A GAME CHANGER IN THE MAKING? LESSONS FROM STATES ADVANCING ENVIRONMENTAL JUSTICE THROUGH MAPPING AND CUMULATIVE IMPACT STRATEGIES

by Charles Lee

A true pioneer in the arena of environmental justice, Charles Lee was principal author of the landmark report Toxic Wastes and Race in the United States, *the first national study on the demographics associated with the location of hazardous waste sites, and organized the First National People of Color Environmental Leadership Summit.*

SUMMARY

This Article focuses on lessons learned from state practice in environmental justice (EJ) mapping and screening, and their relationship to the central issue of cumulative impacts—the reality that EJ communities typically suffer from a concentration of pollution sources and negative land uses as well as health and social vulnerabilities. These lessons are based on work in California and the development, use, and impact of the California Environmental Protection Agency's CalEnviroScreen tool; the Article also examines the U.S. EPA's EJSCREEN because of the ways that federal policies, tools, and data influence activities across all states. Five key lessons are discussed: (1) Addressing cumulative impacts is a core strategy for advancing EJ, and this is embodied in EJ mapping tool development; (2) Guiding principles for developing an EJ mapping tool can be articulated; (3) EJ mapping tools can help facilitate resource investment to promote health and sustainability in EJ communities; (4) Emerging EJ mapping efforts provide a useful, straightforward, and replicable model that state and local governments can emulate; and (5) Progress in advancing EJ at the state level, including mapping tool development, has come from the combined efforts of communities, academia, and government.

During the past several years, I have devoted considerable energy to laying the groundwork for advancing environmental justice (EJ) at the state level.[1] State agencies make most of the decisions under both federal and state environmental laws, and activists and pundits alike have argued for a stronger focus on state EJ efforts.[2] States can be robust laboratories for experimenting with ways to advance EJ, to paraphrase U.S. Supreme Court Justice Louis Brandeis' words.[3] Some transformative advances have taken place.[4] It is critical that those of us

Author's Note: The author wishes to thank the many individuals who spearheaded the work described in this Article, as well as those who provided helpful comments. The ideas put forth in this Article are the author's own. They do not represent the views of the U.S. Environmental Protection Agency or any agency in the federal government, and no such representation should be inferred.

1. "Advancing EJ" means realizing principles of EJ (such as fair treatment, meaningful involvement, and the achievement of healthy, equitable, resilient, and sustainable communities) in the ways government programs are carried out, and in the results these programs deliver.

2. Ever since the 1990s, EJ activists, scholars, and policy analysts have advocated for more attention to advancing EJ at the state level. For example, the U.S. Government Accountability Office's 2011 report, *Environmental Justice: EPA Needs to Take Additional Actions to Help Ensure Effective Implementation*, made systematic state engagement one of its five strategic recommendations.

3. Justice Louis Brandeis popularized the phrase "50 laboratories of democracy" in *New State Ice Co. v. Liebmann*, 285 U.S. 262 (1932), to describe how a "state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country."

4. Beside developing CalEnviroScreen, California has passed legislation on the human right to water and on incorporating EJ in general plans, created the Community Air Protection Program, and directed resources to disadvantaged communities through its Greenhouse Gas Reduction Fund, Transformative Climate Communities, and green energy programs. These represent an unprecedented body of work to advance EJ, a summary of which can be found at CHARLES LEE ET AL., CALIFORNIA ENVIRONMENTAL JUSTICE RESOURCES (2019), http://graham.umich.edu/media/files/California-Environmental-Justice-Resources-Aug2019.pdf.

working to advance EJ systematically expand the discourse within all levels of government. Under the federalist system of governance in the United States, lessons from one level can cross-fertilize and inform work at other levels. Critical attention to the role of nongovernmental players in driving transformative change in government is also necessary.

This Article will focus on lessons learned from state practice in EJ mapping and screening, and their relationship to addressing the central issue of cumulative impacts. Identifying appropriate geographic areas of concern has emerged as a recurring issue because it is a practice essential to federal and state environmental programs. A rich history of approaches and applications in this area is beginning to emerge, and I hope to offer useful lessons for EJ practitioners, including advocates, researchers, policymakers, funders and staff from community and advocacy organizations, academia, and government, seeking to advance work in their own states.

These lessons are based on work in California and the development, use, and impact of the California Environmental Protection Agency's (CalEPA's) CalEnviroScreen tool. In addition, I discuss the U.S. Environmental Protection Agency's (EPA's) EJSCREEN because of the ways that federal policies, tools, and data influence activities across all states. A formal definition of "cumulative impacts" is provided later in the Article, but briefly speaking, this concept refers to the reality that communities burdened by EJ issues typically suffer from a concentration of pollution sources and negative land uses as well as health and social vulnerabilities.

Five key lessons are discussed here:

(1) Addressing cumulative impacts is a core strategy for advancing environmental justice, and this is embodied in EJ mapping tool development.

(2) Guiding principles for successfully developing an EJ mapping tool can be articulated.

(3) EJ mapping tools can help facilitate resource investment to promote health and sustainability in environmentally overburdened and disadvantaged communities.

(4) Emerging EJ mapping efforts provide a useful, straightforward, and replicable model that future EJ mapping development at the state and local government levels can emulate.

(5) Progress in advancing EJ at the state level, including EJ mapping tool development, has come from the combined efforts of communities, academia, and government.

Before I discuss each lesson in detail, I will first provide an overarching perspective on why I believe the current discourse on EJ mapping is so important, followed by a summary of CalEnviroScreen and EJSCREEN. In addition, the lessons discussed in this Article inform my suggestion in the conclusion that we may in fact be witnessing the emergence of yet another "true game changer" for advancing EJ in the United States. This term is how I described my landmark *Toxic Wastes and Race* report on the 30th anniversary of its publication.[5]

I. Importance of the Current EJ Mapping Discourse

The current discourse on EJ mapping tools is extremely critical for three reasons. First, identifying and prioritizing environmentally burdened and vulnerable communities is a fundamental first step to integrate EJ in government decisionmaking. For this reason, it was the inaugural topic of EPA's State EJ Training Webinar Series for 2019, a collaborative effort by EPA, CalEPA, and the Minnesota Pollution Control Agency (MPCA).[6] While locating areas of high exposure and vulnerability is a critical and necessary first step, merely identifying them is insufficient. Our imperative is to have this information drive decisionmaking. Prioritizing vulnerable communities for attention, engagement, and resources is a good first use of this information and can yield significant benefits. It is also a gateway to exploring other substantive actions.

There are important lessons here that speak to some core concepts related to the definition of "environmental justice." In her Ph.D. dissertation on state EJ policies, noted EJ activist and scholar Ana Baptista argues that "state policies focus their efforts on distributive injustices through largely rhetorical, procedural strategies that are narrowly constructed within environmental management agencies." Distributive justice refers to the equitable distribution of environmental benefits and burdens. Procedural justice refers to equitable treatment within the decisionmaking process.[7]

Baptista argues for a paradigm shift that goes beyond procedural and distributive justice to address structural justice. Her discussion includes a hard-hitting critique of the systemic nature of how racial discrimination is ingrained within government processes. Baptista describes structural injustice as "deeper forms of structural inequality that require more profound shifts in the way the state addresses economic and environmental problems in poor, minority communities."[8] By effectively integrating EJ mapping into their work, government agencies can finally take substan-

5. *See* Brooks Berndt, *"A True Game Changer": Toxic Wastes and Race 30 Years Later—An Interview With Charles Lee*, POLLINATOR: UNITED CHURCH CHRIST ENVTL. JUST. BLOG (Sept. 8, 2017), https://www.ucc.org/pollinator_an_interview_with_charles_lee.

6. EPAgroups, State EJ Training Webinar—Identifying and Prioritizing Environmentally Impacted and Vulnerable Communities, YOUTUBE (Apr. 16, 2019), https://youtu.be/1gsI4oIEb0U.

7. *See* Robert Kuehn, *A Taxonomy of Environmental Justice*, 30 ELR 10681 (Sept. 2000). Robert Kuehn provides basic definitions for distributive, procedural, corrective, and social justice. The ideas involved in Kuehn's discussion of social justice are related to those in Baptista's discussion of structural justice.

8. *See* Ana Isabel Baptista, Just Policies? A Multiple Case Study of State Environmental Justice Policies (May 2008) (Ph.D. dissertation, Rutgers University), https://rucore.libraries.rutgers.edu/rutgers-lib/24087/PDF/1/play/.

tive steps to go beyond merely conducting enhanced public participation in response to disproportionate impacts.

Second, the EJ mapping discourse holds the potential to more precisely characterize and operationalize the concept of disproportionate impacts. This continues to be a particularly vexing conundrum for EJ practitioners. In 1994, Executive Order No. 12898 introduced the phrase "disproportionately high and adverse environmental and human effects," and called upon every federal agency to identify and address them. But for a variety of reasons, the concept of disproportionate impacts has proven to be notoriously challenging for government decisionmakers to comprehend and operationalize.[9] In fact, most government agencies have avoided using it.

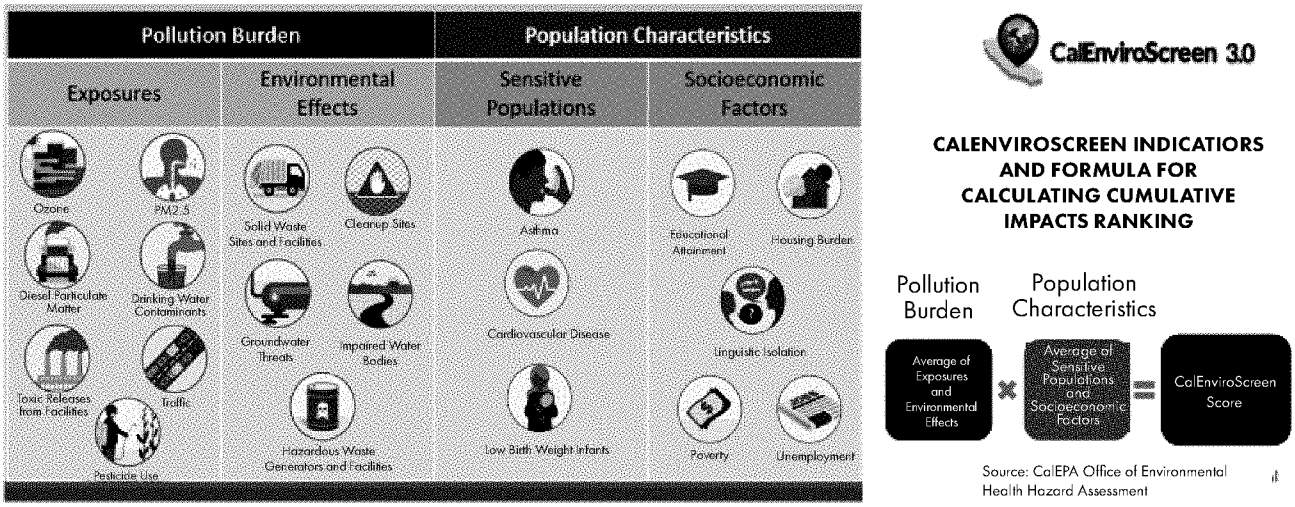
However, EJ mapping tools can now combine data on environmental burdens, demographic, and other vulnerability factors in ways that enable us to directly confront disproportionate impacts in the course of governmental decisionmaking. Once an agency can map cumulative impacts, it is better equipped to characterize, visualize, and operationalize an understanding of disproportionate impacts. Indeed, the concepts of disproportionate impacts and cumulative impacts are closely related. In other words, "disproportionate impacts" refer to a consistent pattern of greater exposure to multiple and cumulative environmental and social stressors falling on the same populations and places—primarily people of color, low-income, or indigenous. An enormous body of literature now provides ample evidence of this condition, and EJ mapping tools enable us to systematically take this reality into account during the course of environmental decisionmaking.[10] Such tools assess cumulative impacts based on relative rankings that empirically identify places that, when compared to others, are disproportionately impacted.

Third, the EJ mapping topic is extremely timely. Many states and others across the country are taking EJSCREEN and CalEnviroScreen methodologies and seeking to apply them. We are now beginning to see efforts in states that are proactively building on the CalEnviroScreen and EJSCREEN methodologies and data, as represented by Washington's Environmental Health Disparities (EHD) Map, Illinois' methodology for identifying environmental justice communities under the Future Energy Jobs Act (FEJA), and others yet to be developed.[11] In addition, there is now an unprecedented thirst for such information, as evidenced by the fact that some 1,500 persons representing government agencies in all 50 states and the District of Columbia were registered for the EPA State EJ Training Webinar Series cited earlier.

II. Summary of CalEnviroScreen and EJSCREEN

Developed by CalEPA's Office of Environmental Health Hazard Assessment (OEHHA) and released in 2013, CalEnviroScreen is a mapping tool that identifies California communities that are most affected by multiple sources of pollution and are most vulnerable due to their health and socioeconomic status. CalEnviroScreen combines 20 indicator data sets categorized into four broad groups—exposures, environmental effects, sensitive populations, and socioeconomic status. These indicators are analyzed

Figure 1. CalEnviroScreen Indicators and Methodology



9. Ryan Holifield, *Environmental Reviews and Case Studies: Accounting for Diversity in Environmental Justice Screening Tools: Toward Multiple Indices of Disproportionate Impact*, 16 Envtl. Prac. 77 (2014), *available at* https://www.tandfonline.com/doi/abs/10.1017/S1466046613000574?journalCode=uevp20.

10. *See, e.g.*, Rachel Morello-Frosch et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 Health Aff. 879 (2011); The Routledge Handbook of Environmental Justice (Ryan Holifield et al. eds., Routledge 2018).

11. *See* Washington State Department of Health, *Washington Environmental Health Disparities Map*, https://www.doh.wa.gov/DataandStatisticalReports/EnvironmentalHealth/WashingtonTrackingNetworkWTN/InformationbyLocation/WashingtonEnvironmentalHealthDisparitiesMap (last visited Jan. 12, 2020). *See also* Illinois Solar for All, *Environmental Justice Communities*, https://www.illinoissfa.com/environmental-justice-communities/ (last visited Jan. 12, 2020).

at a census tract level to produce a combined score that enables relative ranking at all census tract levels across the state. The scoring methodology for computing CalEnviroScreen scores is peer-reviewed.[12] Figure 1 lists the 20 indicators used in CalEnviroScreen 3.0 and provides the formula for its peer-reviewed scoring methodology.

CalEnviroScreen's most important feature is its ability to produce ranking scores of cumulative impacts for every census tract in the state. Though data limitations at the census tract level pose a continuing challenge, this tool now enjoys broad public acceptance from most stakeholder groups, including business and local government. How this came to be is an instructive lesson and will be discussed in detail later in this Article. As an indication of CalEPA's commitment to continuous improvement, CalEnviroScreen is now in its third version.[13] There are many efforts to enhance and fine tune the data and functionalities of CalEnviroScreen through internal CalEPA efforts and external partnerships. For example, San Diego State School of Public Health is conducting research on identifying the most relevant and accurate indicators for use in the United States-Mexico border area.[14]

EJSCREEN, released publicly as a draft in 2015 by EPA and in final form in 2016, is EPA's nationally consistent EJ mapping and screening tool.[15] EPA uses EJSCREEN to identify areas that may be candidates for additional consideration, analysis, or outreach as EPA develops programs, policies, and activities that may affect communities. The core elements of EJSCREEN are 11 environmental indicators[16] and six demographic indicators, as indicated by Figure 2.[17] EJSCREEN provides information at an extremely high resolution (i.e., the census block group level).

EJSCREEN is a web-based tool accessible to all, offering a powerful range of interactive functions. Users can define an area of interest, such as a point, line, buffer, or polygon, and access a wide array of environmental and demographic data as well as the location of sensitive populations like schools, day care centers, hospitals, and public housing projects. A preconfigured report format makes it easy to produce clearly understandable reports. Batch processing can be used to simultaneously analyze large groups of sites.

The tool is housed on EPA's GeoPlatform, which provides access to a huge number of data sets.[18] Data can be imported for use with ArcGIS or other platforms. The availability of user-defined areas is an extremely powerful function. For example, adding this feature to CalEnviroScreen would be the most important step in the future to support its use in local- or regional-level decisionmaking, including zoning, facility siting, and permitting.

Figure 2. EJSCREEN Indicators

Environmental Indicators	Demographic Indicators
❑ PM 2.5	❑ Low-Income
❑ Ozone	❑ Minority
❑ NATA Diesel PM	❑ Less than High School Education
❑ NATA Air Toxics Cancer Risk	❑ Linguistic Isolation
❑ NATA Respiratory Hazard Index	❑ Individuals under Age 5
❑ NATA Neurological Index	❑ Individuals over Age 64
❑ Lead Paint (pre-1960s Housing)	
❑ Traffic Proximity	
❑ Proximity-NPL Sites	
❑ Proximity-RMP Facilities	
❑ Proximity-TSD Facilities	
❑ Proximity-Waste Water Dischargers	

Source: U.S. Environmental Protection Agency

I will conclude this section by outlining three big-picture observations about CalEnviroScreen and EJSCREEN that can get lost in more detailed analyses of these two tools. Numerous articles have compared CalEnviroScreen and EJSCREEN in terms of data and functionality issues.[19] In fact, this is a typical first step for efforts at the state level to develop EJ and cumulative impact mapping tools. While I will not focus on the "nuts and bolts" issues of geospatial tool development and differences in data sets, it is worth noting that CalEnviroScreen does not include race, while EJSCREEN does.[20] Further, CalEnviroScreen includes health data as "population sensitivity" indicators, while EJSCREEN does not.

First, both CalEnviroScreen and EJSCREEN use a combination of environmental and demographic factors. As mentioned earlier, CalEnviroScreen also includes health information. They are examples of a second generation of

12. OEHHA, CalEPA, Cumulative Impacts: Building a Scientific Foundation (2010).
13. *See* OEHHA, *CalEnviroScreen 3.0*, https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30 (last updated June 25, 2018).
14. Penelope Quintana, San Diego State University School of Public Health, Improving the CalEnviroScreen Score at the US-Mexico Border (2019), https://publichealth.sdsu.edu/research/pq01/ (last visited Jan. 12, 2020).
15. *See* U.S. EPA, *EJSCREEN: Environmental Justice Screening and Mapping Tool*, https://www.epa.gov/ejscreen/ (last updated Aug. 2, 2018).
16. PM is the acronym for particulate matter, NATA for national air toxics assessment, NPL for the national priorities list, RMP for risk management plan, and TSD for transport, storage, and disposal.
17. The formula for calculating EJSCREEN's EJ indexes is found at https://www.epa.gov/ejscreen/environmental-justice-indexes-ejscreen (last updated Dec. 2, 2019).
18. The Geospatial Platform (GeoPlatform) is a strategic national resource that supports strategies to enhance transparency, collaboration, and participation. The GeoPlatform provides data, services, and applications for use by federal agencies—and their state, local, tribal, and regional partners and the broader needs of the nation. It acts as a one-stop shop for data associated with federal government web services and applications, with more than 160,000 data sets registered in its data catalog.
19. *See* Lakshika Nishadhi Kuruppuarachchi et al., *A Comparison of Major Environmental Justice Screening and Mapping Tools*, 6 Envtl. Mgmt. & Sustainable Dev. 59 (2017); Aubree Driver et al., *Utilization of the Maryland Environmental Justice Screening Tool: A Bladensburg, Maryland Case Study*, 16 Int'l J. Envtl. Res. & Pub. Health 348 (2019); Laura Grier et al., Assessing the State of Environmental Justice in Michigan (2019), https://seas.umich.edu/sites/all/files/AssessingtheStateofEnvironmentalJusticeinMichigan_344.pdf.
20. *See* CalEPA, California Communities Environmental Health Screening Tool, Version 1.1 (2013 Update), https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreenver11report.pdf. The report reads:

> [CalEnviroScreen 1.1] uses the same methodology as Version 1.0 except that the indicator for race/ethnicity was removed from the calculation of a community's CalEnviroScreen score. This change was made to facilitate the use of the tool by government entities that may be restricted from considering race/ethnicity when making certain decisions. While race and ethnicity will not be used in compiling a score using CalEnviroScreen, a new section has been added that provides information on the racial and ethnic composition of communities throughout the state. This information will help us to better understand the correlation between race/ethnicity and the pollution burdens facing communities in California.

In California, Proposition 209 precludes any resource allocation or making decisions based on race or ethnicity.

EJ mapping and screening tools. Earlier "first-generation" EJ mapping and screening tools, developed between the late 1990s to mid-2000s, focused solely on demographic indicators and were often used as a threshold analysis to trigger some sort of action in the form of greater public participation. These were the original EPA EJ mapping and screening tools, developed by individual EPA regions and the states of Connecticut, Illinois, Massachusetts, New York, and Pennsylvania.[21] The primary feature that distinguishes CalEnviroScreen and EJSCREEN from the first generation of such tools is their inclusion of pollution burden, demographic, and population vulnerability indicators.

Second, data in EJSCREEN is available for all states, and data in CalEnviroScreen pertains only to California. While this is stating the obvious, its implications are significant. EJSCREEN uses only nationally consistent data sets. It is limited in the sense that it will not include data sets that are available only in a given state or of special interest to groups there. CalEnviroScreen includes data sets developed and maintained by California agencies above and beyond what is nationally available. For states with better data sets, this is a positive. However, there is incredible variability across states regarding data availability and quality.

EJSCREEN data can be downloaded and used within a state tool or combined with state or local data on platforms such as ArcGIS. 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. This creates options for approaches states can use to address the need for second-generation EJ mapping.

Third, somewhat different conceptual frameworks guided the development of CalEnviroScreen and EJSCREEN. As will be discussed later, CalEPA explicitly developed CalEnviroScreen as a cumulative impacts tool, building a policy foundation and the scientific justification to do so. EPA developed EJSCREEN to identify areas of concern for EJ that the agency should pay attention to, with more information collection in order to take action.[22] Hence, CalEnviroScreen provides a single (cumulative) ranking score, while EJSCREEN provides a ranking score for each of its 11 individual environmental indicators. However, it should not be overlooked that the concept of cumulative impacts is embedded in EJSCREEN's core design by virtue of its combining environmental and demographic factors. This enables the user to apply the tool in a cumulative manner as well as to adapt it for analyzing cumulative impacts.

Practitioners and researchers are already using its data and indexes to rank communities in a cumulative impacts' manner. Examples are methodologies being developed in Illinois, Maryland, Michigan, and Washington on the state level and the mapping of cumulative burdens on the municipal level in the Chicago, Illinois, and Newark, New Jersey, areas by the Natural Resources Defense Council (NRDC), Little Village Environmental Justice Organization (LVEJO), Southeast Environmental Task Force (SETF), Southeast Side Coalition to Ban Petcoke (SSCBP), and the Ironbound Community Corporation (ICC).[23] I will describe these in greater detail in Lesson 4, below.

One can also look across all the indicators and qualitatively get a sense of the degree of cumulative impacts. This may involve a batch processing protocol that systematically aggregates and compares the number and degree of higher-ranking indexes in an area with those in other areas. For example, one can identify census block groups in EJSCREEN where all or a majority of EJ indexes exceeded a certain threshold. Or this can be done visually, by looking at EJSCREEN maps and their color-coding of census block groups at the 80th, 90th, and 95th percentiles for each EJ index.

For those without the capacity to develop a methodology that combines EJSCREEN indexes in an empirical manner, qualitative methodologies are easy ways to identify the areas of greatest environmental burden and vulnerability that deserve the highest level of attention and resources. Particularly where a qualitative approach is further informed by strong local knowledge, it can support meaningful and effective action. Undoubtedly, both quantitative and qualitative methodologies will become more refined and universally accepted over time and use. This is a very critical point, given the value already attributed to EJSCREEN and its broad use nationally.

III. Lessons for EJ Practitioners

Lesson 1: ***Addressing cumulative impacts is a core strategy for advancing environmental justice, and this is embodied in EJ mapping tools development***

It would be a mistake to view CalEnviroScreen merely as a tool. To fully learn from it, we must understand the strategy behind its development. First and foremost, CalEnviroScreen is the direct result of a bottom-up strategy from EJ community organizations to define cumulative impacts and move public policy to address the issue. Ultimately, it involved actors from academia, the legislature, and government agencies.

The rationale for this strategy was summed up elegantly by Arsenio Mataka, former assistant secretary for environmental justice and tribal affairs at CalEPA when CalEnviroScreen was first released and significantly incorporated into California policies. Mataka, who grew up in the impoverished Central Valley with activist parents, an attorney who is a product of the EJ movement, and perhaps the first of a new generation of young EJ leaders in Califor-

21. Minnesota provides a hybrid approach, which is demographic indicators as a first screen combined with environmental data from various sources.

22. According to EPA, "EJSCREEN was developed by EPA to highlight places that may be candidates for further review, analysis or outreach to support the agency's environmental justice work." U.S. EPA, *Limitations and Caveats in Using EJSCREEN*, https://www.epa.gov/ejscreen/limitations-and-caveats-using-ejscreen (last updated June 9, 2015).

23. *See* Grier et al., *supra* note 19; Driver et al., *supra* note 19; Illinois Solar for All, *supra* note 11; NRDC et al., Seeing the Whole: Using Cumulative Impacts Analysis to Advance Environmental Justice (forthcoming 2020).

nia government, is a role model for young people seeking to make a difference with their own careers:

> When I went with my parents to these local government meetings, whether it was the city council or board of supervisors, they would always get cast aside or ridiculed and told that [what they presented] was just anecdotal information. They would hear it does not have any science base, or we all have it bad here, or you don't have it worse than any of us, and therefore their input was never acknowledged, and the vote was always unanimously against the interest of the community. Fast forward to when I get the privilege of working at the California Environmental Protection Agency. To be quite honest, I wasn't very enthused because I saw that it was an agency that has failed my community and other communities. However, I saw something going on there with respect to cumulative impacts that I could feel passionate about. There was this opportunity because of the groundwork laid by many people, such as community leaders like Diane Takvorian and academics like Manuel Pastor and Rachel Morello-Frosch. *We were somehow driven by the belief that if we could somehow figure out how to quantify the cumulative pollution burden and vulnerabilities in poor communities and communities of color, it would change the course and future of those communities forever.*[24]

Mataka's statement sums up a central tenet of the EJ movement in California, which has spanned several decades of phased development. Community-level actions built power and created models. These led to efforts to influence the political process and secure unprecedented legislation, followed by the implementation of cutting-edge programs. Progress has not been easy. Many challenges were overcome in the face of consistent political opposition. Progress has been the result of leadership from many communities, sometimes in collaboration with public agencies and sometimes in conflict. We will treat these developmental phases together so the reader can see them as a continuum and how they interface and reinforce each other as part of a holistic strategy to address cumulative impacts.

EJ community leaders on CalEPA's EJ Advisory Committee such as Diane Takvorian, along with strong support from local government representatives such as Barbara Lee and Barry Wallerstein, provided the following definition of cumulative impacts, adopted formally by CalEPA in 2005:

> Cumulative impacts 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 socioeconomic factors, where applicable and to the extent data are available.[25]

It is also important to note the critical role of academia in developing cumulative impacts assessment methodology. The prototype for CalEnviroScreen was in fact developed outside of government. Renowned EJ scholars and researchers Manuel Pastor, Rachel Morello-Frosch, and James Sadd developed the Environmental Justice Screening Method (EJSM) in conjunction with community organizations through a community-based participatory research process. The EJSM generates cumulative impact scores that combine hazard proximity, health risks and exposure, social vulnerability, and climate change vulnerability.[26] Academia will be an abiding and critical player in the development and refinement of EJ and cumulative impact mapping tools in virtually all states.

We cannot overlook the important contributions of persons who work in government to advance cumulative impacts assessment and EJ mapping tool development. Shankar Prasad and the late George Alexeeff were two government officials who played key roles in supporting the development of CalEnviroScreen. Prasad provided early support to the EJSM development, including securing resources for initial funding to Pastor to develop the EJSM. He also conceptualized the hypothetical framework known as the "Pollution Burden Matrix" to evaluate cumulative impacts.[27] Subsequently, in a nongovernmental capacity, Prasad spearheaded efforts to pass Senate Bill 535 and codify cumulative impacts in California state law.

Alexeeff, a much-beloved director of OEHHA, advanced cumulative impacts science significantly by providing institutional support and scientific direction for CalEnviroScreen's development as well as energetically promoting the concept. Many others perform scientific analysis, public participation, geographic information system (GIS) tool development, training, and other functions, and advocate for its use internally. As indicated earlier, they are responsible for CalEPA's commitment to continuously improving the science of cumulative impacts and the CalEnviroScreen tool.

Figure 3 provides a time line for CalEnviroScreen's development, as developed by OEHHA and augmented with other milestones related to the items described above. Many of these milestones highlight the critical role of the legislative process in providing impetus for advancing

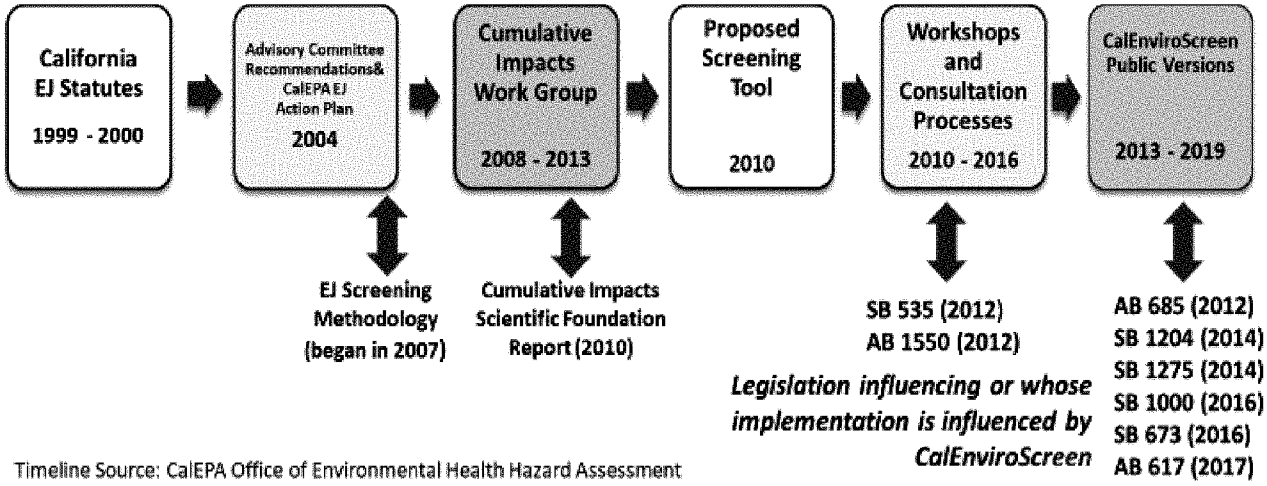
24. Arsenio Mataka, Progress in California and Resistance in Flint, Michigan: Resources for Continuing the Struggle for Environmental Justice, Presentation at the American Public Health Association EJ Town Hall (Nov. 10, 2018) (video available at University of Michigan Graham Sustainability Institute, *EJ and Public Health Leaders Describe Struggle and Progress*, http://graham.umich.edu/ca-env-justice/leaders (last visited Jan. 12, 2020)) (emphasis added).

25. *See* Environmental Health Coalition, *California Environmental Justice Policies*, https://www.environmentalhealth.org/index.php/en/where-we-work/state-of-california/california-environmental-justice (last visited Jan. 12, 2020).

26. James Sadd et al., *Playing It Safe: Assessing Cumulative Impact and Social Vulnerability Through an Environmental Justice Screening Method in the South Coast Air Basin, California*, 8 Int'l J. Envtl. Res. & Pub. Health 1441-59 (2011).

27. The "Pollution Burden Matrix" concept first appeared in the National Environmental Justice Advisory Council's (NEJAC's) 2004 report, *Ensuring Risk Reduction in Communities With Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts*, *available at* https://www.epa.gov/sites/production/files/2015-04/documents/ensuringriskreducationnejac.pdf. Prasad was a member of the NEJAC.

Figure 3. Time Line for CalEnviroScreen's Development and Use

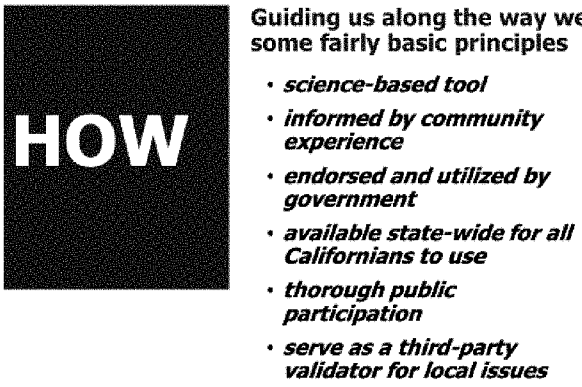


the concept of cumulative impacts and use of CalEnviroScreen, which I will discuss in detail in Lesson 3.

Lesson 2: ***Guiding principles for successfully developing an EJ mapping tool can be articulated***

Mataka provided six guiding principles (see Figure 4) for successfully developing an EJ mapping tool. These may not be all the principles needed, but they are based directly on his working at CalEPA and informed by his own life experiences.

Figure 4. Six Guiding Principles for Developing an EJ Mapping Tool



In words shared during the American Public Health Association EJ Town Hall in San Diego, California, Mataka explained "how we were working from the inside":

(1) We needed something that is ***science-based*** because I saw what my parents went through. When something wasn't science-based, it didn't work because decision makers didn't respond.

(2) It had to be ***informed by community experience*** as communities have been doing this for a much longer time than these agencies. They knew where these communities were at. We just really needed to put the data behind it and there were also academic teams already doing this work and were already well ahead of us at CalEPA.

(3) I wanted ***government to endorse and utilize it.*** This point was very important to me and this is where we struggled a bit. I believe that if my own agency did not endorse it, CalEnviroScreen was going to become another tool that sits somewhere that doesn't see the action that it deserves.

(4) It was important to have it ***available state-wide to everybody*** no matter if you're from the town of Eureka or at the bottom of Imperial County. Everybody like my community should have the chance to know what type of pollution is in their community and how does vulnerability affect the people there.

(5) We sought this information out by doing ***thorough public participation.*** We benefited immensely from the work that the communities had already done.

(6) I was hopeful at least it would ***serve as a third-party validator.*** I want to go back in time to my own folks' stories, who didn't have any universities or any think tanks. They would have had an opportunity to say, "Hey this is not just us saying this. This is the State of California saying this." Maybe that could get the attention they deserved.[28]

As noted earlier, these are by no means the only relevant principles. However, they are the product of a person with the practical experience of working inside government. Indeed, these guiding principles can be a good set of working tenets to build on. They can be an important part of a tool kit for EJ practitioners seeking to develop an EJ mapping tool at the state level.

28. Mataka, *supra* note 24.

Lesson 3: ***EJ mapping tools can help facilitate resource investment to promote health and sustainability in environmentally overburdened and disadvantaged communities***

In 2012, Gov. Jerry Brown signed S.B. 535 into law. This mandated dedicating 25% of the proceeds from the Greenhouse Gas Reduction Fund (GGRF) established under the Global Warming Solutions Act of 2006 to benefit disadvantaged communities. It provided the statutory basis for codifying cumulative impacts and directed CalEPA to develop a methodology for designating these communities. When CalEPA decided to employ CalEnviroScreen to identify these communities, a new arena for considering cumulative impacts in environmental decisionmaking was created.

As mentioned earlier, Prasad left CalEPA in 2008 to pursue his vision of securing legislation that would tie the allocation of resources to the use of a cumulative impacts mapping and screening tool. He believed that resource allocation on a large scale is necessary to bring about change in frontline communities, and that an early stake in the allocation of GGRF proceeds was essential to achieve this goal. It took almost five years of coalition-building and policy debate before state Sen. Kevin de León's bill, S.B. 535, was signed into law. Although many are unaware of the behind-the-scenes work done, Prasad is generally known as the "Father of SB 535."[29]

This mandate requires that 25% of revenues generated under the state's cap-and-trade program be allocated to disadvantaged communities. Subsequent complementary legislation expanded this allocation. Together, these have resulted in billions of dollars being invested in projects that benefit California's disadvantaged communities. Another important milestone for environmental policy involves how the concept of being disadvantaged is defined. Heretofore limited to socioeconomic terms, it now includes environmental factors as a key component. As Cliff Rechtschaffen, environmental advisor to Governor Brown, pointed out, this development was unprecedented.[30]

With S.B. 535 signed into law and CalEnviroScreen designated by CalEPA as the method to identify disadvantaged communities, an important shift in the discourse regarding EJ and CalEnviroScreen took place. Whereas previously the tool was viewed with suspicion in many quarters, such as business and local government, it is now embraced as a way of securing more resources for redressing past environmental and social inequities. Instead of the debate focusing around how to ensure restrictions on the use of CalEnviroScreen to nonregulatory purposes and clarifying that it was not to be used for risk assessment purposes, the debate shifted to why certain disadvantaged areas were not being identified through the tool. This linkage of CalEnviroScreen and cumulative impacts to procuring resources for areas of greatest need has much to do with the current generally positive public acceptance of the tool.[31]

GGRF proceeds total approximately $12.14 billion to date, at least 25% of which is dedicated to disadvantaged communities. Table 1 summarizes where these resources are being devoted by program.[32]

Table 1. California Climate Investments (Appropriations From GGRF, as of October 15, 2019)

Program	Total Appropriations to Date ($M)
Sustainable Communities and Clean Transportation	$9,757
Energy Efficiency and Clean Energy	$506
Supporting Investments	$138
Natural Resources and Waste Diversion	$1,738

In addition to targeting investment from GGRF proceeds to disadvantaged communities, the CalEnviroScreen tool has become embedded into the operation of a number of state programs. These include program planning, incorporation of EJ in California municipalities' development of general plans, CalEPA's EJ Enforcement Task Force, the California Air Resources Board's Community Air Protection Program, and identifying areas of vulnerability for tracking progress in implementing the human right to water. At the end of the day, the measure of success must be a positive impact in communities. One example is the Paradise Creek Apartments in National City, a 201-unit affordable housing complex built on a remediated brownfield that received $9 million from the GGRF to ensure its completion.[33]

There are two key strategic points here: the importance of the legislative process and not overlooking the arena of resource investments. Having EJ incorporated into legisla-

29. *See* Charles Lee, *Asian American Pacific Islander Environmental Leadership for 2040*, 14 AAPI Nexus 130 (2016).

30. While most EJ advocates focus on incorporating socioeconomic considerations in environmental indicators, the inverse can be equally important. *See* University of California, Los Angeles Luskin Center, *Investment Justice Through the Greenhouse Gas Reduction Fund*, https://sb535workshop.wordpress.com/ (last visited Jan. 12, 2020).

31. One should note that S.B. 535 came about in the throes of controversy. It was meant to fill the gap created by A.B. 32's overlooking EJ concerns. Additionally, the issue of emissions trading, otherwise known as cap and trade, was and continues to be a sore point for EJ advocates in climate policy.

32. *See* California Climate Investments, Appropriations From the Greenhouse Gas Reduction Fund (2019), https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/summary-appropriationtable_10-15-19.pdf?_ga=2.253555529.115422816.1578323144-864493257.1444232167 (last visited Jan. 12, 2020). *See also* California Climate Investments, *About California Climate Investments*, http://www.caclimateinvestments.ca.gov/about-cci (last visited Jan. 12, 2020).

33. Diane Takvorian, Presentation at the American Public Health Association EJ Town Hall (Nov. 10, 2018) (video available at University of Michigan Graham Sustainability Institute, *EJ and Public Health Leaders Describe Struggle and Progress*, http://graham.umich.edu/ca-env-justice/leaders (last visited Jan. 12, 2020)). *See also* Press Release, Environmental Health Coalition, Carolina Martinez and Paradise Creek Apartments Receive National Planning Award (Apr. 15, 2019), https://www.environmentalhealth.org/index.php/en/media-center/press-releases/1273-april-15-carolina-martinez-and-paradise-creek-apartments-receive-national-planning-award.

tion in a substantive manner obviously removes a lot of barriers. The story of how this came about in California is told by Pastor in his book *State of Resistance*, which documents California's journey from "despair to hope" in terms of "what moved California from its own abyss to what seems to be an enviable acceptance of the need for diversity, inclusion, and environmental protection."[34]

In addition to EJ advocates looking for opportunities to utilize the legislative process,[35] California saw a generational wave of increased and sustained mobilization for participation in the political process, particularly among Latinos, in response to the regressive attacks in immigration, affirmative action, and other areas during the 1990s. From this wave arose legislators who knew about EJ because they came from districts that were environmentally overburdened. For example, former Secretary of Labor Hilda Solis notes that her own neighborhood, La Puente in Los Angeles County, had the "dubious distinction of having the second largest landfill in the country" and describes the "water contamination, leakage, and the air emissions surrounding the landfill that sat right there as a towering 40-story high monument to civilization."[36] Having specific provisions in statute also did wonders to break down institutional resistance to EJ within agencies.

We cannot overlook the importance of resource investments for advancing EJ. The California and other later examples in this Article show how real progress is being made on the resource allocation front. While much EJ advocacy correctly focuses on regulatory fixes to the permitting and enforcement processes, it is important to recognize that EJ and cumulative impact issues are highly complex societal problems. They are multifaceted in nature and thus require a multifaceted strategy to redress in the journey toward achieving structural justice. Preventing and mitigating environmental harm must be complemented by efforts to secure investments in building healthy, equitable, resilient, and sustainable communities for all people.

With respect to the all-important issue of cumulative impacts in the permitting process, there are two examples of serious public policy advances. First, in 2008, the state of Minnesota amended MPCA's air permitting authority to include the analysis and consideration of "cumulative levels and effects of past and current environmental pollution from all sources on the environment and residents of the geographic area within which the facility's emissions are likely to be deposited."[37] The statute pertains to air permits for a portion of South Minneapolis within Hennepin County that has historic and current EJ issues. Methodologies for assessing cumulative risks and levels have been developed and are being implemented.[38]

The second is S.B. 673 in California. Currently, the California Department of Toxic Substances Control is developing rulemaking and related protocols for considering cumulative impacts in permitting decisions, as outlined in the *Draft SB 673 Cumulative Impacts and Community Vulnerability Draft Regulatory Framework Concepts* document, issued in October 2018.[39] It will be instructive to evaluate the results of both efforts.

Lesson 4: *Emerging EJ mapping efforts provide a useful, straightforward, and replicable model that future EJ mapping development efforts at the state and local government levels can emulate*

Efforts in multiple states are working on second-generation EJ mapping tools. As we distill the key elements of this progress, we will find that there is a set of distinctly common approaches that will prove instructive for future efforts in other states. Two efforts that have made significant progress on a policy level have taken place in Illinois and Washington. While each took place under very different circumstances, they followed a similar trajectory with respect to the core methodological approaches and data. Moreover, efforts in Maryland and Michigan are following the same template.[40] This section will provide important features about these developments and discuss this common methodological thread.

In January 2019, a collaboration consisting of Front and Centered, a coalition of community and advocacy organizations from communities of color, the University of Washington, Puget Sound Clean Air Agency, and the Washington Departments of Health and Ecology released a Washington EHD Map and an accompanying interac-

34. Manuel Pastor, State of Resistance: What California's Dizzying Descent and Remarkable Resurgence Mean for America's Future (2018); Manuel Pastor, *Fighting for Climate Justice in California at the Local Level*, Soc. Sci. Res. Council, Nov. 7, 2017, http://items.ssrc.org/fighting-for-climate-justice-in-california-at-the-local-level/.

35. Roger Kim & Martha Matsuoka, *Building a 21st Century Environmental Movement That Wins: Twenty Years of Environmental Justice Organizing by the Asian Pacific Environmental Network*, 11 AAPI Nexus 139 (2013).

36. Hilda Solis, Talk at the Drum Major Institute (June 27, 2005). Solis is currently the Los Angeles County supervisor and a former U.S. secretary of labor, U.S. representative, and California state senator. She sponsored California's Environmental Justice Act, the first such law in the nation.

37. Interview with Karen Clark, Minnesota State Representative, in Minneapolis, Minn. (Apr. 27, 2017). A three-year community organizing campaign in the East Phillips neighborhood of Minneapolis led Rep. Karen Clark to introduce H.F. 2393. *See* H.F. 2393, 85th Leg. (Minn. 2007), *available at* https://www.revisor.mn.gov/bills/text.php?number=HF3293&version=2&session=ls85&session_year=2008&session_number=0. The community organizing included a collection of maps showing environmental and demographic data layers and manually laying them on top of one another. See the maps collected for legislative debate at https://www.gis.leg.mn/pdf/bills/hf3293.pdf (last visited Jan. 12, 2020).

38. Kristie M. Ellickson et al., *Cumulative Risk Assessment and Environmental Equity in Air Permitting: Interpretation, Methods, Community Participation, and Implementation of a Unique Statute*, 8 Int'l J. Envtl. Res. & Pub. Health 4140-59 (2011), *available at* https://pdfs.semanticscholar.org/64ea/a77f689802f6e81db0e11da3cb9fee39a5b4.pdf?_ga=2.111720900.1957124788.1578585786-1391638390.1551285865.

39. *See* California Department of Toxic Substances Control, *SB 673 Permit Criteria—Community Protection*, https://dtsc.ca.gov/sb-673-permit-criteria-for-community-protection/ (last visited Jan. 12, 2020); California Department of Toxic Substances Control & CalEPA, SB 673 Cumulative Impacts and Community Vulnerability Draft Regulatory Framework Concepts (2018), https://dtsc.ca.gov/wp-content/uploads/sites/31/2015/09/DRAFT-CI-Regulatory-Frameworks-Concepts-10-15-2018.pdf.

40. The North Carolina Department of Environmental Quality (NCDEQ) is currently developing the new Community Mapping System With Environmental Justice Tool. Public input was an important part of the mapping tool's development, with NCDEQ conducting listening sessions throughout the state. A beta version is available at https://deq.nc.gov/outreach-education/environmental-justice/deq-north-carolina-community-mapping-system (last visited Jan. 12, 2020), and NCDEQ envisions an iterative development process. The tool provides access to both demographic and environmental data but does not combine them.

tive web-based mapping tool.[41] The effort was triggered by the desire of Front and Centered to build out climate policies that focus on equitable reinvestment. They learned about CalEnviroScreen from groups such as the California-based Asian Pacific Environmental Network and through consultations with CalEPA's OEHHA. Morello-Frosch mentioned to Front and Centered that a University of Washington professor had worked on CalEnviroScreen.[42]

The resulting two-year effort involved an extensive public engagement process, with 11 listening sessions across the state, Front and Centered leading the work group and community engagement, graduate student Esther Min doing the methodological and data work as part of her Ph.D. project, and institutional support from state agencies. The core methodology employed the CalEnviroScreen's scoring formula and EJSCREEN data.

The link between events in California and Washington is direct and illustrates how advances in one state can spark efforts in another. More important, it demonstrates that the body of work developed in California can be transferable for application in other states. Since its development, Washington has used the EHD tool in several programs, mostly state grants and the Volkswagen settlement.[43] Notably, several legislative efforts have incorporated its use in state programs. In 2019, the Clean Energy Bill (S.B. 5116) required use of the EHD tool in its programs as well as development of a climate effects cumulative impacts tool. In addition, the legislature funded a task force to evaluate and recommend next steps for incorporating EHD tool future actions by state agencies.[44] The Washington State experience underscores the importance of Mataka's third principle: securing the endorsement of government makes it easier to incorporate the tool into other governmental processes. Such incorporation in various statutes will catalyze greater use and spur further analytical development.

In 2016, Illinois passed the FEJA to increase solar energy jobs and renewable development projects across the state. The law included $750 million in low-income programs for solar, solar work force, and energy efficiency.[45] The FEJA also created the Solar for All program and mandated that 25% of its resources be allocated for use in environmental justice communities. The program initiated a public participation process, during which community organizations such as LVEJO provided leadership on thinking behind the methodologies and data for identifying disadvantaged areas. Again, the methodology adopted was use of CalEnviroScreen scoring formula and EJSCREEN data. Notably, a mechanism for self-identification as environmental justice communities was also added.[46]

In discussing the FEJA, Juliana Pino, LVEJO's policy director and a leading voice on EJ issues in the state, talks about the difficulties of introducing the EJ concept to state legislators and regulators and how it is important to advance concepts that will break down resistance and promote understanding. Her thoughts are reminiscent of the events related to the changed political dynamics in California once S.B. 535 was enacted. In Illinois, this is likely to be part and parcel of another EJ concept that is entering the mainstream policy discourse. In Illinois, the idea of just transition is now being applied to ensure that all people, particularly low-income individuals, are not left behind in the transition to a clean energy economy.[47]

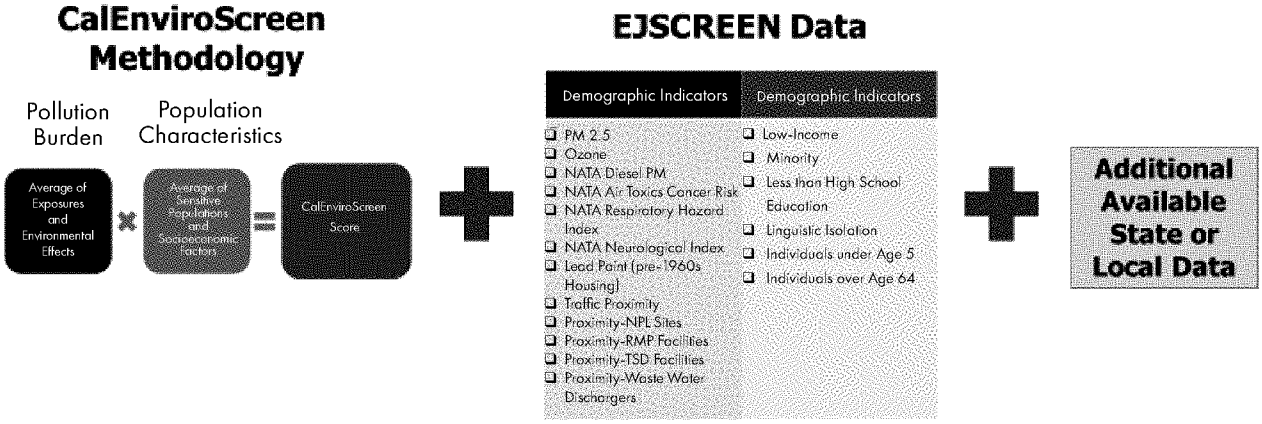
Cumulative impacts has been a long-standing issue for communities and academics in Michigan, as symbolized by advocacy around the heavily polluted 48217 zip code in Southwest Detroit.[48] Paul Mohai, the pioneering EJ academic who organized the first-ever academic symposium on race and environmental hazards at the University of Michigan, has helped to advance EJ mapping and cumulative impact assessment efforts at both EPA and CalEPA.[49] He served on the 2018 Michigan Governor's EJ Work Group, which made developing a cumulative impacts mapping tool a key recommendation.[50]

Mohai's recent University of Michigan graduate students developed a project in support of the Michigan Environmental Justice Coalition and produced the report, *Assessing the State of Environmental Justice in Michigan*. The project relied on extensive community involvement and produced a cumulative impacts mapping tool whose methodology was based on the CalEnviroScreen scoring formula and EJSCREEN data.[51] Given Gov. Gretchen Whitmer's Executive Order focused on EJ, the state is primed to take this work to another level.[52]

University of Maryland students, with support from Profs. Sacoby Wilson and Devon Payne-Sturges, developed the Maryland Environmental Justice Screen Tool (MD

41. Esther Min et al., *The Washington State Environmental Health Disparities Map: Development of a Community-Responsive Cumulative Impacts Assessment Tool*, 16 Int'l J. Envtl. Res. & Pub. Health 4470 (2019), *available at* https://www.mdpi.com/1660-4601/16/22/4470.
42. Telephone Interview with Deric Gruen, Program Director, Front and Centered (Nov. 7, 2019).
43. One element of the settlement of the civil case against Volkswagen Corporation for violations of the Clean Air Act is grants that states provide to projects to reduce nitrogen oxide from heavy-duty diesel sources. *See* U.S. EPA, *Volkswagen Clean Air Act Civil Settlement*, https://www.epa.gov/enforcement/volkswagen-clean-air-act-civil-settlement (last updated Oct. 31, 2019). Settlement information for each state can be found at National Association of Clean Air Agencies, *Volkswagen Settlement Information State and Local Agency Links and Programs*, http://4cleanair.org/Volkswagen_Settlement_Information (last updated Dec. 19, 2019).
44. Communications with Tina Echeverria, Research Investigator, Washington State Department of Health (Nov. 24, 2019).
45. *See* Citizens Utility Board, *Future Energy Jobs Act*, https://www.citizensutilityboard.org/future-energy-jobs-act/ (last visited Jan. 12, 2020).
46. *See* Illinois Solar for All, *supra* note 11.
47. Telephone Interview with Juliana Pino, Policy Director, LVEJO (Oct. 28, 2019).
48. 48217 is known as the most polluted zip code in the state of Michigan. *See* Bill Kubota & Detroit Journalism Cooperative, *Toxic Town: Michigan's Most Polluted Zip Code*, Mich. Radio, June 19, 2017, https://www.michiganradio.org/post/toxic-town-michigans-most-polluted-zip-code.
49. For example, Mohai served on EPA's National Environmental Justice Advisory Council review of EJ screening methodologies and chaired a CalEnviroScreen review panel for CalEPA.
50. *See* Environmental Justice Work Group, Michigan as a Global Leader in Environmental Justice (2018), https://www.michigan.gov/documents/snyder/Environmental_Justice_Work_Group_Report_616102_7.pdf.
51. Grier et al., *supra* note 19.
52. *See* Exec. Order No. 2019-02, Establishing the Department of Environment, Great Lakes, and Energy, and an Interagency Environmental Justice Response Team (2019), https://www.michigan.gov/whitmer/0,9309,7-387-90499_90705-488736--,00.html (last visited Jan. 12, 2020).

Figure 5. Emerging Paradigm Common to EJ Mapping Efforts at State and Local Levels



EJSCREEN) in partnership with the National Center for Smart Growth and the Maryland Environmental Health Network.[53] The tool's envisioned long-term purpose is two-fold. First, it is to highlight areas with EJ issues, areas that need additional investments. Second, it is to be used in permitting, regulatory, zoning, and development decisions. The project emphasizes intensive community involvement, customization to community concerns, and use of local data.[54] The tool is now operational on an ArcGIS online platform, where anyone can access either the Prince George's County or Baltimore-oriented editions of the tool.[55] Once again, the core methodology used was based on the CalEnviroScreen scoring formula and EJSCREEN and local date.

The central lesson from these emerging EJ mapping efforts is that there now exists a useful, straightforward, and replicable model that future EJ mapping development at the state and local government levels can emulate. Simply stated and illustrated in Figure 5, it involves the use of the California definition of cumulative impacts, CalEnviroScreen methodology, and EJSCREEN data in combination with additional available state or local data. The approach is highly elegant and easy to understand. Communities, universities, and/or state agencies in virtually all 50 states can initiate such efforts. In fact, they can provide opportunities for students and young professionals who yearn to make a difference with their lives by making important real-world contributions.

Notably, the use of a cumulative impacts mapping methodology need not be limited to the state level, as evidenced by the project cited earlier that includes NRDC and community partners (LVEJO, SETF, SSCBP, and ICC). NRDC researcher Yukyan Lam emphasizes that asking the question, what would be useful from a community advocacy perspective, is an important point of departure for this project. Its methodology draws on all 17 of EJSCREEN's environmental and demographic indicators and applies a quintile ranking and normalization approach similar to the one used in the early EJSM. The quintile approach proved to be more straightforward for nontechnical audiences to understand but still yielded credible results.

In addition to Chicago, the same methodology was applied in Newark and several other locations. For all these efforts, NRDC had community partners on the ground who verified that the results resonated with their understandings and lived experience.[56] Additionally, it is noteworthy that statutes for addressing cumulative impacts now exist on the local level. For example, the city of Newark passed the first-ever in the nation Environmental Justice and Cumulative Impacts Ordinance in 2016.[57] Advocates have been struggling to ensure implementation of the ordinance and developing a cumulative impacts map and tool for the city seems like a logical next step.[58]

Ironically, as cited earlier, states that made an early commitment to EJ and belong to the first generation of EJ mapping development are now at a disadvantage. They did so when the concept of cumulative impacts did not exist and there were no real frameworks by which to visualize disproportionate impacts. At that time, EJ efforts in the country had not yet developed the capacity to define, articulate, and visualize the concepts of disproportionate impacts or cumulative impacts. Thus, states that pursued a first-generation approach to EJ mapping of using

53. Driver et al., *supra* note 19.

54. *See* Aubree Driver et al., Maryland Environmental Justice Screening Tool (2018), http://publichealthresearch.umd.edu/poster/view/3124 (last visited Jan. 12, 2020).

55. *See* the National Center for Smart Growth EJSCREEN pages for the Prince George's County Tool at http://uofmd.maps.arcgis.com/apps/webappviewer/index.html?id=63dcbfb775d44aa594a17f5ffa257caa (last visited Jan. 12, 2020), and for the Baltimore City Tool at http://uofmd.maps.arcgis.com/apps/webappviewer/index.html?id=69a3b4817a2a472883dd78ceebf0f912 (last visited Jan. 12, 2020).

56. Communications with Yukyan Lam, Staff Scientist, NRDC (Dec. 12, 2019).

57. *See* Newark, N.J., Environmental Justice and Cumulative Impact Ordinance (July 7, 2016), *available at* https://newark.legistar.com/LegislationDetail.aspx?ID=2770971&GUID=D0C566D0-463A-482D-A4AC-78884351DA79&FullText=1 (last visited Jan. 12, 2020).

58. The Newark efforts are part of a larger continuum of efforts to advance EJ and cumulative impacts mapping in the state of New Jersey. EJ advocates there were among the first to advance the concept of cumulative impacts. As a result, the New Jersey Department of Environmental Protection created *A Preliminary Screening Method to Estimate Cumulative Environmental Impact* with the input of EJ stakeholders in 2009, *available at* https://www.nj.gov/dep/ej/docs/ejc_screeningmethods_pp20091222.pdf.

only demographics are now boxed into policies they promulgated that conceive of EJ only in terms of demographic thresholds that trigger public participation versus structural justice. Some attention should be devoted to overcoming this and starting to implement the broader approach described here.

Lesson 5: *Progress in advancing EJ at the state level, including EJ mapping tool development, has come from the combined efforts of communities, academia, and government*

By this point, the final lesson is fairly evident. Many examples illustrate how a combined effort from communities, academia, and government has been essential to the progress made to date. Continued collaboration is absolutely necessary not only for meaningful advances in EJ mapping tools, but in how those tools are applied to address environmental injustice. Much of the experiential knowledge and technical expertise that informs second-generation EJ mapping comes from sources outside government agencies. This is true in all the cases of successful EJ mapping tool development that has fully incorporated a cumulative impacts policy base.

On the other hand, having government endorsement and utilization is critical to the viability and impact of such tools. In some ways, the groundwork laid and the data and GIS tools now available make such EJ mapping efforts easily within reach of a well-constructed partnership of communities and universities pretty much anywhere in the nation. However, such efforts will likely languish on the shelves without putting in the hard work of obtaining government buy-in, endorsement, and utilization.

Government left to itself does not typically undertake or initiate actions to make meaningful advances of a transformative nature. This is true on all levels of government. In California, the concept of cumulative impacts was initially advanced from external nongovernmental sources. It was met with some executive-level support in CalEPA as well as skepticism and resistance to change in other quarters. The unique combination of effective advocacy from outside of government, unswerving dedication to the passage of S.B. 535, and a new generation of leaders inside government who brought their lived experience to the challenge, resulted in the progress to date.

In addition, to move from the historical and routinely practiced risk-based paradigm toward an impacts paradigm is difficult to comprehend in a silo-based policy context. The individuals named in this Article from California, Illinois, Maryland, Michigan, Minnesota, New Jersey, Washington, and the NRDC, as well as EPA, should be commended for their innovative thinking and perseverance in moving this agenda forward in spite of the barriers to change.

This final lesson points to the need for developing the capacity of EJ practitioners to work across sectors, particularly communities, academia, and government. After my many decades of practice, I have concluded that this is not a skill set that comes about organically. Nor is there much attention to proactively cultivating it. I spoke to this issue in my aforementioned remarks on the 30th anniversary of the *Toxic Wastes and Race* report: "If we are to rise to these challenges, we must nurture new generations of EJ leaders—knowledgeable about how to work in both communities and institutions, armed with stellar technical and legal skills, and most important, guided by audacious vision, commitment, and spirit."[59] Commensurate changes in agency policies about how they go about their business, including how to communicate and engage with communities, is also necessary.

IV. Conclusion

Mataka eloquently described CalEnviroScreen's impact by calling it a "policy barrier remover." It has been used in myriad ways to challenge agency assumptions about being unable to systematically devote resources to overburdened communities and to equip communities with data to speak for themselves.[60] CalEnviroScreen has turned out to be a tool that can help advance the structural justice called for by Baptista. As noted earlier, we should see the development of EJ mapping as more than the development of a tool. Indeed, it is part of an entire body of work associated with a strategy to address disproportionate and cumulative impacts.

In the same way that I described *Toxic Wastes and Race* on its 30th anniversary, I believe that we may in fact be witnessing the emergence of yet another "true game changer" on the national level.[61] I cannot overemphasize how significant it is that the emerging paradigm for EJ mapping and cumulative impacts is relatively straightforward to replicate from a technical perspective. Given the availability of a scientifically sound model from CalEnviroScreen and easily accessible data from EJSCREEN, groups in virtually all states and localities have the means to develop their own cumulative impacts map. Just as when hundreds of studies on the demographics of communities associated with environmental hazards have sprouted up after the publication of *Toxic Wastes and Race*, I can see a "thousand flowers blooming" in the area of EJ mapping and cumulative impacts. Of course, such an upsurge will take concerted effort, and I urge all people concerned about environmental justice to help make it happen.

However, we are only beginning to level the playing field. Much work still needs to be done. There are major chapters of the story on EJ mapping and cumulative impacts yet to be written. Two of them are (1) use of EJ mapping tools to address cumulative impacts in land use planning, zoning, and facility siting and permitting; and (2) use by local government and business. Moreover, state and local lessons can be transferred to the federal levels of government. Hence, it will be interesting to see whether the paradigm adopted by state and local government practitioners will inform future iterations of EPA's EJSCREEN. Finally, the cumulative impacts paradigm described in this Article makes it possible to begin filling in the gaps for environmental decisionmaking created by the limitations of traditional risk assessment.

59. Berndt, *supra* note 5.
60. Mataka, *supra* note 24.
61. Berndt, *supra* note 5.

EJ mapping and cumulative impacts is an evolving area of research, policy, and practice. Propelled by the complex challenges of accurately characterizing the multiple and cumulative impacts of environmental, health, and social stressors, both CalEPA and EPA are committed to continuous improvement of CalEnviroScreen and EJSCREEN. Additionally, we will learn from practice in other states and local areas. Some technical and policy challenges include the need to better account for all environmental impacts, such as water and pesticide indicators. For example, EJ mapping tools currently tend to be air-centric due to the more advanced development of environmental indicators in that media. Another important area for continued attention is the role of race/ethnicity in EJ mapping and cumulative impacts tool development, both from a policy perspective and research to better understand the correlation between race/ethnicity and the pollution burdens facing communities.

It is heartening that the lessons highlighted in this Article illustrate how the practice of EJ has matured to a point whereby tested methodologies now exist that can be taught, learned, and replicated. A great example of this is the development of EJ mapping and cumulative impact strategies. In the practice of EJ, we no longer have to rely merely on success stories. As remarkable as they are, they tend to be single "one-off" cases. This is important for developing a pedagogy of EJ, where theory and practice can be systematically deepened.

Ultimately, this Article is a call to action. The reader should realize that nothing described here just fell into place. The highlighted accomplishments resulted from concerted action by committed individuals who persevered to overcome tremendous obstacles. Therefore, the Article is also a celebration of committed people whose actions have resulted in transformative change. In my opinion they offer immense hope, because a process growing out of many decades of work by people from all quarters in many parts of the nation has begun to coalesce into a potentially workable strategy to tackle what is arguably one of the most vexing EJ challenges confronting the nation. Given the urgent challenges of our times for building truly healthy, equitable, resilient, and sustainable communities, all people concerned about EJ should take notice.