

C O M M E N T S

# COMMUNITY INPUT ON STATE ENVIRONMENTAL JUSTICE SCREENING TOOLS

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A number of environmental justice screening tools and processes have been developed across the United States in an effort to identify communities experiencing environmental injustice. These tools combine environmental and demographic data sets, layer them over a map, and present the map in a web-based format.<sup>1</sup> Users

can typically zoom in on a certain geographic area and see data specific to that area.<sup>2</sup> Environmental justice screening tools can help identify vulnerable and disproportionately impacted communities, and can reflect the cumulative nature of environmental, social, and health-related impacts that community members experience. Developing these tools is one major step state and federal governments can take to both better understand the cumulative nature of environmental and social impacts and incorporate cumulative impacts into their decisionmaking processes.<sup>3</sup>

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At the national level, the U.S. Environmental Protection Agency (EPA) maintains EJSCREEN, a publicly available online screening tool that combines environmental and demographic data and displays environmental justice indexes at the census block group level.<sup>4</sup> EJSCREEN displays six demographic data sets from the American Communities Survey and 11 environmental data sets. The tool combines the demographic information with each environmental indicator in an "Environmental Justice Index."

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In addition to EJSCREEN, 18 states—California, Colorado, Connecticut, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Virginia, Washington, and Wisconsin—have a state-specific environmental justice screening tool in use or in the process of development.<sup>5</sup> Many of these state-level tools

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1. Charles Lee, *A Game Changer in the Making? Lessons From States Advancing Environmental Justice Through Mapping and Cumulative Impact Strategies*, 50 ELR 10203 (Mar. 2020), available at <https://www.elr.info/articles/elr-articles/game-changer-making-lessons-states-advancing-environmental-justice-through>; Arianna Zrzavy et al., *Addressing Cumulative Impacts: Lessons Learned From Environmental Justice Screening Tool Development and Resistance*, 52 ELR 10111 (Feb. 2022), available at <https://www.elr.info/articles/elr-articles/addressing-cumulative-impacts-lessons-environmental-justice-screening-tool>.

2. Lee, *supra* note 1.

3. *Id.*

4. OFFICE OF POLICY, U.S. EPA, EJSCREEN ENVIRONMENTAL JUSTICE MAPPING AND SCREENING TOOL: EJSCREEN TECHNICAL DOCUMENTATION (2019), [https://www.epa.gov/sites/production/files/2017-09/documents/2017\\_ejscreen\\_technical\\_document.pdf](https://www.epa.gov/sites/production/files/2017-09/documents/2017_ejscreen_technical_document.pdf).

5. For information on the development and methodologies of these state-specific screening tools, see California Office of Environmental Health Hazard Assessment (OEHHA), *CalEnviroScreen*, <https://oehha.ca.gov/calenviroscreen> (last visited Apr. 18, 2022); Colorado Department of Public Health and Environment, *Colorado EnviroScreen*, <https://cdphe.colorado.gov/enviroscreen> (last visited Apr. 18, 2022); Press Release, Con-

use the methodology of California's CalEnviroScreen as a model and reflect cumulative impacts.<sup>6</sup> CalEnviroScreen, developed and maintained by the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA), is the largest statewide public environmental justice screening tool in the United States, both in terms of geographic scope and the level of detail provided by the data.<sup>7</sup>

CalEnviroScreen displays data at the census tract level, and provides a score for each tract that is calculated by multiplying a "Pollution Burden" score with a "Population Characteristics" score. This combined score reflects communities' overall vulnerability in terms of cumulative environmental impacts and socioeconomic and health disadvantage. The tool ranks census tracts from highest to lowest based on their "CalEnviroScreen" score, and uses a color scale with highest scoring tracts in red and low-

est scoring tracts in green to display the results on a map.<sup>8</sup> CalEnviroScreen is a model for state-specific environmental justice screening tools for both its methodology and the bottom-up strategy the government used to develop it, which was largely informed by input from environmental justice organizations.<sup>9</sup>

An important feature of CalEnviroScreen, and other state-level environmental justice screening tools for which CalEnviroScreen has served as a model, is its attempt to reflect cumulative impacts. By "reflect cumulative impacts," we mean that the methodology includes calculating environmental justice scores that allow users to rank and compare geographic units in terms of their combined environmental exposure and social vulnerabilities. The notion of cumulative impacts is central to the contemporary environmental justice movement. Members of racial or ethnic minority groups and low-income communities are exposed to more environmental threats and social stressors than members of white groups and wealthier communities, and these dangers and stressors are cumulative in nature.<sup>10</sup>

For example, a member of an impacted community may live in a residential area that is exposed to increased levels of air pollution, noise, and water pollution from industrial facilities nearby, and at the same time have to work multiple low-wage jobs, lack funds to pay for childcare, and need to travel far distances to access health care for their family. Environmental policies are currently limited in that they focus on specific pollutants and their sources one at a time, but they should be expanded to consider the cumulative environmental, social, and health-related impacts that members of impacted communities experience.<sup>11</sup>

Cumulative impacts in the context of environmental justice are especially relevant to events and efforts in Michigan, where advocates have been working for decades to address the disproportionate distribution of pollution on low-income and minority communities.<sup>12</sup> Community members in southwest Detroit's 48217 ZIP code are fighting to get state officials to address high asthma rates caused by surrounding industrial air pollution.<sup>13</sup> Native communities exert their sovereignty in cases where pipelines and mining efforts threaten the water quality on which they rely.<sup>14</sup> Flint residents brought lead exposure in their water to

necticut Department of Energy and Environmental Protection, DEEP and UConn CIRCA Partner to Develop Mapping Tool for Environmental Justice Communities (Oct. 27, 2021), <https://portal.ct.gov/DEEP/News-Releases/News-Releases---2021/DEEP-and-UConn-CIRCA-Partner-to-Develop-Mapping-Tool-for-Environmental-Justice-Communities>; Illinois Environmental Protection Agency, *Illinois EPA EJ Start*, <https://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=f154845da68a4a3f837cd3b880b0233c> (last visited Apr. 18, 2022); Indiana University, *Hoosier Resilience Index*, <https://hri.eri.iu.edu> (last visited Apr. 18, 2022); Jan-Michael Archer & Sacoby Wilson, MD EJScreens v2.0: A Tool for Mapping Environmental Justice in Maryland, Presentation at Commission on Environmental Justice and Sustainable Communities Meeting (Feb. 25, 2020), <https://mde.maryland.gov/programs/Crossmedia/EnvironmentalJustice/Documents/mdejscreen-cejssc-2-25-2021v1.pdf>; Massachusetts Environmental Public Health Tracking, *Environmental Justice*, <https://matracking.ehs.state.ma.us/Environmental-Data/ej-vulnerable-health/environmental-justice.html> (last edited Mar. 3, 2022); OFFICE OF THE ENVIRONMENTAL JUSTICE PUBLIC ADVOCATE, MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY, *MIJSCREEN DRAFT TECHNICAL REPORT* (2022), [https://www.michigan.gov/documents/environmentaljustice/Report-2022-03-MiEJScreen-Technical\\_750040\\_7.pdf](https://www.michigan.gov/documents/environmentaljustice/Report-2022-03-MiEJScreen-Technical_750040_7.pdf) [hereinafter *MIJSCREEN DRAFT TECHNICAL REPORT*]; Minnesota Pollution Control Agency, *MPCA and Environmental Justice*, <https://www.pca.state.mn.us/about-mPCA/mpca-and-environmental-justice> (last visited Apr. 18, 2022); East-West Gateway Council of Governments, *2021 Title VI Program Maps—By Jurisdiction*, <https://www.ewgateway.org/library-post/2021-title-vi-program-maps-by-jurisdiction/> (last visited Apr. 18, 2022); New Jersey Department of Environmental Protection, *New Jersey Environmental Justice Mapping Tool*, <https://www.arcgis.com/apps/webappviewer/index.html?id=34e507ead25b4aa5a5051dbb85e55055> (last visited Apr. 18, 2022); New Mexico Environment Department, *Open EnviroMap*, <https://gis.web.env.nm.gov/oem/?map=egis> (last visited Apr. 18, 2022); New York Department of Environmental Conservation, *Maps & Geospatial Information System (GIS) Tools for Environmental Justice*, <https://www.dec.ny.gov/public/911.html> (last visited Apr. 18, 2022); North Carolina Department of Environmental Quality, *DEQ North Carolina Community Mapping System*, <https://deq.nc.gov/outreach-education/environmental-justice/deq-north-carolina-community-mapping-system> (last visited Apr. 18, 2022); Pennsylvania Department of Environmental Protection, *Environmental Justice Areas Viewer*, <https://padep-1.maps.arcgis.com/apps/webappviewer/index.html?id=f31a188de122467691cae93c3339469c> (last visited Apr. 18, 2022); Virginia Department of Transportation, *Virginia Block Group Level Demographic Maps*, <https://www.virginiadot.org/business/bu-civil-rights-maps.asp> (last modified Oct. 13, 2021); Washington State Department of Health, *Washington Environmental Health Disparities Map*, <https://doh.wa.gov/data-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map> (last visited Apr. 18, 2022); Wisconsin Department of Health Services, *The Wisconsin Environmental Equity Tool*, <https://www.dhs.wisconsin.gov/climate/env-equity-tool.htm> (last revised Mar. 3, 2022).

6. Lee, *supra* note 1.

7. JOHN FAUST ET AL., UPDATE TO THE CALIFORNIA COMMUNITIES ENVIRONMENTAL HEALTH SCREENING TOOL: CALENVIROSCREEN 3.0 (2017), <https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf>.

8. *Id.*

9. Lee, *supra* note 1.

10. DORCETA TAYLOR, TOXIC COMMUNITIES: ENVIRONMENTAL RACISM, INDUSTRIAL POLLUTION, AND RESIDENTIAL MOBILITY (2014); Rachel Morello-Frosch et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 HEALTH AFFS. 879 (2011); Humberto Flores-Landeros et al., *Community Perspectives and Environmental Justice in California's San Joaquin Valley*, ENV'T JUST. (Aug. 17, 2021).

11. Morello-Frosch et al., *supra* note 10.

12. Zrzavy et al., *supra* note 1.

13. Zoë Schlanger, *Choking to Death in Detroit: Flint Isn't Michigan's Only Disaster*, NEWSWEEK (Mar. 30, 2016), <https://www.newsweek.com/2016/04/08/michigan-air-pollution-poison-southwest-detroit-441914.html>.

14. Andy Balaskovitz, *Q&A: Michigan Researcher on Pipelines and Modern Colonialism*, ENERGY NEWS NETWORK (Apr. 4, 2017), <https://energynews.us/2017/04/04/midwest/qa-michigan-researcher-on-pipelines-and-modern-colonialism/>; Brian Bienkowski, *Pollution, Poverty, and People of Color: A Michigan Tribe Battles a Global Corporation*, SCI. AM. (June 12, 2012), <https://www.scientificamerican.com/article/pollution-michigan-tribe-battle-global-corp/>.

the nation's attention through data they collected in their homes, exposing the Flint water crisis in 2015.<sup>15</sup>

Advocates have also long been working to bring the cumulative nature of these exposures to the state's attention.<sup>16</sup> Notably, in the wake of the Flint water crisis, former Michigan Gov. Rick Snyder appointed the Environmental Justice Work Group, which included community representatives, in February 2017 to provide recommendations to improve the environmental justice engagement of the state government and its agencies.<sup>17</sup> One of the recommendations in the work group's final March 2018 report was for the state to "[d]evelop an environmental justice screening tool in Michigan and include cumulative impacts in decision-making processes,"<sup>18</sup> a recommendation long backed by the Michigan Environmental Justice Coalition (MEJC), a statewide alliance of community advocates, academics, and professionals working to advance environmental justice across Michigan.

Through their climate justice campaign, the MEJC has advocated for climate policies and solutions that center on the communities most impacted by pollution. Part of this campaign has been advocating for the state of Michigan to develop and use an environmental justice screening tool that reflects cumulative impacts.<sup>19</sup> In March 2022, the state of Michigan released the draft Michigan Environmental Justice Screening Tool (MiEJScreen) for public comment. The draft tool was informed by CalEnviroScreen, EJSCREEN, and other states' tools, as well as academic work that we and other graduate students completed at the University of Michigan's School for Environment and Sustainability in partnership with the MEJC.<sup>20</sup>

Many state agencies, such as those in California, have incorporated processes to obtain feedback from members of impacted communities and other stakeholders on the screening tools they develop.<sup>21</sup> Often these processes involve obtaining input through public meetings or formal public comment periods, which are not traditionally designed to garner anonymous or in-depth input. Our research team took interest in obtaining community input on a Michigan-specific environmental justice screening tool through systematic data collection and analysis, allowing commu-

nity members and stakeholders to meaningfully provide anonymous and in-depth input.

Our goal was to determine community views about the salient environmental, socioeconomic, and health-related challenges that impacted communities across Michigan experience, and what indicators would best reflect those challenges in a screening tool. We also sought to understand how environmental justice advocates<sup>22</sup> perceive a Michigan-specific environmental justice screening tool in terms of potential benefits and caveats. We believe community input should guide the development of state-specific environmental justice screening tools, including the decisions about what indicators to include and how such tools will affect policy decisions.

The findings we present in this Comment are part of a broader research endeavor that we conducted in partnership with the MEJC, in which we built a Michigan-specific environmental justice screening tool.<sup>23</sup> While our research looks at community input on the Michigan-specific tool, we believe our findings and recommendations are relevant to stakeholders across the United States interested in advancing environmental justice through state-level environmental justice screening tools.

## I. Methodology

### A. Sampling Strategy

To address our specific objectives, we interviewed 30 environmental justice advocates in the state of Michigan. We employed a convenience sampling technique utilizing contacts provided by the MEJC, as well as a snowball sampling technique. Both processes are explained below.

Interviewees fell into three different interview samples. The first sample consisted of MEJC members. The MEJC provided a list of its membership at the start of the outreach process. We reached out to all 22 contacts on the list via e-mail and interviewed 12 members (n=12). The second interview sample consisted of snowball contacts collected from the MEJC members we interviewed. MEJC interviewees provided 17 new contacts. We reached out to all 17 contacts via e-mail and interviewed eight (n=8).

The third interview sample consisted of individuals who submitted a proposal to present at the MEJC's statewide Environmental Justice Summit that occurred in Flint, Michigan, in September 2018. We added this sample to the outreach process in an effort to capture greater geographic diversity across the state of Michigan. The MEJC

15. FLINT WATER ADVISORY TASK FORCE, FINAL REPORT (2016), [https://www.michigan.gov/documents/snyder/FWATF\\_FINAL\\_REPORT\\_21\\_March2016\\_517805\\_7.pdf](https://www.michigan.gov/documents/snyder/FWATF_FINAL_REPORT_21_March2016_517805_7.pdf).

16. Zrzavy et al., *supra* note 1.

17. ENVIRONMENTAL JUSTICE WORK GROUP, ENVIRONMENTAL JUSTICE WORK GROUP REPORT: MICHIGAN AS A GLOBAL LEADER IN ENVIRONMENTAL JUSTICE (2018), [https://www.michigan.gov/documents/snyder/Environmental\\_Justice\\_Work\\_Group\\_Report\\_616102\\_7.pdf](https://www.michigan.gov/documents/snyder/Environmental_Justice_Work_Group_Report_616102_7.pdf).

18. *Id.* at 6.

19. MEJC, *Fighting for Our Future*, <https://www.michiganej.org/climate-justice> (last visited Apr. 18, 2022). See the MEJC site, <https://www.michiganej.org>, for more information about the coalition.

20. Laura Grier et al., *Assessing the State of Environmental Justice in Michigan* (May 2019) (M.S. thesis, University of Michigan), <https://deepblue.lib.umich.edu/handle/2027.42/149105>; Molly Blondell et al., *Environmental Justice Tools for the 21st Century* (May 2020) (M.S. thesis, University of Michigan), <https://deepblue.lib.umich.edu/handle/2027.42/154874>; MiEJSCREEN DRAFT TECHNICAL REPORT, *supra* note 5.

21. OEHHA, CALENVIROSCREEN 4.0 (2021), <https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf>.

22. For the purpose of brevity, we refer to our interviewees as environmental justice advocates throughout this Comment. This definition includes community members, scholars, and other professionals who advocate for the advancement of environmental justice in Michigan. Interviewees either live, work, or study in affected communities and regularly interact or work with affected community members.

23. See University of Michigan School for Environment and Sustainability, *Screening Tool for Environmental Justice in Michigan*, <https://www.arcgis.com/apps/webappviewer/index.html?id=dc4f0647dda34959963488d3f519fd24> (last visited Apr. 18, 2022), for the Michigan-specific environmental justice screening tool.

provided a list of names and contact information of these individuals who submitted proposals. We reached out to all 26 applicants via e-mail and interviewed 10 of them (n=10). See Table 1 below for a summary of interview samples and sizes.

**Table 1. Size of Interview Samples**

Interview Sample	Number of People Contacted	Size of Sample (N)	Response Rate
MEJC Members	22	12	55%
Snowball Contacts	17	8	47%
Summit Presentation Applicants	26	10	38%
<b>Total</b>	<b>65</b>	<b>30</b>	<b>46%</b>

We developed a semi-structured interview guide to elicit the knowledge, perspectives, and experiences of Michigan environmental justice advocates. The guide consisted of two sets of interview questions: one for advocates who self-identified as currently residing or working in areas affected by environmental justice issues, and one for professionals, scholars, and activists who are not currently affected by environmental injustice but work with, advocate for, study with, or represent these communities in some capacity. Both sets of questions underwent multiple reviews. We integrated feedback from reviewers and three pilot interviews, which helped us clarify some questions to ensure comprehension.

Once the interview guide was finalized, we scheduled interviews either in person, when possible, or over the telephone. We provided all participants with detailed information about the study and privacy considerations. We obtained informed consent from all participants through a process approved by the University of Michigan's Institutional Review Board (IRB). The outreach methods and examples of e-mail outreach scripts were also approved by the IRB.

The interview guide included questions about salient challenges associated with environmental issues and how these challenges affect the day-to-day lives of affected community members. It also included a set of questions regarding interviewees' views on a potential Michigan-specific cumulative impacts screening tool.

## B. Data Analysis

We adopted an inductive approach to qualitative data analysis drawing from grounded theory, which allows for the interpretation of data without having a predetermined hypothesis.<sup>24</sup> We selected this approach as this study was exploratory in nature, and it was important to allow the participants to determine the salient concerns regarding environmental justice in Michigan.

The first analytical step was to develop a codebook by identifying patterns in the data and organizing these patterns into categories and subcategories. We coded each of the 30 interviews manually, highlighting information relevant to our three research questions on individual interview transcriptions and labeling it with a short descriptive phrase ("code"). For example, on an interview transcript we highlighted the quote "*The main thing I focus on is health issues. So, exposure to poor air quality, poor water quality, economic stressors, as well.*" We labeled it with the codes "air quality" and "water quality" as two environmental challenges that members of impacted communities experience. We based our coding methodology on the process described in the *Qualitative Data Analysis* textbook.<sup>25</sup>

We created a separate codebook for each of the three samples (MEJC members, snowball respondents, and summit applicants), and we coded their responses separately. We then compared responses from the three separate codebooks in order to identify differing patterns across the three groups. Differences across these three codebooks were minor; therefore, we then combined all codebooks into one final codebook that reflected categories and subcategories that were consistent across samples. For example, one category in our data was environmental challenges that community members experience. We broke this category down into five subcategories: air, water, land, pollution sources, and specific pollutants.

The next step in our qualitative data analysis was to create matrices displaying the overall patterns for notable categories and subcategories based on code frequencies. The matrices that we created displaying the categories and subcategories yielded three sets of results that identified (1) challenges faced by communities; (2) perceived benefits of environmental justice screening tools; and (3) caveats for environmental justice screening tools. We discuss these results and associated tables in more detail below.

## II. Results

### A. Challenges Faced by Impacted Communities

Our first set of results identifies the challenges that residents of impacted communities experience. When asked about challenges that residents face, our interviewees discussed specific concerns that fell into three categories: (1) environmental, (2) social, and (3) health-related challenges.

#### 1. Environmental Challenges

The first category of challenges interviewees mentioned is "environmental." Some interviewees spoke about their concerns in general terms, while others listed specific facilities and toxins of interest. Interviewees mentioned a total of 63 different environmental challenges that fell into five

24. KATHY CHARMAZ, *CONSTRUCTING GROUNDED THEORY* (2014).

25. MATTHEW B. MILES ET AL., *QUALITATIVE DATA ANALYSIS: A METHODS SOURCEBOOK* (3d ed. 2014).

subcategories, including air, water, land, pollution sources, and specific pollutants (see Table 2).

The most frequently mentioned environmental challenges were poor water quality, which was mentioned a total of 23 times, and decreased air quality, which was mentioned a total of 21 times. It is not surprising that water quality was one of the most frequently mentioned concerns given the recent Flint water crisis, which was mentioned multiple times throughout our interviews. Additionally, interviewees brought up concerns about the Great Lakes, including how poor water quality affects the cultural and environmental management practices of Native American communities in the state. For example, in describing water quality issues, one interviewee said:

*The mercury pollution affects our relationship with the fish that we can no longer eat indiscriminately. Pregnant women, some of them are advised that they should never eat fish. Oth-*

*ers maybe once a month at the most. This has been a really big part of our culture.*

Air quality followed water quality in frequency of mentions. In discussing air quality issues, another interviewee said:

*Our home is always, always getting dust from somewhere. We have to clean it. There's always dust. Also, the smell in the neighborhood. Sometimes it gets [a] really foul smell, especially around the school. When it rains, it really, really is so bad. On certain days it really is bad when it rains.*

Other examples of environmental challenges interviewees frequently mentioned are the presence of waste and garbage around their neighborhoods (frequency of 8), proximity to incinerators (7) and pipelines (6), and exposure to lead (9). See Table 2 for all environmental challenges that interviewees mentioned.

**Table 2. Environmental Challenges and Their Respective Frequencies**

Environmental Challenges Mentioned by Interviewees (total number of mentions: 228)				
Air	Water	Land and Food	Pollution Sources	Specific Pollutants
Decreased air quality (21)	Poor water quality (23)	Waste/garbage (8)	Incinerators (7)	Lead (general) (9)
Vehicle traffic (11)	Lead in water (10)	Contaminated soil (7)	Pipelines (6)	Per- and polyfluoroalkyl substances (PFAS) (5)
Truck routes (5)	Water runoff (4)	Noise pollution (5)	Mining operations (6)	Lead paint (4)
Odors (3)	Groundwater quality (4)	Less green space (4)	Oil refineries (5)	Fire retardant/polybrominated biphenyl (PBB) (4)
Vapor intrusion (trichloroethylene (TCE)) (2)	Surface water quality (2)	Changing landscape (2)	Large agricultural operations/concentrated animal feeding operations (CAFOs) (4)	Neurotoxins (3)
Dust (2)	Pharmaceuticals in water supply (1)	Lack of access to the outdoors (2)	Fracking/natural gas operations (4)	Mercury pollution (2)
Poor indoor air quality (1)	Climate change/water-level rise (1)	Increasing impervious surfaces (2)	Steel mills (3)	Petroleum coke (2)
Rail traffic (1)		Heat waves (2)	Chemical plants (3)	Sulfur dioxide (2)
Particulate matter (1)		Transport of toxic materials through residential areas (2)	Cement/asphalt plants (3)	Dichloro-diphenyl-trichloroethane (DDT) (2)
		Lack of access to healthy food (2)	Power plants (3)	Coal ash (1)
		Vibrations (2)	Landfills (2)	Polychlorinated biphenyls (PCBs) (1)
		Commercial fishing impacts on tribal fishing operations (1)	Wastewater treatment plants (2)	Petroleum (1)
		Food contamination (1)	Superfund sites (2)	Microplastics (1)
		Demolitions (1)	Military bases (2)	Nitrogen oxide (1)
			Hazardous waste facilities (1)	
			Salt mines (1)	
			Dry cleaning (1)	
			Tanneries (1)	
			Coal-based facilities (1)	

## 2. Socioeconomic Challenges

The second category of challenges interviewees mentioned is “socioeconomic,” consisting of five subcategories including economic, housing, education, political, and social (see Table 3). While socioeconomic challenges make up their own distinct category, interviewees stressed that these particular challenges can inhibit community members’ ability to address the environmental challenges they experience. For example, interviewees cited difficulty in accessing and affording health care when experiencing impacts from environmental exposure. One interviewee spoke about the intersection of economic and environmental challenges when they said:

*People don’t have access to healthcare services. They don’t have access to the financial wealth that they need to live a more healthy life. Having a clean environment is part of that as well.*

This quote highlights the cumulative nature of challenges across categories. Interviewees mentioned a total of 34 different socioeconomic challenges. The most frequently mentioned socioeconomic challenges were gentrification and poverty, which were mentioned 19 and eight times, respectively. For example, reflecting on how the economic power of their community has changed throughout the years, one interviewee said:

*This was a place in which everyday people could have a high standard of living. You didn’t have to go to college. You could work and earn a living and buy a car and buy a house and raise your family and stuff like that. Now, you see all the people fighting all over the country for living wages and such. We don’t have that anymore.*

Other examples of socioeconomic challenges that interviewees mentioned include unemployment and underemployment (7), lower educational attainment (7), a lack of city services and general disinvestment (5), and racial discrimination (3). See Table 3 for all socioeconomic challenges that interviewees mentioned.

## 3. Health Challenges

The third and final category of challenges interviewees mentioned is “health,” consisting of four subcategories including physical symptoms, physical diseases, psychological symptoms, and psychological disorders (see Table 4). Our results show detailed information about symptoms and diseases community members experience as a result of environmental exposure. Interviewees mentioned a total of 32 health challenges.

Interviewees mentioned asthma and cancer the most frequently—15 and 10 times, respectively. In this category, multiple interviewees spoke to personal losses they attributed to growing up and living in areas affected by environ-

**Table 3. Socioeconomic Challenges and Their Respective Frequencies**

Socioeconomic Challenges Mentioned by Interviewees (total number of mentions: 113)				
Economic	Housing	Education	Political	Social
Poverty (8)	Gentrification (19)	Lower educational attainment (7)	Lack of city services or disinvestment (5)	Racial discrimination (3)
Un-/under-employment (7)	Housing insecurity (5)	Missing school days (1)	Political disenfranchisement (1)	Impacts on cultural or religious practices (3)
Digital divide (5)	Mixed residential and industrial zoning (5)	School-to-prison pipeline (1)		Crime (3)
Lack of health care access (5)	Racial segregation (3)	Inadequate transitions to college and adulthood (1)		Violence (1)
Food insecurity (5)	Lowered housing values (2)			Language barriers (1)
Lack of access to clean water (4)	Blight (1)			Lack of consideration for indigenous cultural artifacts (1)
Energy poverty (3)				Mining in sacred/historical grounds (1)
Water shutoffs (3)				
Lack of economic power (2)				
Agricultural losses (2)				
Damaged water lines and appliances (2)				
Missing work days (1)				
High water prices (1)				
Lack of access to transportation (1)				

**Table 4. Health Challenges and Their Respective Frequencies**

Health Challenges Mentioned by Interviewees (total number of mentions: 106)			
Physical Symptoms	Physical Diseases and Disorders	Psychological Symptoms	Psychological Disorders
Breathing difficulties (4)	Asthma (15)	Hopelessness (9)	Post-traumatic stress disorder (PTSD) (4)
Respiratory effects (4)	Cancer (10)	Increased stress (7)	Pediatric behavioral changes due to exposure to neurotoxins (1)
Hospitalization (3)	Death (4)	Fatigue, burnout (7)	
Nausea from fumes and odors (2)	Disability (3)	Powerlessness (4)	
Headaches (2)	Endocrine disruption (3)	Disheartenment (2)	
Immune system decline (2)	Diabetes (3)	Increased fear (2)	
Musculoskeletal effects (1)	Respiratory illnesses (2)	Frustration (2)	
Eye irritation (1)	Developmental disorders (2)	Sadness (1)	
	Obesity (1)	Sense of urgency (1)	
	Autoimmune disease (1)		
	Cardiovascular disease (1)		
	Organ failure (1)		
	Hearing impairment (1)		

mental injustice. For example, one interviewee described the prevalence of asthma among their peers when they said:

*I played a lot of sports in high school and there would always be somebody who had asthma, there would be three or four people who actually had medication and they would have the inhaler for the team. Things like that . . . I'm starting to make sense as to why.*

A distinct subset of health challenges was categorized as psychological in nature. According to one interviewee, emotional and psychological outcomes receive insufficient attention and are often ignored by government officials. Examples of the psychological symptoms interviewees reported are feelings of hopelessness (9), increased stress (7), and fatigue or burnout (7). Further, many interviewees discussed the emotional ramifications of having gone through illnesses themselves or of having experienced the loss of property or loved ones. For example, one interviewee stated:

*I also think there is a fatigue and a sense of hopelessness on the part of a lot of people that are like “We fought these battles before. I’ve been to your public meetings. I’ve gone to your events and nothing changes” . . . people feel like they are fighting an insurmountable battle.*

All health challenges are listed in Table 4. Our interviewees’ responses reflect the experiences and concerns of residents of impacted communities. The challenges they identified are interconnected and cumulative in nature.

**B. Perceived Benefits of a Screening Tool**

Our second set of results identifies the benefits environmental justice advocates perceive in a Michigan-specific screening tool. When asked about their thoughts on the state of Michigan developing a cumulative impacts assessment tool, 20 interviewees were in favor, 1 interviewee was not interested, and 6 interviewees were not familiar with environmental justice screening tools.

There are five main benefits that interviewees identified to the state in developing a Michigan-specific environmental justice screening tool: that it could (1) define and measure cumulative impacts; (2) provide quantitative, visual evidence of environmental injustice; (3) inform state-level policy and funding decisions; (4) provide access to state-specific data; and (5) define environmental justice communities (see Table 5). Each benefit is discussed in greater detail below.

**Table 5. Perceived Benefits of a Screening Tool Along With Their Respective Frequencies**

Perceived Benefits Mentioned by Interviewees (total number of mentions: 23)	
Benefit	Frequency
Define and measure cumulative impacts	10
Provide quantitative, visual evidence of environmental injustice	5
Inform state-level policy and funding decisions	4
Provide access to state-specific data	3
Define environmental justice communities	1

## 1. Define and Measure Cumulative Impacts

First and most commonly mentioned, a screening tool could measure cumulative impacts better than the advocacy and decisionmaking tools currently available. Interviewees described living through environmental, socioeconomic, and health-related challenges all at the same time, and expressed interest in a tool that better reflects the cumulative nature of their experiences. One interviewee spoke about the cumulative nature of their experience of environmental injustice, and how many factors are encompassed in the broad issue of environmental justice, when they said:

*Well environmental justice encompasses, just, it's intersectional. It's just about every other issue that goes on. It has to do with climate change. It has to do with water quality. It has to do with industrial agriculture. It has to do with how we exploit animals and human labor in the making of our food, growing it, distributing it, even at the restaurants. Environmental justice is about a living wage. It's about children's brains not developing to their full capacity. It is about education . . . and if we don't deal with the whole environment as a whole and adjust this issue as well, we're going to be in pretty sad shape, if we don't kind of reverse some of these things that we're doing today.*

In this quote, the interviewee described challenges ranging from climate change to water quality, to food distribution, to wages and education. Another interviewee addressed the importance of addressing cumulative impacts when they said:

*Cumulative impacts is exactly what we've been trying to argue over the years, because we have multiple different impacts in the community. There's steel plants, there's cement facilities, there's steel recycling facilities, there's a wastewater treatment plant, one of the largest in the nation. All these impacts, plus the trucks and the cars on the bridge impacts, transportation industry, the trains, all that. So cumulative is exactly what we've been arguing for all these years.*

Despite the cumulative nature of these challenges, interviewees described how the tools that government agencies use in decisionmaking processes focus on one challenge or risk at a time. The same interviewee went on to describe the need for tools and information that reflect the cumulative nature of the impacts they live through:

*It's about tools. Okay. This is our major tool that we're using right now, is information. We are compiling all that data right now, and we are trying to show that there is an impact, and families are being burdened by all these pollutants, and you have to do something about it, because the cumulative effect is seriously detrimental. And one chemical reacts with another in a different way, and so you get all these vascular and heart diseases, and asthma, and all these things that we're trying to tabulate and find out what the community's dealing with.*

An environmental justice screening tool that measures and reflects cumulative impacts could help residents of impacted communities and the state government move beyond evaluating pollutants one at a time. An interviewee who works as an advocate for residents of impacted communities spoke in favor of a screening tool for the sake of addressing cumulative impacts when they said:

*I hope it happens. I hear the cumulative impacts question the most from the environmental justice community. When I'm talking with residents about a facility they'll say, "Okay. They're within their permitted limits of ammonia or whatever it is that they're emitting, but what about all the other crap that I'm exposed to in the neighborhood?"*

## 2. Provide Quantitative, Visual Evidence of Environmental Injustice

The second benefit of an environmental justice screening tool is that it would provide quantitative and geospatial evidence that community members experience environmental injustice. Several interviewees expressed that policymakers do not value their stories and firsthand accounts of their experiences in the same way they value quantitative data. About this disconnect, one interviewee said:

*Community members sit down and try to talk and say these are the things that are actually happening, these are the things that need to be discussed, and none of their comments are taken into consideration.*

According to interviewees, having data that measure cumulative impacts and having maps that visualize them would both support their stories and firsthand accounts and carry weight with policymakers. On the importance of having this quantitative data to bring to policymakers, another interviewee said:

*And it's all about the data. You know, from what you're doing. That's what you have to have to make any progress and the way things are handled nowadays. You can't just kind of be like me and have lots of passion and enthusiasm, that's not going to move the city leaders. You need the data to say, well here's what's happening, here's what we can do to fix it.*

Many of our interviewees spoke of “bridging the divide” between data and their experiences. Interviewees explained that they are currently able to tell stories about experiencing cumulative environmental and social impacts, but they do not have the data to document these experiences. Interviewees would find it helpful to have a way to visualize these impacts. One interviewee specifically said:

*I think having this visual piece, as well as the stories, as well as some of the number-crunching. We need to have quantitative and qualitative, and bridge that divide, as well as our urban-rural divide.*



### 3. Inform State-Level Policy and Funding Decisions

The third benefit of developing a state-level environmental justice screening tool is that the state could use it to inform its policy and funding decisionmaking processes. According to interviewees, it is especially important for the state government to incorporate a cumulative impacts screening tool into permitting decisions. One interviewee addressed the importance of the state environmental agency reviewing cumulative impacts in permitting decisions when they said:

*I think cumulative impacts in terms of analyzing those, and having datasets that people can look at and experiment with, is very helpful. I mean, this is the one thing that the community has been saying for so long, because the MDEQ [Michigan Department of Environmental Quality, currently Environment, Great Lakes, and Energy (EGLE)] always looks at one permit, and they always say, “Oh, it’s the law. We can only do this. We can only do that.” But everyone who lives there, they’re not breathing one permit or the other. They’re breathing all the permits together.*

Another interviewee gave specific examples of instances when the state needed to evaluate cumulative impacts instead of one permit at a time when they said:

*And the state. I mean, the state has had problems multiple times now, with the sulfur dioxide first, and now with the nitrogen oxide, where in totality, they don’t meet the Federal Air Quality standards. But no facility is violating the law, because the limits are too high. I think examining things cumulatively would be a lot better, and would end up creating much better environmental equality in the area. I think that this idea of looking permit by permit is important. I mean, it’s the way our law system is set up. But I think it allows people to skirt responsibility, and I think it allows certain interests to have undue influence in the process. You know, just look at DTE and US Steel. They were fighting over who was responsible for sulfur dioxide [emissions] a couple years ago. I think that looking at it holistically is a piece that’s really missing. So understanding those impacts, mapping those impacts . . . that’s, in my opinion, really critical to developing 21st century air quality policy that actually is effective, as opposed to just giving the industries what they want.*

In addition to permitting decisions, interviewees maintained that a screening tool should impact funding distribution decisions. Communities with fewer resources are often the ones that experience disproportionate levels of environmental exposure. The state should use a screening tool to identify these communities and prioritize them when distributing funding. One interviewee spoke to the need for a screening tool to address these resource gaps when they said:

*I think we do need a good screening tool for communities because . . . communities that have less resources are the ones*

*that get the hazardous waste dumps, the exposure through other emissions from companies, contaminated water, and all that. So I think we do need one, I think it’s good.*

### 4. Provide Access to State-Specific Data

Providing access to state-specific data is the fourth benefit of the state developing an environmental justice screening tool. Our interviewees indicated that it would be helpful to have access to data that represent the specific experiences of Michigan residents. Several interviewees mentioned that existing screening tools such as EPA’s EJSCREEN show data at the national level, but do not allow users to “zoom in on” experiences particular to Michigan communities. One interviewee expressed frustration with this limitation of EJSCREEN when they said:

*Well, it [was] just created as more of this kind of national thing and I feel like they don’t have Michigan-specific, very specific things, like facilities, our communities, minority communities. Let me tell you, the South Dearborn community is mostly a Middle Eastern community. We’re a Yemeni American community and they’re classified in social data as white. So when you do minority groups living around toxic sites they don’t count because they’re white and white are not minority. But if you have specialized tools for environmental justice purposes you would capture more of that kind of data than the EPA because it doesn’t capture it . . . I know that California has their own tool that captures more of their specific community than the EPA one.*

Others described a need for a tool that is suited to Michigan’s unique geography. One interviewee said:

*I think it’s a really good idea to do the regional thing instead of just a tool for Milwaukee or Flint, Michigan. You’ve got very nice focused tools on those areas, but I really think this regional approach is needed because of our proximity to the lakes, proximity to really important forests. That is some of the prime forest areas and agriculture of the country and certainly the Great Lakes, in terms of our water.*

### 5. Define Environmental Justice Communities

The fifth benefit that interviewees identified is that a screening tool could help provide a platform to identify and define environmental justice communities in the state. Several interviewees expressed the concern that there is not currently a process to provide evidence that impacted residents live within the boundaries of an environmental justice community. They explained that when advocating against a permit for a new polluting facility in their neighborhoods, or when making a legal case against a permit on behalf of members of community residents, there is no criteria to designate that certain communities are disproportionately impacted. On the importance of identifying environmental justice communities, one interviewee said:

*Yeah. I think it's [a screening tool] very critical. Because it serves as a protection. That's kind of how I see it. It puts certain communities off limits for certain land uses, right? Like certain industry expanding permits. I just think that looking cumulatively is extraordinarily important the way that our policies are designed and some of the research that I was doing around air quality was like, "Oh, all of the criteria pollutants are meeting the thresholds, but you put them all together and it's a toxic soup, right?" So, I think it will create this better understanding of what the impacts actually are. And then from there create a better platform for making decisions and ensuring that communities that are impacted the most are protected. That's how I see it.*

According to our interviewees, an environmental justice screening tool could facilitate a process whereby the state and residents define and visualize environmental justice communities based on cumulative impacts criteria, which could help inform decisionmaking around permitting, funding, and other environmental policy decisions.

Benefits that interviewees perceive are listed along with their frequencies in Table 5 above.

### C. Caveats for Environmental Justice Screening Tools

Our third set of results identifies caveats our interviewees have that must be considered when developing a screening tool. Interviewees identified four caveats: that developing a screening tool (1) requires enactment of strong policy; (2) requires accurate and regularly updated data sets; (3) requires access to Internet and training; and (4) cannot be used to determine causation (see Table 6). Each caveat is described in greater detail below.

**Table 6. Caveats for a Screening Tool Along With Their Respective Frequencies**

Caveats Mentioned by Interviewees (total number of mentions: 15)	
Caveat	Frequency
Requires enactment of strong policy	7
Requires accurate and regularly updated data sets	4
Requires access to Internet and training	3
Cannot be used to determine causation	1

#### 1. Requires Enactment of Strong Policy

Interviewees were clear that developing a screening tool would be useless unless the state also enacts strong environmental justice policy that, when informed by a screening tool, protects communities who are disproportionately impacted. On the need for strong environmental justice policy, one interviewee said:

*I wish that there were more processes available, more tools available, that were expressly about environmental justice, but most of the tools we use are really not environmental justice tools, they are environmental tools and they are civil rights tools and neither of them is expressly about environmental justice, but we use them to advance environmental justice. But until Michigan has a plan or promulgates regulations related to environmental justice then we won't have anything directly on point.*

Another interviewee spoke to this caveat when they said:

*It makes a lot of sense to me that Michigan would take that step [adopting a cumulative impacts tool], especially if there are other state level examples of it. But yeah, there's always the question at the end of the day, you can have the tool in place, but is it going to actually end up influencing policy?*

#### 2. Requires Accurate and Regularly Updated Data Sets

Second, our data show that in order for a screening tool to be useful for community members, the data sets displayed in the tool must be reliable, accurate, and regularly updated. One of our interviewees summed up this caveat when they said:

*You know, at the end of the day, any of these screening tools that I develop, any of this mapping software, is only as good as the data.*

Another interviewee discussed the importance of having reliable, accurate, and updated data sets when they reflected on the Toxics Release Inventory (TRI):

*I think a screening tool is good. It's always as good as the data you'd have to put in it. And I see that with TRI. It's something that exists. It's data that you could go and point to and you can learn what's happening around you. It's an important source of information for communities to know. But by the time you get your hands on it, it's what? It's self-reported, right? Self-reported is so questionable. By the time you can get it publicly available, it's a couple of years old. So even if you can see that there's a problem with this industry and it's emitting too much, that might be old information. It might have already changed. And so there's all of these problems with data when you try to create a tool. I think it's better to have a tool than to not have a tool. But it's really hard to come up with a tool that always works in a way that you want it to achieve your purposes.*

#### 3. Requires Access to Internet and Training

Third, several of our interviewees mentioned that developing a screening tool that benefits impacted communities would only be useful if the state also worked to ensure impacted communities could access the tool and the

information it contains. First and foremost, ensuring a screening tool is accessible requires ensuring community members have access to the Internet. One of our interviewees addressed the importance of Internet access when they said:

*But, what we learned is that in Detroit it's a lot of people that's not on the Internet. So, if the information is going out on the Internet and folks don't have the Internet, how do they get any information? So, that was kind of . . . it's important to have these multi . . . what do you call them . . . ways to get information to people. Because everybody's not on the Internet.*

Further, our interviewees specified that the information in the tool must be presented in the languages spoken across communities in Michigan, including Spanish and Arabic. Finally, when developing a screening tool, the state should also provide training in how to use it. A lack of training is one major barrier that our interviewees raised to using EPA's EJSCREEN tool.

#### 4. Cannot Be Used to Determine Causation

Fourth, our interviewees mentioned that while a screening tool would be useful in quantifying and visualizing cumulative impacts, it would not be able to help community members determine causation of any environmental, social, or health-related impacts they experience. An interviewee spoke to this potential limitation when they said:

*So some of those [health impacts] do wind up being in the day-to-day. As far as people who have the physical outcomes that we think are associated, but of course we don't have any true cause as far as causal criteria.*

Determining the direct cause of environmental, social, and health-related impacts would require a different type of analysis and study. Caveats interviewees shared are listed along with their frequencies in Table 6 above.

### III. Discussion and Conclusion

Through our research, we sought to understand how Michigan environmental justice advocates view state-specific cumulative impacts screening tools. We wanted to learn the salient environmental, socioeconomic, and health-related challenges that environmental justice advocates in Michigan know about, perceive, and experience that should be reflected as indicators in a Michigan-specific environmental justice screening tool. We also wanted to learn how advocates perceive a screening tool in terms of potential benefits and uses as well as caveats. To achieve these objectives, we conducted a qualitative assessment of the environmental justice-related challenges that residents of impacted communities experience in Michigan. We also assessed environmental justice advocates' perceived benefits of and caveats for the development of a Michigan-specific cumulative impacts screening tool.

Our results highlight community members' experience of environmental injustice as an accumulation of environmental, socioeconomic, and health challenges. Our interviewees revealed 63 different environmental challenges across the categories of air, water, land, pollution sources, and specific pollutants, of which poor water quality and decreased air quality were most frequently mentioned, 23 and 21 times respectively. Interviewees also mentioned 34 different socioeconomic challenges in the economic, housing, education, political, and social categories of which gentrification and poverty were most frequently cited, 19 and eight times respectively. They also spoke of 32 health challenges, including physical symptoms, physical diseases, psychological symptoms, and psychological disorders, of which asthma and cancer were most cited, 15 and 10 times respectively. Psychological distress and disorders as a result of experiencing environmental injustice were notable, as they do not often receive attention in discussions around cumulative impacts.

Our results also show that environmental justice advocates in Michigan are in favor of the state developing and using a screening tool. Advocates would find a state-specific screening tool beneficial to measure cumulative impacts, provide evidence of environmental injustice, identify communities that are experiencing environmental injustice, make state-level data accessible, and inform state-level policy and funding decisions.

However, environmental justice advocates identify a few caveats that require further attention to ensure the effectiveness of a screening tool. These caveats are that the state should enact strong state-level policy, regularly update the data, ensure access to Internet and training, and not use the tool to determine causation of impacts.

#### A. Implications

There are four main implications to the findings we outline above. First, residents of impacted communities experience environmental, social, and health-related challenges in a cumulative fashion, and it is important for a screening tool to measure cumulative impacts in order to accurately reflect their experiences. Environmental challenges affect the day-to-day lives of those experiencing environmental injustice at the same time that socioeconomic challenges make it more difficult for residents to cope with these exposures. Health-related challenges make residents of these communities more vulnerable to exposures. Further, we learned that residents experience challenges that are seldom considered when assessing environmental injustice, such as mental health issues like trauma and depression.

Second, soliciting input from the environmental justice community is a crucial component of developing and using a screening tool. The large diversity of challenges interviewees mentioned across three categories shows the importance of utilizing qualitative research to obtain community input that shapes the development of these tools. Many of the challenges our interviewees identified are not currently reflected in existing state screening tools, so a community-level input process also reveals new, additional

data sets that need to be collected. The research process we used for this Comment can serve as a model for soliciting input on state-level environmental justice screening tools.

Third, based on the perceived benefits of and uses for a screening tool that interviewees identified, data gaps within state-level environmental decisionmaking processes can be identified. Members of impacted communities experience environmental injustice as a complex blend of environmental, socioeconomic, and health risks and vulnerabilities, yet find themselves unable to provide quantitative evidence of these experiences. Many states also lack both a clear definition of “environmental justice communities” and a process to direct support and investments to those who are most vulnerable. A state-level screening tool would provide access to state-level data and help address the current gaps in decisionmaking processes.

Fourth, developing a screening tool alone is not enough to address environmental injustice. Our findings point to the need for screening tools to be updated and iterated regularly once developed. In order to be effective, screening tools also need to be accessible, which requires addressing language and Internet barriers. Our findings also highlight a need for training in how to use screening tools once they are developed. Finally, our data emphasize a need for the enactment of strong state-level environmental justice policy in conjunction with the development of screening tools.

## B. Recommendations

Based on the data we collected and analyzed, we present eight recommendations for state governments such as the state of Michigan that should inform the development of an environmental justice screening tool. Though the data we collected and analyzed are specific to Michigan, we believe these recommendations are also relevant to other states considering developing a screening tool.

1. Utilize qualitative data collection methods to ask community members about their environmental justice concerns, and include data on the challenges they identify in the screening tool.
2. Employ a methodology that allows the tool to reflect cumulative environmental, social, and health-related challenges.
3. Use the screening tool to inform policy, funding, and other state-level environmental decisions.
4. Collect data specific to the state to complement data sets collected at the national level.
5. Update the data sets used in the screening tool regularly.

6. Ensure every community in the state has access to the Internet, or disseminate the information in different forms when communities do not have access to the Internet.
7. Provide training and information sessions on how to use the screening tool.
8. Include criteria for defining “environmental justice communities.” Work with impacted communities in deciding these criteria.

## C. Limitations and Future Research

The implications of this study highlight the importance of conducting qualitative environmental justice assessments that help elevate perspectives and needs of impacted communities and incorporate them into tools and decisionmaking processes. This qualitative study could be replicated in other states where there is an interest in developing and using a cumulative impacts assessment tool, and could be repeated regularly as the climate continues to change, new data become available, and new data needs arise.

Future researchers could conduct more targeted qualitative studies to better understand specific impacts, such as mental health challenges, and how residents would like to see mental health challenges included in cumulative impact assessments. Researchers could also target certain demographics of people to seek their specific input. For example, a limitation of this study is that we did not reach the desired proportion of representation from members of Native communities. Future researchers could interview or survey members of Native communities in states such as Michigan to learn their nuanced perspectives on environmental justice screening tools and incorporating cumulative impacts into decisionmaking processes.

Once individual states such as the state of Michigan develop and release a screening tool, it would be helpful for researchers to conduct a qualitative assessment to determine environmental justice advocates’ perceptions of the tool. Such a study could inform improvements and updates to the tool.

Finally, additional research should be conducted to analyze how a screening tool can inform state-level environmental policy decisions in states across the United States. Researchers could examine the approaches of other states that have taken steps to integrate environmental justice considerations in their agencies’ operations.