnesota. The areas are color-coded with circular dots that show which indicators are present within Minnesota. (Source: https://mpca.maps.arcgis.com/apps/webappviewer/index.html?id=9d45793c75644e05bac197525f633f87.)

The MPCA helps protect the state's environment by writing rules and enforcing policies related to air, hazardous waste, solid waste, tanks, and water. However, there is no indication that *What's in My Neighborhood* is used to shape any policies. The agency has an EJ Advisory Group that advises the Commissioner on improving policies and procedures to better integrate EJ principles to their work (MPCA, n.d., c). This advisory group also provides feedback on the agency's EJ framework and its effectiveness, and makes suggestions to enhance future works (MPCA, n.d., c). Yet, there is no specific mention of the tool in achieving these goals.

Maryland: MD EJCREEN

Maryland's EJSCREEN, also known as *MD EJSCREEN*, is a screening tool that assesses EJ risks similarly as *EJSCREEN* and *CalEnviroScreen* by using environmental and demographic

indicators to allow users to identify layers of environmental justice concern, based on an overall EJ scoring system (Driver et al., 2019:1). As of now, the tool is operating on the ArcGIS online platform for Prince George's County and Baltimore City only (CEEJH, n.d.).While there is no mention of a year, *MD EJSCREEN* was developed by the Maryland Environmental Health Network (MEHN), the University of Maryland's National Center for Smart Growth, the Community Engagement, Environmental Justice, & Health (CEEJH) lab, and faculty at the University of Maryland School of Public Health, to identify, visualize, and analyze areas with EJ concerns in Maryland (CEEJH, 2019). The development of the tool was funded by the Town Creek Foundation and the Maryland Department of Natural Resources (CEEJH, n.d.). The developers gathered feedback from stakeholders and community members in the process of building the tool through a series of demonstration workshops (Driver et al., 2019:2). Moreover, in addition to *EJSCREEN's* environmental and demographic indicators, *MD EJSCREEN* added indicators such as asthma emergency discharges and watershed failure, which are specific to Maryland (Driver et al., 2019:2). While the tool has been presented to the Environmental Justice Legislative Team at MEHN, the Maryland Commission on Environmental Justice and Sustainable Communities (CEJSC), and the Green Funders' Network, it has not been incorporated into state-level policy decisions to date.

The tool itself does not define EJ nor provide criteria for EJ communities, however the Maryland Department of the Environment (DoE) provides their own definition for EJ. According to the Maryland DoE, EJ is "that all people – regardless of their race, color, national origin or income are able to enjoy equally high levels of environmental protection" and communities that are most vulnerable to environmental injustices are those that are "low-income and minority" that "house a disproportionate amount of polluting facilities putting residents at a much higher

risk for health problems from environmental exposures" (Maryland DoE, n.d.). Since this tool was not developed in collaboration with the Maryland DoE or any other state agency, it should be noted that the definition above does not apply to the tool.

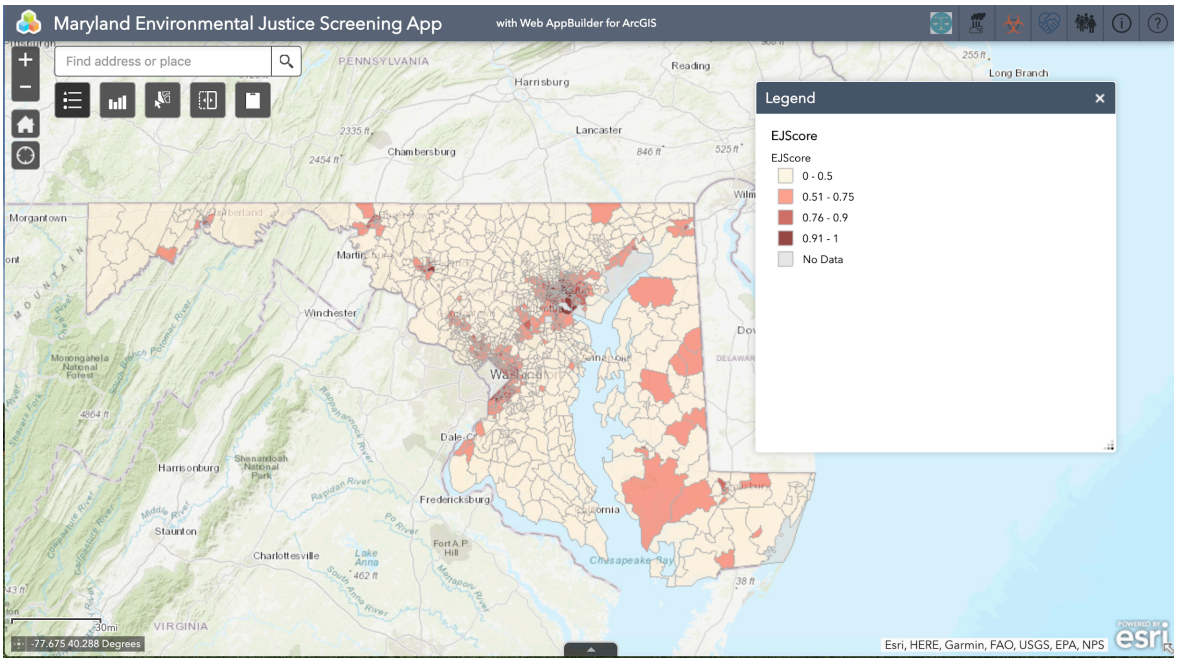

Figure 5: The *MD EJSCREEN* on the ArcGIS online platform indicating areas of EJ concern, based on their overall EJScore (as seen on the legend) (Source: https://p1.cgis.umd.edu/ejscreen/)

In addition to *MD EJSCREEN*, the CEEJH lab is currently partnering with the Maryland Department of Natural Resources (DNR) and the University of Maryland Center for Geospatial Information Sciences to update the Maryland DNR's Park Equity Tool (CEEJH, n.d.). This tool investigates "the cultural, socioeconomic, and health barriers to green space access for people of color and low-wealth community members" (CEEJH, n.d.) in Maryland and is used by the Maryland DNR as a guide to identify where resources may be needed. This tool provides criteria for each of its factors, which includes combined score, ratio of children, poverty, density, distance to parks, and distance to trees, amongst others (Maryland DNR, n.d.).

Interactive State Screening Tools Currently Under Development: NC and NJ

Inspired by the efforts of the above mentioned state agencies developing their own EJ screening tool, researchers in North Carolina and New Jersey have recently developed or are currently developing similar tools. It should be noted at the outset that these tools have not been used in policy-making.

North Carolina

The North Carolina Department of Environmental Quality (NCDEQ) began the process of developing a Community Mapping Tool to address environmental justice across the state, to ensure the fair treatment and meaningful involvement of all people (NCDEQ, n.d., a). The tool aims to provide community information "to assist in local and state planning decisions with respect to development and implementation of permits in North Carolina" (NCDEQ, n.d., a.). The NCDEQ has held information sessions to gain community feedback on what a North Carolina Community Mapping Tool should look like in order to benefit all North Carolinians. For those who could not attend these sessions, there was a survey on the NCDEQ website that could be filled out as an alternative. It is to be noted that at the current stage of the mapping tool, the state does not define what an environmental justice or disadvantaged community is.

As of Fall 2019, NCDEQ has indefinitely suspended further development of the tool due to outstanding legal circumstances. At this present time, the NCDEQ is in the midst of a lawsuit involving local EJ organizations. Due to this, the agency has expressed to us that they are unable to disclose any further information regarding their tool development (NCDEQ Official, personal communication, Nov. 2019).

New Jersey

The New Jersey Department of Environmental Protection (NJDEP) developed a nascent cumulative impacts screening tool that estimated the relative amount of cumulative impacts in every block group in New Jersey (NJEJA, 2018). Preliminary indicators used for the screening method involved the following: NATA cancer risk, NATA Diesel, NJDEP Benzene estimate, Traffic All, Traffic trucks, Density of major Regulated sites, Density of known contaminated sites, density of dry cleaners, and Density of Junkyards (EJAC, 2009:5). However, the New Jersey DEP does not have a separate screening tool for identifying EJ communities (NJDEP, 2018). The Division of Air Quality, which is a subdivision under the New Jersey Department of Environmental Protection, currently has a mapping application tool labeled *Community Corner "What's in My Community."* With this application, you can find every facility with an air permit registered with the Division of Air Quality. Both major and minor sources of emissions are shown in the application. Facilities can be located through searches of each municipality. Direction and measure of wind speed are also recorded. Some of the limitations listed for the tool include but are not limited to: a) it only reports 36 air toxics' emissions; b) actual emissions are based on information submitted by each facility; and c) location of facilities are based on facility-submitted coordinates. Although not specified, the DEP maintains that its programs are regularly maintaining the information in their databases (NJDEP, 2020).

On April 20th, 2018, Governor Philip Murphy signed Executive Order No. 23. This EO directed the Department of Environmental Protection (DEP), in consultation with the Department of Law and Public Safety and other relevant departments, to take the lead in developing a guidance document for all executive branch departments and agencies for the consideration of EJ in implementing their statutory and regulatory responsibilities (NJDEP, 2018). The New Jersey

DEP finds the EPA definition to be fair and helpful to understanding and guiding the purpose and goals of the directive set forth by Governor Murphy in EO23. The NJDEP recommends that state agencies use EPA's *EJSCREEN* as well as other available tools and state and community-level data, for the purpose of identifying EJ communities that are affected by or may benefit from state programs or actions.

On July 29, 2009, Acting DEP Commissioner Mark Mauriello provided comments on the Environmental Justice Advisory Council (EJAC). The Commissioner indicated that the DEP would work with EJAC in developing a preliminary geographic information system-based screening tool that integrates a variety of environmental measures along with demographic and socioeconomic indicators (NJDEP, 2009). However, once Chris Christie's Administration began in January 2010, the tool was effectively shelved and since then, the tool has not returned to public discourse. From information found through online documents detailing the preliminary methods of the screening tool, the tool does not specifically detail how to define an EJ or disadvantaged community.

Other State Environmental Justice Databases

Lastly, we would like to acknowledge that there are six other state-wide EJ screening and mapping tools that are being used by state agencies. We address these particular tools here, apart from the first set we described earlier, as we have come to learn about them from our 'snowball' methodology. Information from our initial respondents and our project advisor led us to a list of state and nationwide mapping tools compiled by the North Carolina Department of Environmental Quality (NCDEQ, n.d., b). The aforementioned tools were not commonly referred to in our literature review, nor do they have the same components as the main screening tools of our study, which is the primary reason we did not incorporate them as extensively in our analysis

relative to tools in California, Washington, Minnesota, Maryland and New Jersey. These are: 1) Connecticut Department of Energy & Environmental Protection's *Environmental Justice Communities*; 2) Illinois EPA's *EJ Start*; 3) Massachusetts' *Environmental Justice Viewer*: 4) New Mexico Environment Department's *OpenEnviroMap*; 5) New York Department of Environmental Conservation's *Potential Environmental Justice Areas*; and 6) the Pennsylvania Department of Environmental Protection's *eMap PA* (NCDEQ, n.d.). We will address these briefly in turn. It is important to mention that we have also periodically checked the tools and to date, we have found no major updates.

Connecticut

The Connecticut Department of Energy & Environmental Protection (CTDEEP) currently has an EJ program that aims to regulate disproportionate environmental burdens based on race or economic status (CTDEEP, 2020b). CTDEEP's EJ program provides resources to municipalities or communities that are defined as 'distressed municipalities' by the Connecticut Department of Economic & Community Development. The 'Distressed Municipalities' list measures economic well-being based on per capita income, percent poverty, unemployment rate, and education level, among other factors (CTDECD, 2020). This data comes from the U.S. Census. There is also a list of 'Other Affected Towns' that are selected if 30% of the population lives below 200% of the national poverty level (CTDEEP, 2020a). There are no indicators for race or environmental factors. These lists of municipalities appear on the Connecticut state government's website as lists of Microsoft Excel sheets as well as Word documents of criteria (CTDECD, 2020). There is currently no interactive map feature for EJ in Connecticut, or a combination of environmental and social factors in the data provided, and thus we did not include Connecticut in our analysis.

Illinois

Illinois EPA's *EJ Start* is designed solely for internal use of the Illinois EPA, and solely for the purpose of screening socio-demographic data to identify the "EJ potentials for minority and/or Low Income" communities in Illinois (IEPA, 2019). Data included in *EJ Start* is based on 2010 U.S. Census Block Groups that particularly layer data based on greater than or equal to twice the state average for the current American Community Survey 5-year estimate for the population being a minority or low income (or both) within each Block group (IEPA, 2019). *EJ Start* color codes such data with blue representing the 'EJ value for Minority,' yellow representing 'EJ value for Low Income' and red representing 'both.' Based on its internal-based frameworks (as in frameworks that were developed internally amongst the personnel that created EJ Start) and lack of environmental data, such as air quality data, we did not include *EJ Start* in our qualitative methods and analysis.

Massachusetts

The Massachusetts Department of Environmental Protection (MDEP) uses the following criteria to describe an EJ community: median household income in comparison to the state, races other than white, and English isolation (households without a member that speaks English well; MDEP 2020). The MDEP *Environmental Justice Viewer* is a GIS map with various layers whose primary 'EJ Layers' include: EJ communities based on the 2010 Census (disaggregated into individual factors of income, race, and English isolation), geographic features (water bodies, rivers and streams), and transportation information (trains, roads, and major routes) (MDEP n.d.). While the geographic features and transportation layers listed above could be considered proxies for environmental hazards, there is no discussion of industrial pollution or cumulative impacts (i.e. environmental data) as displayed on this map. Additionally, the data are generally

older, dating back to at least the 2010 Census, if not the 2000 Census, depending on the layer (MDEP 2020).

New Mexico

The New Mexico Department of Environment's *OpenEnviroMap* uses block group level data based on information from the 2010 US Census. There are four different types of layers that the map is composed of; 1) Black, American Indian, Hispanic or Latino, Unemployed, Poverty 2) Colonias (these are defined through the US Dept. of Housing and Urban Development) 3) Tribal Lands-Indian Country, and 4) Municipal and Populated Areas. The map lists known pollution sources or polluted areas (leaking tank sites, hazardous waste facilities, superfund sites, landfills, dairies, brownfields, petroleum storage tanks, impaired waters), areas where state program are being implemented (State Cleanup Program, Voluntary remediation program, Nonpoint Source Program), geographic data (roads, counties, land cover, watershed boundaries, and Legislative Boundaries), and types of permits being issued (Groundwater Discharge permits, NPDES permits). It must be noted that the core TIGER/Line files and Shapefiles do not include demographic data, but they do contain geographic entity codes that can be linked to the Census Bureau's demographic data (U.S. Census Bureau, 2020). The data depicted in the map are not updated in real time and the dates of last update of each of the layers are different. With this in mind, the NM Department of Environment advises that the data be used for orientation purposes only, and not for professional services, publications, or legal actions. For the most complete and accurate data, those interested should contact the Department directly with an IPRA request (NMED, 2020).

New York

New York state's Department of Environmental Conservation (DEC), in accordance with DEC Commissioner Policy 29 (CP-29), identifies Potential Environmental Justice Areas (PEJAs) within U.S. Census block groups of 250 to 500 households that reach the following statistical thresholds:

> "1. At least 51.1% of the population in an urban area reported themselves to be members of minority groups; or
> 2. At least 33.8% of the population in a rural area reported themselves to be members of minority groups; or
> 3. At least 23.59% of the population in an urban or rural area had household incomes below the federal poverty level" (NY DEC, n.d.).

The DEC does not have an interactive tool that is available for use. Rather, they have published PDF versions of PEJAs by county. Additionally, the DEC's GIS layer for PEJAs can be downloaded by users in KMZ format and used on Google Earth platforms (NYDEC, n.d.). As the DEC does not allow for community-based interaction with the maps, and does not include public health or air quality data, it was not included in our research analysis.

Pennsylvania

The Pennsylvania Department of Environmental Protection (PADEP) has 16 different geographic information systems (GIS) mapping tools, including *eMap PA*, which is an online interactive screening tool with "over 50 map layers, relating to administrative and political boundaries, culture and demographics, geology, mining" (PADEP, 2020a), and more. While the DEP provides instructions on how to use *eMap PA* to determine EJ areas, technical difficulties arose when trying to follow those steps; we were not able to find the folder icon nor the "Cultural & Demographic"' information on the map, which were necessary steps to move forward. Instead, the DEP's Office of Environmental Justice has an *Environmental Justice Areas Viewer*, which is an interactive GIS tool that identifies where EJ areas are located and a non-interactive *proposed*

Environmental Justice Areas map that identifies EJ areas by block groups in a PDF file (PADEP, 2020a). DEP's Office of EJ also provides criteria for EJ and determines EJ areas as "any census tract where 20 percent or more individuals live in poverty, and/or 30 percent or more of the population is minority" (PADEP, 2020b) based on the U.S. Census Bureau. While each of these tools from the Office of EJ identifies areas of EJ concern, due to the lack of combining environmental information with demographic information in its criteria of an EJ area, *eMap PA, Environmental Justice Areas Viewer,* and the *proposed Environmental Justice Areas map* were excluded from our analysis.

In summary, we did not analyze the aforementioned tools further because they either: a) lacked a visualization component; b) lacked environmental data in combination with social factors like race or income; c) contained outdated data or d) they were not presented on an interactive platform. Community capacity to utilize and access these tools allows them to engage in the decision-making process with state agencies and administrators. As such, when evaluating the scope of tools for our research, we decided to focus our efforts on tools that emphasized the combination of recent social and environmental data, as well as an interactive visual platform for easier understanding. The tools detailed in this subsection do not currently incorporate these features. Due to their absence, they are not included in the qualitative research and analysis of our report.

Nevertheless, in order to ensure we did not overlook any of these tools, we periodically checked to see if there were any additional updates or versions that included distinguishable features that would render them eligible for our in-depth analysis. Additionally, we conducted Google and Google Scholar searches using the following keywords: "Environmental Justice

screening tools," "screening tools," "environmental screening tools," "screening tools in my area," "screening tools in my state," and "health screening tools." These searches yielded no new information apart from what we found through our initial research. Despite other states' tools not incorporating such updates within the time-frame of our study, we acknowledge that there could be significant updates to these tools in the future, which may warrant further study.

III. Qualitative Methods

We will make note that our initial research goals were to build off the work of Grier et al. (2019) and MEJC. By interviewing stakeholders of states that utilized EJ screening tools, we had initially sought to justify why the state of Michigan should develop a tool of its own. Since we have started this project, we have heard that the work of Grier et al. (2019) and the MEJC has led to sincere consideration to create the tool by state officials in Michigan. Since learning of this development, our research and methodology has shifted toward ensuring that we develop an understanding of best practices for community inclusion, potential limitations of the tool's use, and potential barriers to development of the tool in Michigan.

In order to research how existing EJ screening tools are used to inform and influence state-level policymaking, we believed that it was important to learn through the perspectives of those in local communities, policymakers, and members of state legislatures, by conducting semi-structured interviews. While written reports of the above-mentioned screening tools are published and accessible to the public online, we wanted to conduct interviews to gain additional details about the development process of the tools and their uses in policymaking.[1] Moreover, we wanted the interviews to give us insights on the challenges, barriers, successes and failures, and future plans of respective screening tools, such that we would be informed how the development of an EJ screening tool specific to Michigan could assist in the development of EJ policies, programs, and initiatives for the state.

Following the initial review of reports within their respective agencies, we conducted 26 semi-structured interviews with EJ advocates and activists, university academics (graduate

[1]Our team submitted an application to the University of Michigan's Institutional Review Board (IRB) in April 2019 and obtained an IRB exemption status. While an exemption status eliminates our need to apply for an additional IRB review and approval, we understand that we still have an obligation to abide by the accepted principles of responsible and ethical conduct of research.

students and professors), as well as professionals, who were involved with state agencies and nonprofit organizations in the efforts of developing an EJ screening tool at the USEPA and in the states of California, Washington, Minnesota, Maryland, North Carolina, New Jersey, and Michigan. Each group member made contact, through email or phone (and sometimes a combination of the two), with these respondents from the aforementioned states. Initially, our research goal was to conduct at least 30 interviews over the course of this project. However, our efforts were hampered by the later stages of the global Coronavirus pandemic. As a result, we had to discontinue our efforts in coordinating any further interviews.

To gain insight in the government-level decision making process and understanding of EJ, we conducted interviews with state agencies such as the California EPA, MPCA, Washington Department of Ecology, Washington Department of Health, and the Office of Michigan Governor Gretchen Whitmer; and at the federal level, with the USEPA. Since the EJ screening tools in Washington and Maryland were developed in partnership with local universities, representative Professors and students from the University of Washington and University of Maryland were interviewed about their involvement in the development process, with a focus on any challenges encountered or improvements that could be made. Lastly, we believed that it was crucial to listen to the voices of the communities for whom these screening tools were made. Hence, we contacted grassroots or EJ organizations and community representatives in California, Washington, and Michigan, to understand their perspective on the use, benefits, strengths, weaknesses, barriers, and future potentials of their respective screening tools.

We formed an initial list of several interviewees after consulting with our research advisor and project client on people and organizations to contact. For the frameworks of our interviews, we initially conducted them through a snowball methodology. As such, we asked the

respondent before we concluded our interviews if they had knowledge of other individuals who were involved with the creation of a screening tool or knew about an EJ screening tool being developed in their state. We also asked the respondents if they knew of others who were interested in utilizing cumulative impact approaches for policy. However, while some of them suggested additional information sources to look into further, not every interviewee was able to lead us to a new person of interest, which was expected. As a result, we shifted to a key informant sampling methodology, in which individuals who we believed were most knowledgeable about EJ screening tools or who were potentially involved in its creation process based on online research, were contacted for an interview.

When conducting each interview, we asked our interviewees if they would be willing to have a 30-60 minute conversation facilitated through Zoom and BlueJeans software. Using a student-linked account through IT Services at the University of Michigan, we were able to store audio recordings of the interview, strictly upon the interviewee's consent, for future transcription. In order to transcribe each interview, we used the speech-to-text software service from Rev.com to incorporate quotes from the interviewees into our analysis. While most of our interviews were conducted using the aforementioned online video conferencing tools, some interviews (N = 4) were conducted via phone calls that were not recorded and transcribed verbatim or interviewees responded via written communication.

Our interview guide consisted of a set of main questions and follow-up questions pertaining to the development and use of the screening tool and how it was incorporated into state EJ laws, movements, and attitudes. These sets of questions were verified by our project advisor and were pre-tested between groupmates prior to conducting the interviews. They are a combination of open-ended and closed-ended questions. Some examples include: "To better

address environmental injustices, how could other states that lack a mapping tool use your example with *CalEnviroScreen*?" and "Has the incorporation of *CalEnviroScreen* into law and policymaking faced any resistance by law and policymakers?"

An example of additional interview questions for one of our state interviewees, CalEPA, can be found in Appendix D. It must be noted however, that since we have interviewed individuals from different sectors, which included EJ community members, academics, state officials, among others, our questioning changed slightly among our interviewees. For instance, some questions pertain more to the creation of an EJ screening tool while others asked about how cumulative impact is being considered in their respective state.

To analyze the interview data, a codebook was developed on a qualitative analysis software program, NVIVO 12 Plus, using deductive codes based on the literature reviews, and inductive codes based on emerging themes from the interviews. The codebook consists of main codes used to distinguish the different sections in the interview guide, and of subcodes that emerged from the data. The seven main codes are:

1) Understanding of EJ

2) Development of screening tools

3) Use of screening tools (current and future)

4) Limitations of screening tools

5) Resistance

6) Overcoming resistance; and

7) Metrics of success.

Understanding of EJ refers to the interviewee's conceptual understanding of EJ and its related topics, such as cumulative impacts and screening tools, which are specific to our project.

Development of screening tools refers to the timeline, processes, and strategies the creator of the tool used to develop their EJ screening tool. The current use of screening tools, whether as informational or political, by whom, and its future plans on how to be used, fall under *use of screening tool (current and future)*. *Limitations* specify the functional drawbacks of screening tools. Certain groups that are resistant to the tool are identified and discussed under *resistance*, and *overcoming resistance* describes the different strategies used to address such opposition. *Metrics of success* examines how the success of different screening tools are measured. The definitions of all subcodes, as well as descriptions of the above-mentioned main codes, can be found in Appendix E.

IV. Qualitative Analysis Results

The following is a summation of our findings from our qualitative analysis. They are organized by main themes from our codebook (see previous section), and states that expressed a particular theme are addressed in turn.

A. Understanding of EJ

Through our interviewees, we gauged each state's understanding of EJ, cumulative impacts, and their implications. Understanding EJ, as we categorized it, took many forms in our interviews. Respondents referenced either the USEPA's definition of EJ, a state definition of EJ (which in many cases was derivative of the USEPA definition), or used their own definition of EJ that incorporated that same principles as other definitions -- namely, that there are disproportionate environmental hazards and burdens on low-income and communities of color. In many interviews, respondents connected EJ with knowledge of cumulative impacts. In some cases, there was a consensus about the understanding of EJ and cumulative impacts between several major actors (EJ advocates, state officials and community members), while in other states interviewees stated limitations to understanding of EJ among different actors.

Within California, all major actors in the development and use of *CalEnviroScreen* had articulated there was a consensus among stakeholders regarding a mutual understanding of EJ and cumulative impacts through the process of developing definitions of EJ, cumulative impacts and the screening tool (as detailed in Section D of our literature review). However, one interviewee additionally noted that this understanding of EJ continues to evolve, as demonstrated by the passing of AB-1628 in updated California's definition of EJ.

Interviewees from Washington also articulated an understanding of EJ and cumulative impacts at the institutional, community, and state-level. The growth of EJ principles at the state level has been championed by a Washington state official, who is establishing an EJ framework and *"encouraging the whole department… to prioritize work towards the communities that have a higher environmental health disparity."* This state official is promoting EJ at the state, has been investing in EJ education for staff and management, and acknowledges that a screening tool is important for EJ rulemaking since her work is *"absolutely complemented and empowered by online mapping."*

All Michigan actors (e.g. state officials, community members, and others) articulated similar understandings of EJ. In particular, the majority of interviewees associated environmental injustices with communities suffering from overburden of pollution. In addition to developing an agreed-upon understanding of EJ through a screening tool, interviewees also discussed the state's understanding of EJ in how it is defined. Most responses were similar to that of a Michigan state official:

> *"...environmental justice is ensuring that everyone, no matter where they live, their income or their race benefits equitably from our environmental laws and regulations. It is especially really about ensuring that certain communities don't bear disproportionate impact from environmental -- whether it's man-made or other, like industrial -- issues based on where they live, their income, and who they are. So for me, environmental justice is really just about justice."*

These injustices often led to a discussion of cumulative impacts, which many community organizers and state officials recognized as being the primary cause of EJ issues in Michigan. One Michigan state official went as far as to say: *"I don't think you can really look at environmental justice without looking at cumulative impacts."*

Additionally, all Michigan actors displayed a strong familiarity with EJ screening tools. They were able to identify their purpose (to measure cumulative impacts), as well as name some examples of existing screening tools:

> *"...we heard about the CalEnviroScreen, and then we heard that other states like Minnesota, Oregon, New Jersey were also using them. So we wanted to know what [the screening tools] were and how could we utilize them to adapt them to Michigan, and to Michigan's pollution problem."*

The most commonly mentioned screening tool across our interviews was California's *CalEnviroScreen*.

Differences in Collaborative Processes when Understanding EJ

In our analysis, we recognized interviewees noting that there were more opportunities for collaboration in the development of state definitions and screening tool indicators between stakeholders in California and Washington that ultimately led to greater consensus-building in their respective understanding of EJ and cumulative impacts. Even still, we noticed that some testimony from our interviewees in Minnesota and Maryland did not showcase the same degree of consensus-building across community and state networks in understanding EJ. An EJ and Public Health academic from Maryland stated that:

> *"...the state of Maryland had established a commission, and they had people on this commission representing academia, business, and some community-based organizations. It's staffed by people from the Maryland Department of the Environment. What I had understood is that the commission could never reach an agreement on how to define environmental justice in the state of Maryland, how to identify communities that are 'overburdened.'"*

State agency representatives in Minnesota stated that understanding of environmental justice was based more through community advocacy and representation through the EJ Advisory Group. A state official in Minnesota noted the EJ Advisory Group "*was actually*

requested by the community as we develop our environmental justice framework," community values with respect to EJ are predominantly represented to the MPCA through the Advisory Group. This Advisory Group, while it provides significant representation of communities to MPCA, was the only organizational grouping cited by interviewees as a means of direct collaboration of community interests within MPCA.

Two Maryland academics that we interviewed have articulated an understanding of EJ, especially in relation to public health. For instance, one of them stated that *"environmental justice is about public health"* and discussed food justice, access to green space, noise and pollution mitigation, and mental health, while the other mentioned the impacts of air quality and drinking water quality on human health. However, this understanding of EJ seems to be absent at the state-level, where Maryland academics expressed disappointment with the lack of an EJ framework within the Maryland Department of the Environment's EJ Commission. According to one Maryland academic, "*the Commission could never reach an agreement on how to define EJ in the state of Maryland, how to identify communities that are 'overburdened,'"* and did not have an environment framework, nor a plan or an agenda, which was *"shocking."* Moreover, the "*Maryland Department of Environment, which staffs the EJ Commission, took little interest at the time in really engaging EPA headquarters on how to define EJ.*" In fact, interviewees noted that the Maryland Department of the Environment is not working on any screening tools for the state, and that it was an entirely academic pursuit. According to a Maryland state official:

> *"MDE is not involved in any screening tools. Our department serves to staff the Commission on EJ. We serve as a meeting place but we're not doing any EJ work, no screening tools or anything like that. You should look into the University of Maryland."*

These anecdotes from a Maryland academic and a Maryland state official indicate that while there could be a general consensus regarding how EJ can be identified in Maryland, academics

have taken the brunt of responsibility for development of screening tools to pursue EJ in Maryland.

Understanding of EJ in State Definitions

One interviewee from California noted that in addition to being aligned with the federal definition of EJ, California's definition continues to evolve. This includes AB-1628's definition of EJ, passed in 2019, also includes "the fair treatment and **meaningful involvement** of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (California AB-1628 Environmental Justice, 2019 [emphasis added]). Through this inclusion of "meaningful involvement," EJ concerns additionally requires that Government entities promote meaningful participation of communities in "all phases of the environmental and land use and decision-making process" (California AB-1628 Environmental Justice, 2019) and incorporates a meaningful consideration of recommendations by communities impacted by pollution and land use decisions (California AB-1628 Environmental Justice, 2019). By providing further clarification on how communities may continue to be involved in decision-making processes, California places impacted community testimonies and advocacy as a central focal point in their understanding of EJ. Meanwhile, other states such as New Jersey have acknowledged they may not yet have an agreed-upon definition of EJ, but are engaging in an ongoing process to ensure the state definition is more focused. As mentioned by one EJ academic from New Jersey:

> *"The bill that Troy Singleton put together, he initially proposed in his bill that any community that fell within the lower 33rd percentile of household income in a census tract, would be considered an EJ community… [s]o, that bill comes closer to actually trying to define an EJ community as cumulative impacts."*

Here, we can see that there is ongoing debate considering legislation that would ensure consensus on a proper EJ definition for the state.

Though EJ is by no means limited to cumulative impacts, having a clear and agreed upon understanding of which facets of EJ a tool should address is critical to understanding its capacities to aid in the remediation of environmental injustices.

B. Development of Screening Tools

As we delved into the different screening tools that exist throughout the United States, we discovered that there were major differences in how they were developed. Where these tools are housed (e.g. in a state agency versus an outside institution), the process by which data was collected and analyzed, and the length of time it took for the tools to be completed (not including future improvements and updates) sets the foundation for the tool's effectiveness. For example, where a tool is housed can determine who has access to the data, whether it be state officials, the public, or both. Moreover, the environmental, socioeconomic, or health factors that are chosen to be incorporated into the tool can affect its ability to classify vulnerable communities.

From our interviews, we were able to delineate five sub-themes from this category: 1) Community engagement, 2) Other stakeholder engagements, 3) Tool location (i.e. where the tool is housed), 4) Timeline for development; and 5) Tools no longer in use (i.e. New Jersey). It should be noted that not every state's interviewees mentioned each sub-theme, so some may not appear under each sub-theme. The following paragraphs will detail what we have found in each state screening tool development based on these sub-themes.

Community Engagement and Other Stakeholder Engagements

Community engagement in screening tool development was considered important for many of our interviewees in that it brought members from the impacted communities to the table, so to speak, where they otherwise felt excluded in the decision-making process. While we

acknowledge that all state agencies have engaged with their respective stakeholders in various capacities, we recognize that the extent of collaboration with stakeholders varies greatly from state to state.

Out of all the states we interviewed, California seemed to be the most proactive when it came to incorporating public input into every stage of their screening tool process. According to one California EJ advocate:

> "*... this was a push that really was led by grassroots organizations and led to the early development of the Environmental Justice Screening Methodology that was a research community partnership, which ultimately led to the development of CalEnviroScreen... there was ground-truthing and equitable partnerships, and that created a foundation and an established methodology for the state to model at the Office of Environmental Health and Hazard Assessment, to really take that foundation and model it. And then when CalEnviroScreen was developed, [OEHHA] engaged in a public process... there were tweaks and amendments and shifts, all of which were, from my understanding, were community vetted along the way*."

For the state of Washington, the creators of the *Health Disparities Map* also took a collaborative approach in developing their screening tool, including many opportunities for stakeholder engagement and participation. The developers of the tools (composed of academics, community organizations, state agencies) and the public (community members) were involved in the building of the tool through multiple listening sessions across the state as much as they could. According to a primary developer of Washington's screening tool, there was good communication and relationship-building between the different stakeholders, where facilitators "*just listen[ed] and [were] actually there to hear what communities' lived experiences were with the different solutions and EJ issues.*" In addition, some members of the team "*had worked on CalEnviroScreen in different capacities in their previous years of research.*"

When asked about public participation in a screening tool's development, Michigan state officials emphasized that community participation was crucial to the State's plan to develop the

tool. Particularly, one state official envisioned communities to be involved *"in terms of identifying factors that they feel are important to be able to measure with a screening tool,"* as well as *"how the public could use the tools themselves."* Another Michigan state official said that the Governor's EJ response team planned on providing "*multiple opportunities throughout the process to have individual communities engage and speak to our response team*" through *"regional round tables across the state of Michigan in environmental justice communities."* These steps were estimated to be included later in the tool's development. Conversely, a Michigan EJ community activist expressed the need for public input at the beginning of the tool's development: *"[Communities] need to be at the table... public participation can begin at the beginning level."* The same respondent felt discouraged by previous state efforts to include them in the processes of environmental regulations, specifically with the current permitting process. Therefore, they wanted their input to be valued, and valued early.

Tool developers in Maryland consulted with representatives from USEPA's *EJSCREEN*, and while they did not consult with those from CalEPA, documentation from their multiple *CalEnviroScreen* publications were used to develop the tool. This was a frequent mention among the stakeholders in states we interviewed. Although some of them had not communicated directly with those behind the development of *CalEnviroScreen*, they still utilized the public resources available showing how the tool works and some of its best practices, in order to guide their own tool development.

Tool Location

When interviewing stakeholders in Maryland, our conversations with the developers of *MD EJSCREEN* revealed that the tool was developed between the Maryland Environmental Health Network, the University of Maryland's National Center for Smart Growth, the Community

Engagement, Environmental Justice, & Health lab, and faculty at the School of Public Health, indicating that there was no state involvement. This is unlike California, Minnesota, and Washington where the state itself has been instrumental in the screening tool's development. Maryland's tool is currently housed in an academic institution.

In terms of future development, Michigan currently plans to adopt a screening tool within state government. One state official in Michigan explained the State's interest in utilizing a tool within a state agency for the purposes of education:

> *"But [a screening tool] is definitely something that we want to look at. And I think it's something that will be really instrumental for us -- first educating people in Michigan, both legislators and communities, on cumulative impact and on environmental justice, and then secondarily, how and if we want to actually enforce anything around cumulative impacts."*

Another Michigan state official expressed that there could be widespread utility of the tool: *"Definitely Environment, Great Lakes and Energy could potentially use [the tool], as well as any of the other departments."* This respondent went on to say, to clarify the tool's purpose and its users: *"I definitely see [a screening tool] more as a tool of state government."*

Timeline of Development

Many interviewees spoke to the timeline of developing screening tools for their respective states. For California, the process of developing an environmental screening tool in California began with the first iteration of its state definition of EJ in 1999. As noted by an EJ advocate of California: *"Environmental justice was formally defined by SB 115 in 1999, that was authored by Senator Solis. Then there was another bill that created Senate Bill 89 that created the [California Environmental Justice] Advisory Committee."* The same respondent went on to note that the California Environmental Justice Advisory Committee met for *"two years, three years,*

and came up with over 100 recommendations, but one of the top five recommendations was creating a cumulative impacts screening tool."

Following the recommendations of the Advisory Committee, Office of Environmental Health Hazard Assessment (OEHHA) began development of *CalEnviroScreen* as part of CalEPA's environmental justice program in 2000 with the public release of its first iteration, *CalEnviroScreen* 1.0 in 2013.

As described previously, respondents in Washington executed a two-year collaborative approach that was largely informed by California's methodology. Our discussion with state officials and administrators in Michigan revealed intended plans to adopt a Michigan-specific tool within state agencies in the near future. However, one Michigan state official explained that the administrative body working on the tool was *"so early in this process"* and that they required *"a bit more time to work with our response team to figure out exactly what [the response team members] believe"* and to *"bring a lot of different perspectives to the table."*

Tools No Longer in Use: New Jersey

When interviewing stakeholders in New Jersey, we learned that the state of New Jersey has created a preliminary screening tool, but has been effectively shelved with the Republican administration coming in 2009. According to the same EJ academic in New Jersey:

> "*The screening tool that they developed -- we don't know what they're doing with that and they seem to be disavowing it. We want to talk to them about that. We just don't know what's going on."*

This has been one of the few instances we found where there seems to be a screening tool in place but it is not being used (or knowledge on how it is being used is unknown) due to lack of political will; as politicians have not assured the public as to how the tool is being used.

C. Use of Screening Tools: Current and Future

Our interviews revealed that while the understanding of EJ, the process of developing the tool, and the type of stakeholders involved were different amongst each state, there was a stark similarity between how they were currently being used. The three most common uses of screening tools are: 1) to disseminate information for educational purposes; 2) to promote advocacy for community members; and 3) to better incorporate EJ principles into state policies. Aside from the three identified common uses, in Minnesota there are relevant tools being used internally within its state agencies, especially MPCA, to help shift behaviors in the permitting processes. California has additionally utilized *CalEnviroScreen* to determine funding for the 'Transformative Climate Communities Project' (TCC) by the California Strategic Growth Council. Lastly, apart from New Jersey, where a well-known academic in the field of environmental justice stated that they *"don't know"* what is being done and *"don't know what is going on,"* screening tools in the other four states are being used for at least two of the three identified common uses.

For Informational and Educational Purposes

Respondents in California, Washington, Minnesota, Maryland, and Michigan explained how their screening tools are being used as an informational source (note: Michigan has yet to adopt a tool but would like for their tool to be used in the same way) for both state officials and community members to understand local EJ issues through the visualization of areas that bear the most disproportionate impacts of environmental hazards. In California, interviewees noted that multiple agencies and advocacy organizations have used *CalEnviroScreen* as a means of identifying disproportionately impacted communities. In Washington, the tool allows users to visualize the disparities between communities, promoting clear and easy communication about

the state of EJ in Washington. In Maryland, an academic specializing in EJ at a public research university said the information provided by the map informs community members about *"the type of hazards that is present in their community"* and also *"educates policy makers"* about EJ. In Michigan, state officials have agreed that the tool should be primarily used as an informational source for the similar reasons as Washington and Maryland.

For Promoting Advocacy Amongst Community Members

In California, Washington, Maryland, and Michigan, developers of the tools strongly expressed that the tool can be used for advocacy purposes, especially for affected communities and local EJ activists. In Maryland, community members are urged to make their own cases for the purpose of advocating and pressuring their local authorities for EJ policies. In California, an EJ advocate noted that *"community based organizations do really name and point to CalEnviroScreen as a framework that has uplifted the issues that we've known have always existed. Because we're organizing, we live and work and advocate in those neighborhoods"*. Though community members are well aware of the environmental health inequities they are experiencing, multiple interviewees stated the *CalEnviroScreen* has been a resource to further validate community testimonies.

Using the tool to advocate for equity and justice can also be done by policy-makers and state officials who want to promote EJ within their state. For instance, a state official working to promote EJ within Washington said that the tool is used by *"agencies to guide their work"* on EJ and cumulative impact analyses to provide a *"grander scheme… for policy makers, agencies, or organizations to advocate for equity and EJ."*

For Better Incorporating EJ Principles into State Policies

With regard to current use of tools in policy, the screening tool in Washington State has been used for the HEAL Act (Washington 2SSB 5489, 2019) which pushes for EJ at the state level. The HEAL Act, which was first passed by the Washington State Senate in March 2019 but is currently under consideration by the House, includes measures to create an EJ task force, adopting a cumulative impact analysis tool, and "establishing a healthy environment for all by addressing environmental health disparities" (Washington 2SSB 5489, 2019:1). According to a staff member from a county government office in Seattle, the screening tool was also used to pass the Clean Energy Transformation Act (Washington E2SSB 5116, 2019), effective May 2019, which aims to support "Washington's clean energy economy and transitioning to a clean, affordable, and reliable energy future" (Washington E2SSB 5116, 2019:1).

Respondents from different states have suggested that there are ideas regarding the future uses of screening tools at the state or community level. In Washington, an academic from a public research university in Seattle told us that the state wants *"...to use the map… to add onto it the similar model of how this climate change and vulnerability, how is that going to impact communities in Washington State,*" indicating state-level efforts to widen the use of its tool. Maryland currently does not use the tool for policy, however a university professor specializing in environmental health and justice issues in Maryland, who was part of the team that developed *MD EJSCREEN*, expressed aims for the tool to *"have an impact on policy"* moving forward. Moreover in Michigan, state officials have mentioned that a tool could also be used to inform future regulations or policies, but that it should not be advertised as a regulatory tool.

D. Limitations

Functional drawbacks of screening tools were not mentioned in some states, such as Washington. However, for other states that did mention them, we identified limitations in: 1) data sources; 2) establishing criteria to identify communities impacted by environmental injustices; and 3) its ability to measure specific environmental concerns.

A limitation that is common between Michigan and Maryland is regarding data sources and access. Both states use publicly available data provided by federal or state government entities. In Maryland, the concerns over publicly available data are that they are usually provided at the zip-code level, which makes it difficult to narrow it down to smaller scales. One of the primary developers of *MD EJSCREEN* who was in charge of data acquisition, stated that publicly available data are usually *"not beneath the zip code level"* so there needs to be *"assumptions in bringing that down to a lower level geography."* According to the same respondent, *MD EJSCREEN "extrapolates from zip codes to census tracts"* but cannot get it down to a smaller scale even if desired, because going from zip codes to census blocks is *"too far"* and does not *"feel comfortable."* This issue regarding geographic units, raises questions about data accuracy and creates difficulty for the viewer to use the tool to identify and call out on the siting of specific facilities at the census-tract level.

In Michigan, there are issues regarding data availability and collection due to technological issues, legal issues, and a lack of information sharing between different state departments. According to a state official, data is *"hard to find"* because the information technology capacity of the state department *"really broadly is very out of date"* which makes *"the way that the state actually houses data and materials… pretty archaic."* Another state official mentioned how there are regulations and laws related to sharing specific state data. According to the same respondent, health related data, in particular, is challenging to access

"because of privacy laws" that address the *"high parameters about how you share that, and who shares it, and what can be identified in that data."* Lastly, the same respondent pointed out that one of the biggest challenges regarding data is *"to have different data systems or these different places that hold data talk to each other,"* indicating the lack of information sharing between state departments. This was discussed in further detail when the respondent elaborated:

> *"...trying to get other kinds of information from different departments, a lot of concerns and questions from the folks that work at the departments that are really worried about people's security of their information and are very hesitant to share personal information. So that's something that we consistently get told."*

California's limitation with the tool raises questions of how different screening tools should define or set criteria to identify affected communities, in ways that would not exclude impacted communities or appear unfair to them. Based on the thresholds designated by SB 535 and AB 1550 in determining a "disadvantaged community," census tracts in California that score in the top 25% when applying *CalEnviroScreen's* analysis may overlook some communities that are, in fact, disadvantaged. Additionally, communities are not necessarily distinguished by census tract boundaries. According to a California EJ advocate:

> *"Communities don't live in the boundaries of census tracts. So we have, just a block away, households that wouldn't benefit, but they see their neighbors getting access to energy efficiency upgrades. The fact that there's these boundaries that are created by a tool aren't actual boundaries that people are living."*

Other functional drawbacks of the tool relate to its limitations in capacity to address environmental concerns outside of cumulative impacts, such as climate change. A member from a California-based EJ organization mentioned how *CalEnviroScreen "...was never meant to address climate change impacts."* Community members see this as an issue and are suggesting the development of a compatible tool to gauge how environmental injustice and climate change may exacerbate inequalities in communities. For instance, the same respondent stated that:

> *"...we call for complementary tools to reflect how communities are impacted by climate*

change, including wildfires, extreme heat, drought, sea level rise, and other risks that we see having impacts in our neighborhoods… So we've been pushing for a complementary framework that allows us to think about those socioeconomic burdens and how they overlay and interact with climate change impacts."

E. Resistance and Overcoming Resistance

From our interviews, we identified possible actors who may be resistant to using an EJ screening tool, both internal and external. In this case, *internal* actors refer to state agencies and legislators, as the tools typically reside within state government. *External* actors are those outside of state governments. Industry actors and lobbyists are most commonly recognized as being external actors resistant to screening tools in that they see it as a possible barrier to their status quo business practices.

Internal Resistance

In terms of internal resistance, our interviews revealed great conflict at the state level regarding screening tools and their accuracy. In California, there was to some degree of opposition regarding the accuracy of the tool in creating criteria for identifying an EJ community. As noted by an EJ advocate:

"...there was a lot of pushback about whether [the tool] was accurate, whether it was fully representational. So there was that period of time before it became fully recognized and accepted. So that was probably a two to three year period after its first launch."

However, as another interviewee, an EJ advocate, noted, the process of tools have also been validated through ground-truthing methods in conjunction with community knowledge and experience:

"The biggest thing was making sure that the data that was represented in that tool was accurate to what the people were experiencing on the ground, because sometimes you'll find that data isn't the correct location. There's supposed to be a facility on these streets, but they're actually a couple streets down. So, they wanted to make sure that the tools

were accurate."

In Washington, certain agencies are concerned about accountability due to the findings of the tool. Additionally, there was pushback during a Washington legislative session from a district representative concerning the tool's accuracy in measuring cumulative impacts. The community that was represented argued they were misranked (i.e. ranked lower than they should have been), because "*the tool measures overall air pollution but not short term sort of situational measures like, wildfire smoke,*" which is a natural disaster that their community experiences frequently. Similarly, there is extensive political debate in New Jersey about whether scientists know how to accurately take into account pollutants from multiple sources, which academics believe is a result of power dynamics within the state. One New Jersey academic spoke to this political dynamic:

> *"And because EJ communities often find themselves politically vulnerable, they're not able to move the State to say no to industry. And even under democratic administrations, which you would assume would be friendlier to these types of interventions, there's still resistance, because the regulatory structure of the state is risk averse."*

Internal resistance, therefore, can occur in regards to questioning the measurements of the tool.

In Minnesota, the tool faces slightly different internal resistance. As the tool is inward-facing -- meaning that the tool can only be used by personnel within the Minnesota Pollution Control Agency (and not the general public) -- there is internal resistance regarding how permitting processes are slowed as a result of the tool. As noted by a Minnesota official:

> *"The environmental justice policies and tools that we have are going to slow the process down and it's going to frustrate the facilities, but that is our commissioner's focus, but also now our permitting staff's goal is to slow down the process when a facility finds itself in an overburdened community."*

Michigan state officials also expressed similar expectations of resistance. They identified state administrators within state agencies as possibly resistant to a tool, as it would change their institutional norms and processes. According to a Michigan state official, a screening tool could *"make [agencies'] permitting more challenging."* This same respondent added that state

agencies who use the tool could *"run into some barriers with potentially local governments as well"* because the governments at the local level may wish to expand their economic ventures but are unable to due to state policies.

Additionally, some MPCA officials believe that it is more important to shift the staff demographics of agencies such as MPCA in order to be more representative of communities from the start (in reference to the importance of DEI hiring processes). As the tool is currently used in an internal-facing capacity, there are currently barriers for community involvement and use and input on the tool. In regard to the community-facing tool, one interviewee of the MPCA mentioned *"there's been a request for us to share to our advisory group on how this works. So that's something we're working on now."* As MPCA's EJ Advisory Group is in the process of working with MPCA to better understand the community facing tool, community members and EJAG members are in the initial stages of utilizing screening tools for their advocacy.

Some state agencies struggled with internal resistance in that they did not see broader state support or legal backing as a result of the tool. In Maryland, for example, where the screening tool is housed in an academic institution and not in a state agency, a primary developer of *MD EJSCREEN* in charge of data acquisition mentioned that it is important for the tool to have legal power. In particular, having a legal framework that would render the tool as valid (e.g. *CalEnviroScreen*) or to have it legislatively institutionalized would increase its levels of reliability and validity. There are possible barriers that screening tools face that involve limited resources to create or use these tools at a state level. A staff member from a state government county office in Seattle, Washington, suggested that barriers with funding and staffing may arise in the long-run, as the tool is run outside of a government office. This would take away from the

longevity and accuracy of the tool. In a similar way, one barrier identified by a Maryland academic was the difficulty of having the tool institutionalized and adopted at the state-level:

> *"We've got to get buy in [from state agencies], and unfortunately since we didn't have a co-created process where people would work on it together, it's going to be more difficult to get buying in [from state agencies] now than in adoption, I think. Because if they were co-creating it, you would have gotten early adopters because they were helping to co-create it, right?"*

Due to not taking a collaborative approach with the state government to develop the tool, questions regarding the validity and reliability of the tool has led to difficulties in establishing it as a state-official tool in Maryland. In Michigan, there appears to be some barriers to adopting the tool at the state level. Specifically, there are issues related to funding, staffing, and IT that may delay development of the tool within state agencies. According to one state official:

> *"With actually developing the tools, again, I'd see [issues] from an IT and just a capacity perspective for our EJ Public Advocate Office. It's more on the implementation side that I see that we would need significant funding if we're going to be doing more assessments or adding things to our permit process. We're just going to need more people to do that. So there's the IT side and then any time you add any sort of layer to a regulatory system, it just means there's more time and more people that need to figure out what decisions need to be made."*

In sum, internal resistance can take many forms, including: legislative concern of a screening tool's ability to identify (or not identify) an EJ area; the state not allowing the public use of the tool; a lack of legal backing for the tool; and limited resources to develop a tool.

External Resistance

In California, external actors -- especially industries -- are seeing shifts in the enforcement and regulation that comes from *CalEnviroScreen*. Though this is a sign of the tool being put to use, enforcement could result in the tool, and subsequent enforcement of pollution regulations, being met with industry resistance. In New Jersey and Michigan, industry is identified as an external

actor with much influence over internal actors (the State), and in this sense industry is the most powerful opposing group. According to a New Jersey academic:

> *"...both Democratic and Republican administrations [in New Jersey] have resisted a cumulative impact approach to justice, and the main reason why is because of industry influence."*

Another EJ academic from New Jersey detailed some of the resistance as the following:

> *"You [industries that emit pollutants] have to reduce your emissions or not enter into this community. And States are unwilling politically to do that, unless they're pressured to do so by a large swath of their electorate... There's still resistance, because the regulatory structure of the State is risk averse. They're afraid of being sued."*

All interviewees from Michigan -- which include community members, academics, lawyers, and state officials -- agreed that a screening tool would be a considerable threat to the business practices of the heaviest polluters, and as such they would not want information concerning cumulative impacts to be exposed. Industry would also be opposed to such a tool being used in a regulatory context. Additionally, a Michigan-based expert in environmental law stated that state legislators would *"probably be resistant"* to the tool because they would be opposed to *"something that would try to benefit low income communities of color."* This respondent continued by saying:

> *"I would imagine their response would be, 'We have a set of environmental laws that protects all people. Why do we need to make sure that ... Why do we need to give special treatment essentially to communities of color in regards to this issue?' Environmental justice just isn't in their consciousness as it is with I think some other people, some other legislators. And so I think it would be seen as something that would be not necessary by a lot of state legislators, essentially."*

Lastly, EJ and faith-based organizations were also seen as possible resistant groups in Michigan in that they had the potential to be co-opted by industry. This concern was raised by a Michigan community activist from Detroit, who explained that this kind of co-option is already happening in regards to decision-making processes for DTE Energy:

> "*...many of these community organizations -- the lower nonprofits and the faith-based organizations -- many of them are poor, and they're cash-strapped. So yeah, so many of them can often be co-opted [by industry] as we see now. When we went to speak to the Michigan Public Service Commission, they had a line of ministers that lined up to support DTE and their coal power plant in their production of energy, and how helpful they were because they were poor, so they were able to be paid off, so they were co-opted. There's no trust…"*

For this reason, all Michigan interviewees expressed some apprehension towards moving forward with the tool. In Washington, a staff member from a state government county office in Seattle pointed out that industries and lobbyists seem to argue against the tool and *"put equity groups against"* EJ policies, because those policies are imperfect in that they don't provide *"perfect solutions."* On the other hand, a Washington-based EJ community organization member stated that while utilities may have felt *"a stake"* in the development of the tool, they were more confused than resistant against it. For instance, utilities would *"challenge a little bit the legitimacy about, what was the sample size of community outreach you did"* or would claim that their information is *"not scientifically sound or not representative of agencies"* hence it should not be used.

Overcoming Resistance

There have been several strategies proposed by our interviewees regarding overcoming resistance. According to a local activist in Washington, one way to overcome external resistance is to have a state agency house the tool, rather than an educational institution. This provides the tool with validity. In Michigan, one state official argued that if the tool is framed as an educational tool, rather than a regulatory or enforcement tool, then perhaps some of the industry resistance could be avoided:

> *"That's how I would message it, because as much as we emotionally get why it's important, it's not going to matter to some people unless you could show them hard numbers. And this is a way to quantify impact and not just anecdotally talk about impact, and I think it should be described in that way."*

This approach of framing the tool as an educational and/or informational tool is also necessary to overcome resistance from state legislators, according to a Michigan-based expert in environmental law. This respondent stated:

> *"... for policymakers, I would think it would be important to stress that it's an information gathering tool that you're looking to assess these risks, and essentially try to see if there's a problem, and not assume that there is a problem, but basically say, 'If there is, then we'll craft what are the necessary solutions to address it.'"*

A federal actor at the USEPA described similar resistance with the USEPA's *EJSCREEN*, saying that the USEPA had to *"make clear what [the tool] is and what it isn't, that it was a screening tool"* and that *"it wasn't going to be used for regulatory or a risk assessment purposes."*

Interviewees in Minnesota emphasized that the importance of overcoming resistance was based in their communication networks and through the importance of inclusivity in all decision-making processes, from hiring to permit review. As noted by a Minnesota state official:

> *"...what we run into is to make sure that we're educating our supervisors and managers to make sure they know what environmental justice is and how we as an agency are pushing it as a policy so they can support their staff to do more, to do their job properly and that is to fulfill our mission on protecting the environment and human health."*

Additionally, interviewees in California credit *CalEnviroScreen* with its adaptability as a means of addressing more localized concerns. As one EJ advocate noted, *"It's not just about the state-level either. You can also use the data for regional decision making and planning and also for local decision making and planning, too."* Though the tool takes a state-based focus, proponents of the tool also use collaboration and education metrics so legislators and local officials may understand the tool, why community members support it, and how it may be further applied to their specific local concerns.

F. Metrics of Success

In gauging the impact of EJ screening tools in various states, we asked interviewees about what metrics they would consider in determining the successful implementation of the screening tool. We found that while there were no officially designated metrics to record success, most interviewees emphasized goals and metrics related to: 1) coalition-building and community resiliency; 2) allocation of funds for EJ communities; 3) changes to policy or decision-making processes; and 4) overall reduction in pollution.

A community member in Washington emphasized the need to make sure the tool is reflective of what the communities are facing, and that it is *"responsive to what their concerns and needs are."* Conversely, a Washington state official responded that there is no clear metric of success, however they would be *"thrilled"* if it *"resonated with communities, that [the tool] perpetuated,"* that it continues to improve, and people are interested in investing in it.

Minnesota's MPCA, currently using the '*What's In My Neighborhood*?' app for internal review, has implemented the tool in changing their permitting processes and ensuring that there is more effective review about siting and permitting of polluting industries. As noted by a Minnesota state official:

> *"...it's encouraged our permitting staff to just not issue a permit and move on. It forces our permitting staff to stop, identify the makeup of that community, whether it's low wealth or people of color or a tribal community. It also requires them to take some time to figure out what is the language spoken in the area."*

The developers of Maryland's tool and representatives in Michigan also emphasized that an important metric of understanding success is in the tool's capacity to change and/or influence the permitting process and also improving processes of collaboration among different stakeholders. Representatives of New Jersey also claimed they want permits to be denied based on the analyses done through cumulative impact screening tools. They emphasized the need for a clear

indication saying that due to the existing amount of pollution that burdens this community, decision-makers cannot, in good faith, subject a community to additional toxic emissions. As one academic described: *"Well look, if you're kind of admitting this is an issue but you're not doing anything about it, then that's not acceptable because your mission is to protect public health."*

When permits come up for renewal, communities want to be able to say that we can no longer accept permits for additional pollution-emitting projects. As another academic from New Jersey has mentioned:

> *"You need to have some mechanism that will allow you to deny permits based on the existing amount of pollution… So we would expect to see a denial of permits or a constraining of permits… And so, cumulative impacts if it works well, should tell the State there are conditions under which you have to say no."*

Overall, there must be a measurable reduction in pollution in the neighborhood, as this is the only way that communities can achieve better health and well-being. One academic scholar from New Jersey further iterated: *"And a cumulative impacts tool would hopefully give you the ability to stop that addition from happening."*

Given that EJ screening tools are fairly recent in their establishment in state governments, metrics of success are not officially established. However, we noted many aspirational goals for these tools between states.

Through our main themes, we can derive best practices that the state of Michigan can learn from when developing their screening tool. We outline these lessons, as well as examples of EJ policies, in the following Discussion section.

V. Discussion

A. Summary of Main Findings

Our research sought to develop an understanding of best practices in development of an EJ screening tool across states, in addition to an understanding of any barriers to its development and limitations to how the tool has been put into effect. Here, we summarize our main findings from each of our main themes and discuss the lessons that Michigan can learn from other states when it comes to its screening tool development.

Understanding of EJ

Based on our interviews and literature review, we have come to find that many states have their own respective definition of EJ, including the fair distribution of environmental quality and meaningful involvement, that is consistently used between state agencies, state administration, as well as community stakeholders. States with their own respective definitions of EJ, such as California, have built upon the USEPA's definition to better address the interests of their state, expanding upon the common phrases "fair treatment" and "meaningful involvement," as seen here:

> "Environmental justice means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies" (FindLaw, 2020).

This method has shown consistency with federal definitions, but also better incorporates the needs of stakeholders who are impacted by state-level decision-making. Through this consensus in understanding EJ based on a common definition, the capacities of EJ screening tools can be more readily assessed in how they address environmental injustices.

When creating a statewide definition, many respondents expressed that a collaborative process is necessary to ensure that it encompasses the needs of state residents. Furthermore, as

noted by interviewees in California and exemplified in California AB-1628, state definitions do not need to remain stagnant and may evolve to further address community concerns and values, and address newer EJ concerns as they arise.

As Michigan engages in the process of developing its own state-specific definition of EJ, we advise that it follows the precedent of other states and builds upon the Environmental Protection Agency's definition to uphold national consistency. Additionally, Michigan should continue to utilize its Michigan Environmental Council on EJ, whose membership was announced in March 2020, in developing its definition. Furthermore, engagement with community members and other stakeholders by state agencies and legislators is imperative to ensure continued collaboration and understanding of EJ.

Development of Screening Tools

As the EJ screening tool is being developed, community engagement is a critical and central tenet. Being able to consult with community members allows for the tool to be developed in a way that corresponds to community concerns. With this crucial information, the proper layers and pollutants can be monitored over time. This allows for a better outcome for community members as the state shows honest concern for the public health of the community. Regularly scheduled public hearings and workshops are necessary. It must also be kept in mind for these events to be held in public areas accessible to all, such as in a public library or local school. The timing of these events must also be kept in mind, as in order to ensure adequate participation by the community, they should not be held during obscure hours which will require them to miss work, etc. Finally, language also needs to be considered, so interpreters will need to be brought in to eliminate language isolation. To give an example of the lingual diversity in the state of

Michigan, residents of the metro Detroit area alone speak nearly 40 different home languages besides English.

In light of the Coronavirus pandemic, social distancing measures will need to be put in place to ensure the safety of all stakeholders participating in dialogues. We recognize that online conferencing platforms are the most immediate format to continue public hearings and workshops. However, such adjustments are not necessarily accessible to the public, as they rely on all participants having access to reliable internet connections from their homes. As the USEPA has allowed power plants, factories and other facilities to self-regulate their air and water pollution for an indefinite period of time amid coronavirus (Friedman, 2020), there is a risk of increased pollution that could further jeopardize the health of impacted communities. Considering these risks, the creation of pathways of inclusive community engagement must be employed that acknowledge both community resources and public safety.

Where the tool is going to be housed is crucial as well. This lends the screening tool greater legitimacy for many stakeholders, especially concerned citizens. Additionally, more resources can be devoted to the tool if it is housed in a state agency versus a nongovernmental institution. For instance, holding a screening tool within a University setting may hold well in the beginning but there is a consistent concern about staffing and funding being able to keep the tool up to speed with proper functions and updates.

Michigan urgently needs an EJ screening tool, as a screening tool will help the state catalog and verify the concerns of communities throughout the state. With issues such as climate change becoming more pressing, the environmental injustices experienced by local communities will only continue to be exacerbated unless there is a way to make them more salient. With incidents such as the Flint Water Crisis still present but garnering little media attention, a tool

has the potential to bring forth sustained attention to critical areas of concern such as this. With Michigan having its own unique EJ issues, we suggest that Michigan start by following the models of other states such as California and Washington as a base. Over time, we would expect Michigan to orient the tool to something that is unique for the state itself. Although engagement with the community is ultimately essential, there must be collaboration with representatives from industry too. However, the representation must be equal and power dynamics have to be acknowledged to ensure equity in the process. For example, it has been observed in past instances that environmental decision-making favors those with resources and political power over people of color and low-income communities (Bullard, 2001), and particularly tribal communities. As argued by the Grier et al. (2019) report, members of the tribal community are some of the least acknowledged residents in Michigan. Additionally, academics must also be consulted; at least through an informative capacity, for they have in the past and continue to shed light on additional concerns through their scholarly work.

Use of Screening Tools

Currently, many states are using screening tools for either education, advocacy, or to incorporate EJ in their state principles (sometimes a combination of these). We think that these are all essential purposes for the use of such a tool. As an educational tool, it can serve to show people throughout the state what is going on in their neighboring communities. Those with political power, and the ability to make decisions for the state, will also have the firsthand knowledge on what environmental hazards may be affecting citizens in their district. On the advocacy level, this tool will allow for affected communities to propel their voices even further and have their concerns be validated.

We believe that Michigan should aim to use the screening tool for all of these purposes as well. With other states setting great examples for the use of these tools, we see no reason for the state of Michigan not being able to do the same. Having the tool help incorporate EJ into its state policy is the most powerful way we view this tool being used for the state of Michigan. States such as California have been the most effective at this. We realize that reaching this particular objective of the tool's use will take time, as it will require accrued political will and advocacy from many affected communities.

Limitations

As we discovered through our research, complex tools such as an EJ screening tool require significant backing from the state in order to operate properly. A lack of resources can be debilitating to the effectiveness of the tool, as we saw in Maryland. State agencies must have an adequate level of staffing to make sure a tool is regularly updated and maintained. Additionally, Michigan has the particular problem of needing specific IT infrastructure for data sharing and tool creation which the state government currently lacks.

With limitations concerning the tool itself, we recognize that it does not have the capacity, at least at this point in time, to record all pollutants which affect human health. Michigan currently does not have the capacity to monitor many pollutants statewide either. Climate change will also undoubtedly play a significant role in exacerbating the risks from environmental hazards. However, as we saw in *CalEnviroScreen*, updated versions of the tool can be created to include previously undocumented hazards over time. Additionally, we heard from respondents that the tool is limited in the way that it identifies affected communities. Specifically, there is serious concern that some affected communities are not included in the tool's calculations for an EJ community. For example, with *CalEnviroScreen*, some communities

may fall just outside the threshold for being declared a "disadvantaged community," and will therefore not be eligible for state funding. However, some respondents noted that there are ways to compensate for this. Depending on the criteria defined, the pollutants ("layers") considered, and the language of policies, more communities can be identified as at risk on multiple levels of governance.

To address these limitations in Michigan, we suggest the following steps be taken in the tool's development. First, several state agencies -- including, but not limited to DEGLE and DHHS -- can collaborate to tackle the lack of resources (e.g. funding, staffing) described earlier. Resource sharing -- especially data sharing -- among agencies is ultimately needed for addressing the public health of Michigan's residents. This will require mandated transparency between agencies and means of secure data transfer. Second, we recommend that the state of Michigan increases community monitoring efforts so that additional and more complete data are collected over time. We would like for this tool to be supplemented with data from local areas to ensure that no affected communities are excluded from receiving governmental assistance.

Resistance and Overcoming Resistance

From our interviews, we identified two types of resistance against the development or use of an EJ screening tool: internal resistance (e.g. actors in state agencies and legislators) and external resistance (e.g. industries and organizations that could be co-opted by industries). Internal actors in state agencies were determined to be possibly resistant in that an EJ screening tool would affect the regulations and processes of their work. Some state legislators are resistant in that they doubt the credibility of the tool. In terms of externally resistant groups, industries were identified as the most likely to be opposed to an EJ screening tool, as well as the most adamant in their resistance. If industries see a screening tool as a way to enact stricter pollution regulations, the

tool is considered a threat to their business practices. Industries are also a unique resistant group in that they have the resources to affect other stakeholders involved with a tool. For example, industries can lobby state legislators to oppose the tool, and can co-opt community organizations to give the appearance of community division on the issue of screening tools. Michigan, in particular, anticipates many of these types of resistance to occur when developing their own screening tool.

To overcome these resistant groups, many of our respondents suggested changes in how the tool is framed or presented as it is developed in state agencies. For Michigan in particular, framing the tool as educational or informative rather than regulatory addresses the concerns of many of these possibly resistant groups. State agencies, for example, can see the tool as a way to better inform their regulations and codes. Moreover, giving the tool an educational backing removes the argument from industries and state legislators that the tool will be used to create or enforce state laws. We believe that, over time and with different political climates in Michigan's state government, the tool may gain enough credibility to be used in regulatory and law-making capacities, as were the cases of California and Washington.

Metrics of Success

None of the interviewees in any of the states in our study could identify concrete metrics of success for EJ screening tools (e.g. timelines or goals) at the state level. However, our respondents described general goals of community building, allocation of funds, changes to policy or decision-making processes, and overall reduction in pollution as linked to screening tool information. We assert that Michigan state officials can build from this list, but they should also have legal goals and metrics that they use. For example, Michigan can use the tool to inform a five-year timeline for particulate matter (PM) emissions reduction in the top five percent of

affected regions in the state. When deciding these goals and metrics, community residents must be genuinely consulted, for their ideas of success from the tool may differ from those of state officials.

B. Policies and Programs Informed by EJ Screening Tools

While most of our research involves the modes of screening tool development and general plans of use, measuring the long-term success of these tools is another matter entirely. These tools have not existed long enough for a longitudinal study, nor have they been used in every state, and thus an in-depth policy analysis is not be possible at this time. However, we believe that it is important to introduce the kinds of policies and programs that can possibly result from a screening tool, and so we summarize them here. Some of these policies were previously mentioned in our "Screening Tools in the United States" section, and explained in more detail.

Here, it is important to distinguish *policies* from *programs*. "Policies," in our view, is the umbrella term encompassing all official actions by a governmental body. These actions can include regulations (which are typically created within state agencies, and without legislative approval), executive orders, and of course, laws that are passed by a legislative body. However, while policies are actions by a governmental body, not all policies are actionable -- meaning that not all policies have goals, timelines, or budgetary requirements. For example, policies that define EJ for the state do not necessarily require the state to address EJ. We consider state "programs" to encompass serviceable state action. These programs typically have a purpose upon enactment, a timeline to implement change, and state department affiliation from which to draw funds. We recognize that many EJ state policies enact or amend state programs to include

EJ, but we believe there are important differences in the language and purpose of EJ policies versus programs that we wish to illustrate here.

State EJ Policies

As mentioned previously, California has the longest history of using a state-specific EJ screening tool. As such, California has the greatest number of state policies that utilize *CalEnviroScreen* and its criteria for 'disadvantaged communities' (Table 1). A complete list of these policies, as well as their descriptions, can be found in Table 1 below.

Screening tools typically have informed state or city policies by using criteria of affected communities. Once these regions or populations are identified using a screening tool, policies are created to: 1) allocate resources (e.g. funds or benefits from government programs); 2) prevent further environmental hazards from reaching these regions, or ; 3) change decision-making processes to consider the needs of affected communities (Table 1). For example, California's State Bill 535, the California Global Warming Solutions Act of 2006, was amended in 2012 to allow money raised by the Greenhouse Gas Reduction Fund to be distributed to 'disadvantaged communities' (California SB-535). This is an example of the screening tool being used in some capacity for resource allocation. We also see this in Washington's Clean Energy Transformation Act (Washington E2SSB 5116), where the bill requires benefits from its clean energy programs to be equitably distributed to vulnerable populations. Additionally, California used its definitions of disadvantaged communities to prevent these communities from being affected by hazardous waste sites under the authority of the Department of Toxic Substances (California AB-1329), thus protecting them from greater risk. Lastly, California passed a bill in 2012 (California SB-1000) that requires local governments to identify disadvantaged communities in their jurisdictions to reduce harmful pollutants, but also to increase engagement with these

communities in decision-making processes. Screening tools are also used to inform state definitions of EJ, and to create bodies within the state government that address it, as we see in Washington's HEAL Act and its EJ Task Force (Table 1).

A screening tool's parameters for affected communities and its general understanding of cumulative impacts seem to be the most utilized aspects of a screening tool when it informs state policies. However, once these criteria are established, policies can vary greatly in their intended purposes, as seen above. Therefore, even from our limited examples of policies informed by screening tools, we see great potential and flexibility in terms of how Michigan can use its screening tool to inform future policies.

Table 1. State policies that are informed by an EJ screening tool.

State	*Policy Title*	*Type of Policy (Year)*	*Description*
California	SB-535: California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund (amendment)	Senate Bill (2012)	Requires that 25% of the funds created by the Greenhouse Gas Reduction Fund (GGRF) will be invested in projects providing benefits to disadvantaged communities, and a minimum of 10% to projects located within these communities
	AB-1532: California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund (amendment)	Assembly Bill (2012)	Establishes the process for direct investment of GGRF toward the most disadvantaged communities and households in the state
	AB-1329: Hazardous waste	Assembly Bill (2013)	Amends the Health and Safety Codes related to hazardous waste so that EJ regions as defined by CA EPA are not affected by waste sites controlled by the Dept. of Toxic Substances Control
	SB-43: Green Tariff Shared Renewables Program	Senate Bill (2013)	Enacts the Green Tariff Shared Renewables Program (see Table 2)
	SB-673: Hazardous waste	Senate Bill (2015)	Amends the Health and Safety Codes related to hazardous waste so that the Dept. of Toxic Substances Control establishes or updates criteria for use in determining whether to issue a new or modified hazardous waste facilities permit or a renewal of a hazardous waste facilities permit
	AB-1071: Supplemental environmental projects	Assembly Bill (2015)	Requires each board, department, and office within the CA EPA to establish a specified policy on supplemental environmental projects (SEPs) that benefits disadvantaged communities, as defined by *CalEnviroScreen*
	AB-693: Multifamily Affordable Housing Solar Roofs Program	Assembly Bill (2015)	Enacts the Multifamily Affordable Housing Solar Roofs Program (see Table 2)

Table 1. Continued.

State	*Policy Title*	*Type of Policy*	*Description*
California	AB-1550: Greenhouse gases: investment plan: disadvantaged communities	Assembly Bill (2016)	Building upon SB-535, this bill requires that (1) a minimum of 25% of the funds created by the GGRF will fund projects and benefit individuals living in, disadvantaged communities, (2) an additional minimum of 5% to projects that benefit low-income communities located anywhere in the state, and (3) an additional minimum of 5% either to households that are outside of, but within a 1/2 mile of, disadvantaged communities, or to projects located within the boundaries of, low-income communities, that are outside of, but within a ½ mile of, disadvantage communities
	AB-2722: Transformative Climate Communities Program	Assembly Bill (2016)	Creates the Transformative Climate Communities Program, which includes grants t for the development and implementation of neighborhood-level climate community plans that include greenhouse gas emissions reduction projects; provides local economic, environmental, and health benefits to disadvantaged communities
	SB 1000: Environmental Justice in Local Land Use Planning	Senate Bill (2016)	Requires local governments to identify disadvantaged communities in their jurisdictions with the purpose of facilitating engagement in decision-making processes, as well as reducing harmful pollutants
Washington	E2SSB 5116: Clean Energy Transformation Act	Senate Bill (2019)	Acknowledges the need of clean and equitable energy benefits to vulnerable populations
	2SSB 5489: Healthy Environment for All (HEAL) Act *not yet passed	Senate Bill (2019-2020)	Creates a definition of environmental justice, directs agencies to address environmental health disparities, and creates an EJ task force
New Jersey (City of Newark)	16-0803: Environmental Justice and Cumulative Impact Ordinance	City of Newark Ordinance (2016)	Requires additional documentation from development applicants in order to build an improved basis of information on which to create sound environmental and land use policy
Minnesota	116.07(4a): Environmental Protections, Chapter 116: Powers and Duties (Permits)	Statute (2019)	Requires the MPCA to analyze and consider "cumulative levels and effects of past and current pollution" before a permit may be issued for a facility located in the area described by the statute.
Maryland	Currently, there are no state policies informed by an EJ screening tool		

State EJ Programs

Much like state policies, California is far ahead of other states in using its screening tool to inform state programs. In fact, to our knowledge, California was the only state in our research sample that had any state programs using the tool. See Table 2 below for a summary of these state programs. California's programs were informed by a 2018 report by the California Environmental Justice Alliance entitled "CalEnviroScreen: A Critical Tool for Achieving Environmental Justice in California" (CEJA, 2018a). To our knowledge, there are no state programs informed by an EJ screening tool in Washington, Minnesota, or New Jersey. Again, similar to state policies, these programs use *CalEnivroScreen's* thresholds for disadvantaged communities to offer a variety of benefits or considerations. These benefits range from certain wattage of renewable energy under the Green Tariff Shared Renewables (GTSR) Program, to community grants to reduce greenhouse gas emissions under the Transformative Climate Communities (TCC) Program (Table 2). Other programs prioritize 'disadvantaged communities' when dealing with toxic substances, such as the Abandoned Underground Storage Tank Initiative, which aimed to address potential leaks from abandoned underground gas tanks (Table 2). Disadvantaged communities were considered at greater risk for contamination and therefore were addressed first.

Both state policies and programs informed by screening tools address a wide variety of issues associated with EJ. Michigan can learn from this example as it moves forward with its tool.

Table 2. California state programs that are informed by an EJ screening tool.

Program Title	*Year Est.*	*Description*
Abandoned Underground Storage Tank Initiative	2013	Addresses contamination concerns of abandoned gas stations that had the potential to leak hazardous substances into the environment; the Initiative prioritized areas that were in the top 10 percent of CES 2.0 results
Green Tariff Shared Renewables Program (GTSR)	2013	Increases renewable energy access in California by allowing customers to meet their electricity needs through off-site renewable energy generation; designates 100 MW of GTSR's 600 MW target for renewable energy projects in areas identified as the top 20 percent most disadvantaged *CalEnviroScreen* census tracts for each service territory
Active Transportation Program (ATP)	2013	Aims to enhance public health and reach climate goals by increasing safety and mobility for non-motorized, active transportation modes such as biking and walking; at least 25% of funds for each ATP component program fund projects that benefit disadvantaged communities
Solar on Multifamily Affordable Housing (SOMAH)	2015	Funds solar installations on multifamily affordable housing; these locations are defined as census tracts in the top 25 percent CES 3.0 scores, or have at least 80 percent of tenants with incomes at or below 60 percent of area median income
City of San Diego Climate Action Plan (CAP)	2015	Use the most recent version of the *CalEnviroScreen* tool and other methods to identify underserved communities, which it defines as "census tracts ranking in the top 30 percent of *CalEnviroScreen* scores;" example of local use
Transformative Climate Communities (TCC)	2016	Administered by the California Strategic Growth Council (SGC); directs large-scale grants to community-led plans at the neighborhood scale that reduce greenhouse gases while achieving important economic, environmental, and public health co-benefits; focuses on the state's "most disadvantaged communities," defined as communities containing a majority of census tracts within the top 5 percent of CES 3.0 results

C. Other EJ Policies

We would also like to mention the various EJ policies that are *not* informed through the use of an EJ screening tool. There are various policies which address issues that contribute to environmental injustice, such as; bans on pollutants, public health codes, land use, proactive

planning, review processes, and the creation of EJ-specific policies and programs (Baptista et al., 2019:15). These policies typically occur on a smaller scale, within the legal context of a city ordinance or a county law. These types of policies have certain benefits. Cities or counties do not operate under the same constraints as state officials, and can create more specific policies to assist impacted communities. Local jurisdiction also encompasses much of the permitting, zoning, and land use issues that are at the root of many EJ problems. There is also greater chance for engagement at the local level that may not occur at a state level, and thus EJ organizations in more than two dozen cities and counties across the country have taken up that mantle (Baptista et al., 2019:32).

While there are many benefits to local EJ policies, there are also obstacles when dealing with EJ issues on a city-by-city basis. First, city ordinances or county laws are only applicable to residents within their jurisdiction. Environmental issues can accumulate downwind or downstream of city or county lines, and thus policies that only benefit their residents may not benefit other affected communities. Knowing that these issues can transcend beyond single communities or cities, these tools could help indirectly inform how other environmental injustices are exacerbated. Second, since state laws supersede city and county laws, there can be legal conflicts between city/county and state interests. This is the issue that New Jersey currently faces with its Newark EJ ordinance, the Environmental Justice and Cumulative Impact Ordinance (New Jersey 16-0803).

We argue that both local and state EJ policies are crucial to address environmental injustices in that they approach different problems at different scales. We suggest that state-specific EJ screening tools, if developed effectively and with proper community engagement, can be used to inform local- and state-level policies to better assist impacted communities.

D. Limitations of Screening Tools

Beyond the aforementioned limitations that were described in the report, we also wish to point out that what usually affects the content of these screening tools is the availability of the data itself, and whether that data are specific enough to address EJ issues. Michigan is currently looking at the draft screening tool generated from the previous report from Grier et al. (2019), which uses California's methodologies but with publicly available data (Michigan state official, personal communication, Oct. 2019). This will, as we have seen, lead to gaps in information on EJ if not supplemented somehow. Over time, the state should include more state-specific data pertaining to environmental hazards and environmental health. For this to occur, there should be better communication links between state agencies that will ensure that data becomes more available, and therefore can be quickly incorporated into the tool. States such as California have been notable examples of this, as they went on to include additional data along with what their state government had already recorded.

We also wish to be explicit in that there are various examples of environmental injustice that deserve as great or even more critical attention from the state that are not necessarily measured by an EJ screening tool. These include, but are not limited to: access to safe and nutritious foods (Hilmers et al., 2012); access to affordable energy, which is also termed 'energy justice' (Reames, 2016); access to running water (Harris et al., 2015); access to sustainable transportation (Gössling, 2016); proximity of schools to environmental hazards and their impact on student performance (Mohai et al., 2011); and access to green spaces as well as recreational areas and parks (Wolch et al., 2014). This is not to say that these tools will not be able to one day seamlessly incorporate examining these other injustices, but Michigan must be more proactive in linking data on these issues from studies, community experiences, as well as cumulative impact

information. By finding and documenting as many of these injustices as possible, we can further enrich our understanding of the greater cumulative impact of these injustices and how they contribute to the well-being of people in Michigan. Our hope is that with additional research and increased mainstream attention to these issues, we can figure out more innovative ways to examine and solve these complex issues.

As we continue to find ways to be more innovative in addressing these problems, we can continue to work through the current political system in finding solutions as well. An expert in cumulative impact screening tools at the federal level has stressed that:

> "It is critical that those of us working to advance EJ systematically expand the discourse within all levels of government. Under the federalist system of governance in the United States from one level can cross-fertilize and inform work at other levels" (Lee 2020).

Further, the existence of these tools may create critical linkages in how one environmental injustice may inform or exacerbate another. In understanding that communities in Southeast Detroit also experience vulnerability in food access, air quality measures have limited their capacities for resilience planting their own food sources. As EJ screening tools may identify hotspots of cumulative impacts in air pollution, there may also be recognition of how interventions to reduce air pollution in these areas may provide innumerable forms of relief and benefits to communities. By effectively integrating EJ mapping into their work, government agencies can finally take substantive steps to go beyond merely conducting enhanced public participation in response to disproportionate impacts (Lee, 2020).

Reliability of the data itself is essential when making these screening tools. As much as we want to fully rely on the data that are available or given for the usage of said tools, they may not put forth an entirely transparent picture. After all, the tool only works as well as the information that it is given. It has been mentioned before that the information industry delivers to

the state or for the public to analyze is not enough when it comes to fully understanding the severity or cumulative impact of toxic emissions. When the community or even the state tries to seek out additional information as to what exactly refineries and other processing plants are emitting or using within their processing plants, information is not released because it is considered a 'trade secret.' This is more clearly stated in a report by the MDEGLE:

> "There are two exceptions to reporting a chemical name that is not on the Section 313 list. In the case of a substantiated claim of trade secrecy, a facility can report a generic chemical name. The second is a case of a supplier claiming that a Section 313 chemical identity in a mixture or trade name product is proprietary or trade secret; in this situation, the facility can report a 'mixture component identity'" (MDEGLE, 2020).

This continues to be a cause for concern when figuring out how to catalog sources of emissions, and can make communities further hesitant about whether they can trust the information given by these tools.

E. Issues of Quantification

While we recognize that EJ screening tools are an important tool in mapping and conveying cumulative impacts to a number of stakeholders, there are many aspects where this tool can be regarded as problematic in its distinction of communities. Community members in Michigan often testify to decision-makers in state agencies and industries only to be told by these decision-makers that they need data to back their claims (Grier et al., 2019:62); meanwhile industries and state agencies neither take the needed preventative measures nor corrective measures to protect these communities facing environmental harm. This can -- and does -- unfairly add tremendous onus on community members to corroborate the severity of their situation. EJ screening tools, in many respects, perpetuate the notion that community residents must have their lives and health risks quantifiably justified in order for the state to intervene and regulate pollution.

In evaluating the problematic undercurrents of data collection, we additionally reference Sally Engle Merry's *Seduction of Quantification* (2016). Merry's analysis acknowledges that indicators of data are widely used as a means of translating social phenomena into understandable and comparable measures that may guide decision-making processes (Merry, 2016:9-10). However, the process of categorizing lived experiences of communities into data often hollows its capacity to convey the underlying socio-historical context and human that comprises an individual data point (Merry, 2016:20,21-22). In focusing on an 'objective' and 'scientific' truth, which is certainly offered by data points, EJ screening tools risk reducing lived experiences of community members in order to create normative hierarchies that are meant to speak to a need for social change.

The state of Michigan, through continued and effective collaboration with community members, has the opportunity to ensure that a state tool honors community experience. However, all stakeholders should be wary of the tool's positionality as a means of supporting community testimony, not a means of validating or invalidating their lived experiences.

F. Rebuilding Trust

We want to emphasize that screening tools are just one way for the state of Michigan to illustrate and address environmental injustices, as well as amplify the voices of community members. However, beyond the screening tools themselves, the state of Michigan has to do better when it comes to recognizing the historical environmental injustices done to marginalized communities. For a long time, the trust between those in the community and those who hold power in the state's political system has been upended. If their voices are continually being ignored, this will cause further volatility, and make communities feel less hopeful that their speaking up will

actually address anything. The state will then have even less of an understanding of the harm that goes on. Trust has to be restored in order for any meaningful progress to happen.

Our hope is that the sooner the state of Michigan can rectify some of these injustices done towards vulnerable communities, the faster trust can then be rebuilt. Only with tangible evidence brought forth to the community's attention can trust be reestablished, and healing can then take place. We suggest for example, that the state of Michigan formally recognize that concerns of community members in the past were not recognized or properly addressed. With the installment of a screening tool, the state needs to proactively engage with the community and publicly list out goals that prioritize corrective justice measures. A fund, similar to the one implemented alongside CalEPA's screening tool program should be put in place. This fund could perhaps help develop programs that will address the public health and well-being of disadvantaged communities throughout the state, especially those known to be severely afflicted by toxic air emissions, such as communities in the 48217 zip code.

G. Limitations of Our Study

There are four main limitations to our study, which are: 1) insufficient sample size, 2) sampling bias, 3) selection bias; and 4) technical difficulties with the data collection method.

Insufficient Sample Size

Our study has a small sample size which may result in difficulties making strong conclusions or conducting precise analysis due to limited data. We acknowledge that our number of interviews (N=26) is an insufficient sample size for statistical measurement. Initially, we aimed to conduct 30 interviews, which is a number that is considered the minimum sample size for most statistical tests. According to a National Centre for Research Methods Review Paper discussing the number

of interviews researchers should conduct for qualitative research, experts "suggest aiming for a sample of loosely around 30" (Baker and Edwards, 2012:9). The paper explains that 30 is a "medium size subject pool [that] offers the advantage of penetrating beyond a very small number of people without imposing the hardship of endless data gathering, especially when researchers are faced with time constraints" (Baker and Edwards, 2012:9). However, due to unforeseen circumstances with the Coronavirus pandemic, we were unable to reach that goal of 30 interviews.

Sampling Bias

Our sampling methodology may have generated sample bias. Our study had an uneven number of interviews between different states, where five or more interviews were conducted for California, Washington, and Michigan, while three or less interviews were conducted for New Jersey, Maryland, and Minnesota. This irregular number of interviews gave us more information, a wide range of perspectives, and stakeholder types for some states than others. With regards to stakeholders, we have an unequal sampling between different states. For instance, three of the four interviewees in Maryland were academics; four of the seven interviewees from Michigan were state officials; our single interview in Minnesota was with a state official; and we have no interviews with community members from Maryland and Minnesota. This may have skewed data for a few states toward specific stakeholder perspectives.

Selection Bias

In terms of the selection process, we selected the different states in our study based on our knowledge of existing screening tools through online research, published reports, and personal communication with EJ researchers, hence it is likely that there are other states that we are unaware or have no information regarding screening tools. In addition, we did not contact

industry representatives from any state, because we wanted to prioritize the voices of community members. Lastly, while we understand that the impacts of environmental injustices are found across different settings, we typically contacted and spoke to community members from urban settings rather than reaching out to those in rural areas, because we acknowledge that urban areas are where most cumulative impacts are measured. As such, based on this study's sampling methodology and selection process, we acknowledge that our qualitative data is not representative of the entire population in each state.

Technical Difficulties

During our data collection process, we faced technical difficulties with a few of our interviews. Since our interviews were conducted through online video conferencing softwares such as Zoom and BlueJeans, or via phone calls, the audio would sometimes be cut off due to poor internet connectivity and phone reception.

VI. Conclusion

Our research project had two objectives: a) to identify states that use state-specific EJ screening tools and understand how these tools are used in state-level decision-making; and b) to utilize data from our informational interviews to roadmap best practices of development and implementation to serve communities in Michigan. We thoroughly researched current screening tools in the United States, EJ policies resulting from a tool, and policies created without a tool. We also conducted a series of informational interviews pertaining to screening tool development and found several common themes. From our findings, we feel that we can give a series of informed recommendations to Michigan community activists and state officials, whom we hope will work collaboratively on an EJ screening tool in Michigan. Our recommendations are as follows:

1. **Michigan must establish a state definition of environmental justice in law (meaning through state legislation), as well as specific criteria to define an "EJ community."**
    a. We suggest that the state first build from the USEPA's definition of EJ, as many other states have done. Defining EJ, as well as the criteria that comprise affected communities, should be an in-depth collaborative process with community members, and this collaboration should continue as these definitions alter over time.
2. **State officials must conduct multiple public hearings, workshops, and roundtables to ensure community involvement in the tool's development.**
    a. These community outreach efforts should be held in multiple languages, with the assistance of language services, to ensure input and understanding from all communities.
    b. These events should also be held while keeping in mind principles of diversity, equity, and inclusion (i.e. disability access, etc.). Many of these community members come from low-income households with less resources available at their disposal. These events should be carefully planned so that they are not held at obscure times (e.g. standard work hours).
3. **State officials must also incorporate other stakeholders into development decisions, such as tribal communities, academics, and industries.**

a. All stakeholder representation must be equal (e.g. industry representatives cannot outnumber community members), and power dynamics (e.g. disparities with political clout) must be acknowledged.

4. **The EJ screening tool must be housed in a state agency rather than an outside institution.**

    a. This is to allow for the most stable infrastructure and access to resources.

5. **Multiple state agencies (e.g. DEGLE, DHHS, etc.) must collaborate on the tool's creation and use.**

    a. While we envision the tool to exist within the Department of Environment, Great Lakes, and Energy (DEGLE), we encourage multiple state agencies to collaborate on the tool's creation -- specifically sharing relevant data -- and to use information from the tool to inform better practices.

6. **Michigan should follow the examples of other states (specifically California) to create a screening tool more efficiently (in a shorter amount of time).**

    a. We assert that Michigan communities need a tool urgently, and thus state officials can use California's methodology for the first draft of the tool, as seen in the tool created by Grier et al. (2019). We acknowledge that in future iterations of the tool, Michigan should make the tool more state-specific.

    b. In the interim, we recommend the State continue to use the draft tool created by Grier et al. (2019) to inform definitions of EJ and criteria of EJ communities.

7. **Michigan must increase community monitoring efforts so that more data can be collected for the tool over time.**

    a. As more information is collected for the tool, the community must be regularly consulted as well as be transparent in what major updates are being provided to the tool so that the public is aware of what has changed in respect to their community.

8. **Michigan can, and should, use an EJ screening tool for education, advocacy, and regulatory purposes statewide.**

    a. To address potential resistance of this tool, Michigan may frame the screening tool as serving an educational or informative purpose in addition to serving its regulatory purpose.

9. **The tool should be used at different levels of governance (e.g. statewide, county-wide, city-wide) to ensure all affected communities are identified for their specific needs.**

10. **All governance levels must communicate health and safety concerns to community members, and provide resources (e.g. financial assistance, greater access to healthcare facilities) for affected community members to respond to such concerns.**

11. **Michigan state officials must consult communities as to the goals and metrics of success for the tool, and create timelines to reach those goals.**
12. **Michigan should aim to implement both local and state EJ policies, as they approach EJ problems at different scales.**
    a. Having EJ policies set at both the state and local level will strengthen overall accountability.

We conclude by reiterating that Michigan should follow the example of other states only to the point of relevance and efficiency. There should be a collaborative process between representatives from marginalized communities and state officials in Michigan to help determine the following: 1) a definition of EJ; 2) the criteria that describes an affected community; and 3) what pollutants, socioeconomic or health factors will be measured by the state. This collaboration needs to occur at the beginning of the tool's development, continue throughout the process, and extend into future iterations of the tool. Additionally, an EJ screening tool should exist to reinforce community testimonies of their current unjust situations, rather than replace them.

VII. Appendices

Appendix A: State Definitions of Environmental Justice

State/Federal Agency	*Definition of Environmental Justice*
U.S. Environmental Protection Agency	*"Environmental Justice* is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work" (USEPA, 2020).
California	"'Environmental justice' means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies" (FindLaw, 2020).
Washington	"'Environmental Justice' means the fair treatment and 17 meaningful involvement of all people regardless of race, color, 18 national origin, or income with respect to the development, 19 implementation, and enforcement of environmental laws, regulations, and policies" (Washington 2SSB 5489, 2019:3).
Minnesota	"The MPCA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (MPCA, 2015:1).
Maryland	"The concept behind the term environmental justice (EJ) is that all people– regardless of their race, color, national origin or income –are able to enjoy equally high levels of environmental protection" (Maryland Department of the Environment, n.d.).
New Jersey	"Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (New Jersey Department of Environmental Protection, 2020).
Connecticut	"Environmental Justice means that all people should be treated fairly under environmental laws regardless of race, ethnicity, culture, or economic status" (Connecticut Department of Energy & Environmental Protection, 2020).
Illinois	"'Environmental Justice' is based on the principle that all people should be protected from environmental pollution and have the right to a clean and healthy environment. Environmental justice is the protection of the health of the people of Illinois and its environment, equity in the administration of the State's environmental programs, and the provision of adequate opportunities for meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." (Illinois Environmental Protection Agency, 2020).

Massachusetts	"Environmental Justice (EJ) is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. EJ is the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits" (Massachusetts Department of Environmental Protection, 2020).
New Mexico	"Environmental Justice at the New Mexico Environment Department is the fair treatment and meaningful opportunities for involvement of all New Mexicans regarding the development and enforcement of environmental laws and regulations" (New Mexico Environment Department, n.d.).
New York	"Environmental Justice is the fair and meaningful treatment of all people, regardless of race, income, national origin or color, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies" (New York Department of Environmental Conservation, n.d.).
Pennsylvania	"Environmental justice embodies the principles that communities and populations should not be disproportionately exposed to adverse environmental impacts… It is our duty to ensure that all Pennsylvanians, especially those that have typically been disenfranchised, are meaningfully involved in the decisions that affect their environment and that all communities are not unjustly and/or disproportionally burden with adverse environmental impacts" (Pennsylvania Department of Environmental Protection, 2020c).

Appendix B: State Criteria of Environmental Justice Communities or Impacted Areas

State/Federal Agency	*Term*	*Criteria Describing EJ Communities or Impacted Areas*
US Environmental Protection Agency	"EJ Community"	The USEPA does not have criteria for EJ communities, nor does it use *EJSCREEN* for the purpose of identifying EJ communities (USEPA, 2016).
California	Disadvantaged Communities	"Disadvantaged communities shall be identified based on geographic, socioeconomic, public health, and environmental hazard criteria, and may include, but are not limited to, either of the following: (a) Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation. (b) Areas with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment" (California SB 535).
Washington *no fixed term to refer to communities impacted by environmental injustices. However, there are several ways EJ communities are identified at the state-level.	2SSB 5489: Highly Impacted Communities & Vulnerable Populations	Senate Bill 5489 defines two types of communities that are closely-related to the term EJ communities. Firstly, "'highly impacted communities' means communities designated by the agencies based on cumulative impact analyses" (Washington 2SSB 5489, 2019:3) using "[the] best practices and current demographic data" (Washington 2SSB 5489, 2019:5). Specifically, the "guidance provided relating to the designation of a highly impacted community must utilize as a basis for this determination the cumulative impact analysis and additional factors as the task force deems appropriate" (Washington 2SSB 5489, 2019:5). In addition, highly impacted communities include "census tracts that are fully or partially on 'Indian country' as defined in 18 U.S.C. Sec. 1151" (Washington 2SSB 5489, 2019:3). Secondly, "'vulnerable populations' means communities that experience disproportionate cumulative risk from environmental burdens due to: (i) adverse socioeconomic factors, including unemployment, high housing and transportation costs relative to income, access to food and health care, and linguistic isolation; and (ii) sensitivity factors, such as low birth weight and higher rates of hospitalization" (Washington 2SSB 5489, 2019:4).
	Washington Tracking Network: Sensitive Populations	The *Washington Environmental Health Disparities Map* displayed on the Washington State Department of Health's Washington Tracking Network tool identifies "sensitive populations" which "refers to those who are at greater risk due to biological/intrinsic vulnerability" (UW DEOHS, 2019:16). More specifically, "this theme relate[s] to biological susceptibility. People with pre-existing cardiovascular

		disease or low-birth-weight infants may be more vulnerable to environmental risk factors" (UW DEOHS, 2019:18).
Minnesota	Areas of concern	"The agency considers a census tract to be an area of concern for environmental justice if it meets one or both of these demographic criteria: the number of people of color is greater than 50%; or more than 40% of the households have a household income of less than 185% of the federal poverty level. Additionally, the MPCA considers communities within Tribal boundaries as areas of concern." (MPCA, n.d., b)
Maryland *pending legislation	Disadvantaged Communities	If passed, Maryland HB 1206, introduced February of 2020, would require the Department of the Environment, in consultation with the Commission on Environmental Justice and Sustainable Communities to designate certain communities as disadvantaged communities in accordance with certain criteria (Maryland General Assembly, 2020).
New Jersey	EJ Communities	"Groups bearing such disproportionate shares are called, 'environmental justice communities.' While the guidance does not define the phrase 'disproportionate share,' NJDEP will use an environmental justice screening tool developed by USEPA called 'EJSCREEN,' and other tools already used by other State agencies, to more precisely establish the meaning of the phrase. (Shahinian and Orsini, 2019)
Connecticut	Distressed Municipalities	According to C.G.S. Section 32-9p, a distressed municipality should be based on "high unemployment and poverty, aging housing stock and low or declining rates of growth in job creation, population, and per capita income" (CTDECD, 2020).
Illinois	EJ area	EJ areas are based on Minority and Individuals with Incomes Below Poverty (Low Income or LowInc). "Minority" community is calculated as greater than or equal to twice the State Average for the current ACS 5-year Estimate for the population being a minority within each Block group. "Low Income" area is calculated as greater than or equal to twice the State Average for the current ACS 5-year Estimate for individuals with Incomes below Poverty within each Block group. Some areas are indicated as both "Minority" and "Low Income" (IEPA, 2019).
Massachusetts	EJ Communities	There are three criteria to identify Environmental Justice communities in Massachusetts: Block group whose annual median household income is equal to or less than 65 percent of the statewide median ($62,072 in 2010); or 25% or more of the residents identify as a race other than white; or 25% or more of households have no one over the age of 14 who speaks English only or very well - English Isolation (Massachusetts Department of Environmental Protection, 2020)
New Mexico	EJ communities	"They are communities of color, low income, mostly young, the working class, and the elderly who face disproportionate risks or are affected disproportionately by environmental pollutants of the air,

		land, and water. These EJ communities already carry a heavy burden, because the people living in these communities do not have equal access to healthcare—either to prevent adverse effects or to address these effects after they have become acute" (ATRI, 2004:197)
New York	Potential EJ area	Potential Environmental Justice Areas (PEJAs) are identified within U.S. Census block groups of 250 to 500 households that reach the following statistical thresholds: "1. At least 51.1% of the population in an urban area reported themselves to be members of minority groups; or 2. At least 33.8% of the population in a rural area reported themselves to be members of minority groups; or 3. At least 23.59% of the population in an urban or rural area had household incomes below the federal poverty level" (NYDEC, 2020).
Pennsylvania	EJ area	"An EJ area is any census tract where 20 percent or more individuals live in poverty, and/or 30 percent or more of the population is minority. *This is based on the most recent census tract data from the U.S. Census Bureau and the federal guidelines for poverty" (Pennsylvania Department of Environmental Protection, 2020b).

Appendix C: Additional Screening Tools in California

The following list of California screening tools was previously compiled by the California Environmental Justice Alliance (CEJA) in their 2018 report "SB1000 Implementation Toolkit: Planning For Healthy Communities" (CEJA, 2018b).

Tool Name	*Tool Developer*	*Region Covered*	*Description*
Environmental Justice Screening Method (EJSM)	Program for Environmental and Regional Equity (PERE) at the University of Southern California	Statewide, Comprehensive	Analyzes cumulative impacts (CI) at the census tract level, summarizing its indicators across four categories: 1) hazard proximity and land use; 2) estimated air pollution exposure and health risk; 3) social and health vulnerability; and 4) climate vulnerabilities. Compared to *CalEnviroScreen*, EJSM utilizes additional metrics in its scoring, including race and ethnicity, climate vulnerability risks, and water quality analysis.
Low-Income Communities Map	California Air Resources Board (CARB)	Statewide	Identifies low-income communities across California by statewide median income and by the CA Department of Housing of Community and Development (HCD) State Income Limits.
Regional Opportunity Index (ROI)	UC Davis Center for Regional Change	Statewide, Issue Specific: Economic Inequity	Identifying vulnerable communities in need of economic investment based on community demographics, such as race, age, and gender; and civic life indicators including education, economic, housing, mobility, environmental.
Cumulative Environmental Vulnerabilities Assessment (CEVA)	UC Davis Center for Regional Change	Regional: San Joaquin Valley and Coachella Valley	Analyzes cumulative impacts in the San Joaquin Valley and Coachella Valley regions. CEVA uses indicators organized across three components: cumulative environmental hazards index (CEHI), social vulnerability index (SVI), and health index (HI). Together, these components deliver a CEVA rating at the census block group level.
Community Air Risk Evaluation Program (CARE)	Bay Area Air Quality Management District (BAAQMD)	Regional: San Francisco Bay Area	Identifies disproportionately impacted communities in the San Francisco Bay Area, using zip codes as a spatial unit of analysis. CARE analyzes rates of pollution risk and related health impacts

			and calculates a pollution-vulnerability index score (PVI) for each zip code, with PVIs in the highest 15th percentile being identified as disproportionately impacted.
Multiple Air Toxics Exposure Study (MATES IV)	South Coast Air Quality Management District (SCAQMD)	Regional: South Coast	Used to understand carcinogenic risks across the South Coast Air Basin through its monitoring program, an emissions inventory of toxic air contaminants, and a model characterizing carcinogenic risk.
Sustainability Maps and Tools	Southern California Association of Governments (SCAG)	Regional: Southern California	Include maps of landfill locations, wildfire threat, gas utility service areas, and electricity generation facilities. Maps and tools do not address cumulative impacts specifically, but local jurisdictions may utilize these maps to supplement and inform their own data collection.
California Healthy Places Index (HPI)	Public Health Alliance of Southern California	Statewide; Issue-specific: Social Equity	Identifies "cumulative health advantage" and communities facing health inequities at various geographic levels (from the census tract to the entire state) across California. A "ground-truthed" tool, HPI's indicators capture social determinants of health and are grouped into eight policy action areas: (1) economic; (2) social; (3) education; (4) transportation; (5) neighborhood; (6) housing; (7) clean environment; and (8) healthcare access.
Mojave Regional Water Quality Studies	California Water Science Center	Regional: Mojave Region	Evaluates groundwater quality of the Mojave River and Morongo groundwater basins, and generates maps showing water contaminant distribution and concentration in the region's groundwater.

Appendix D: Interview Questions for CalEPA

1. How did the development of this EJ screening tool start? Did the state initiate this process or did it come from public input?
2. To what extent is *CalEnviroScreen* used to shape state policies and policy decisions, particularly those pertaining to environmental and social problems?
3. Could you identify specific policies where *CalEnviroScreen* was used in the decision making and/or implementation process?
    a. Which of those policies succeeded or failed? Why? What is your criteria for this?
    b. What do you consider as a success or failure? Why? What is your criteria for this?
4. Which of the policies (identified above) generated the highest yield of justice?
5. To better address environmental injustices, how could other states that lack a mapping tool use your example with *CalEnviroScreen*?
    a. Is CalEPA being actively consulted by other states to develop screening tools?
6. Has the incorporation of *CalEnviroscreen* into law and policymaking faced any resistance by law and policymakers?
    a. Who had resistance against this and why?
7. How should mapping tools be framed and utilized in a way to be considered as a credible tool by law and policymakers?
    a. How should it be presented to law and policymakers and the public to ensure reliability and transparency?
    b. What were the key factors in this process?
8. Has CalEPA been asked to consult on the development of other state's screening tools other than MI and WA?
    a. If so, how does CalEPA recommend states to incorporate state-specific environmental indicators into their respective tools?
9. Do you know other states currently interested in developing a state EJ screening tool?

Appendix E: Qualitative Analysis Codebook

#	Main codes and subcodes	Definition/Description
1	Understandings of Environmental Justice	
1.1	Environmental justice	Definition or criteria of environmental justice
1.1.1	Community input	Refers to whether there was community input in the development of an environmental justice definition or criteria, and if so, what was it like
1.2	Cumulative impacts	Definition or criteria of cumulative impacts
1.3	Screening tool	Understanding of screening tools
1.4	Communities	Definition or criteria of communities impacted by environmental injustices
2	Development of Screening Tools	
2.1	Community engagement	Refers to whether there were opportunities for community engagement and participation, and if so, what was it like
2.2	Tool location	Refers to who has ownership of the tool (e.g. State, an institution, organization, etc.). This answers the question: where is the tool housed?
2.3	Timeline	The period of time of the overall development process
2.4	Other stakeholder engagement	Engagement of stakeholders or actors outside community groups
2.5	Tools no longer in use	State tools that were developed but currently non-effective
3	Use of Screening Tools: current and future	
3.1	Information	Data being collected or pulled by the screening tool
3.1.1	Education	Screening tool being used to educate local communities, policymakers, and other stakeholders for informational and educational purposes
3.1.2	Advocacy	Screening tool being used to advocate for further EJ actions
3.2	Policies	Policies, especially those with principles of environmental justice, being created as a direct result of the tool
3.2.1	Creation	Process of creating policies, especially those with principles of environmental justice and that used the screening tool
3.2.2	Enforcement	Screening tool being used to enforce current policies, if at all
3.3	Programs	Programs (i.e. educational, etc.) created as a result of the screening tool
3.3.1	Creation	Process of creating programs, especially those relating to environmental justice
3.3.2	Implementation	Programs implemented using screening tools
3.4	Who uses tool	Answers the question: Is the screening tool being utilized by

		community members, academics, lawmakers, etc.?
3.4.1	Whether it is used by the state	Answers the question: Does the state/state officials use the screening tool or not?
3.4.2	How and by which agencies	Identifying which state agencies use the screening tool and in what manner
3.5	Accessibility of tool	Whether the screening tool is able to be used by those who have disabilities, people who speak little to no English, those with little internet access, etc.
3.6	Other Screening Tools	Other internal screening tools that are used by agencies
4	Limitations	
4.1	Functional	What the tool can measure and what data it analyzes
4.2	Lack of information sharing	Little or no information sharing and communication between different stakeholders
4.3	Lack of foundational EJ knowledge	Minimal understanding of or no consensus on what environmental justice is (at the state level)
4.4	Lack of resources	Resources refers to funding, staff, time, etc.
4.5	Infrastructure	Infrastructural issues. E.g. having a lack of or no proper informational technology infrastructure
5	Resistance	
5.1	Departmental resistance (state)	Internal dispute between state agencies on if the screening tool should be developed or how it should be used
5.2	Law and policymakers	State legislators and state officials
5.3	Industry	Businesses and the industrial sector
5.4	Others	Other groups not identified above
6	Overcoming resistance	
6.1	Framing and messaging	Ways in which communication/framing around the screening tool has been used or will be used for its promotion
6.2	Communication between state and communities	Refers to whether state officials/agencies have communicated or is communicating with community members on the ground
6.3	Other	Other methods of overcoming resistance
7	Metrics of success	
7.1	Emissions reduction	Refers to whether the amount of air pollutants/toxic emissions has been lowered due to the implementation of the screening tool
7.2	Changes in permitting processes	Alterations in the process of approving, denying, and challenging new persmits and/or existing permits

7.3	To allocate funding	Refers to whether the screening tool has been used to successfully advocate for more funding
7.3.1	For communities	
7.3.2	For State (programs and agencies)	
7.4	Improved health in EJ communities	Refers to whether the overall health of communities impacted by environmental injustices has improved
7.5	Improved collaboration	Refers to whether the tool allowed for better collaboration between state agencies, organizations, and communities

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