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# STRATEGIES FOR ADDRESSING CUMULATIVE IMPACTS IN ENVIRONMENTAL JUSTICE COMMUNITIES



**CUMULATIVE IMPACTS SUBCOMMITTEE  
ENVIRONMENTAL JUSTICE ADVISORY COUNCIL  
to the  
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**MARCH 2009**

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March 2009

Commissioner Mark Mauriello  
401 E. State St.  
P.O. Box 402  
Trenton, NJ 08625-0402

Dear Commissioner Mauriello:

Please find attached a copy of the report entitled **“Strategies for Addressing Cumulative Impacts in Environmental Justice Communities,”** March 2009.

Early in 2007, the Environmental Justice Advisory Council (EJAC) to the Department of Environmental Protection was charged with identifying the most critical and pertinent Environmental Justice issues requiring state action and attention. One issue selected by the Advisory Council was the adverse cumulative impacts of exposure to multiple environmental burdens.

The council recognized that many low-income and people of color communities in New Jersey face significant environmental and health problems as a result of the cumulative impacts of pollution. These populations are often referred to as “Environmental Justice” or “EJ communities.” A subcommittee was established to learn about the issues related to cumulative impacts in EJ communities; learn what other states, communities or academic researchers were working on to understand and mitigate cumulative impacts; and, finally, to recommend a set of actions the state should adopt to address cumulative impacts in New Jersey.

The following report reflects the research and findings of the subcommittee over the course of more than a year. We urge NJDEP, along with your partners in NJDHSS and other state agencies, to consider implementing the recommendations herein to further New Jersey’s efforts to ease the burden faced by communities of color and low-income communities throughout our state. We are delighted that Deputy Commissioner Watson has expressed an interest in the Faber model, which we recommend in this report as a first step in identifying the communities that are most at risk from cumulative exposures; and we look forward to providing a presentation on this model to DEP staff and others in the very near future.

cc: Governor Jon Corzine  
US EPA Administrator, Lisa Jackson  
NJDEP, Deputy Commissioner Jay Watson

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## **EXECUTIVE SUMMARY**

Cumulative impacts of environmental pollution weigh heavily on environmental justice (EJ) communities. Such impacts represent the reality of living in burdened communities where socio-economic, environmental and health factors combine to create deleterious effects on the most vulnerable populations in our state. The Environmental Justice Advisory Council to the New Jersey Department of Environmental Protection (NJDEP) recognized the significance of cumulative impacts and took on the task of making recommendations to the NJDEP to identify and alleviate these burdens. Although the problem of cumulative impacts is highly complex and many issues need further exploration, the Council has adopted a “bias for action” approach. We seek to diminish or prevent harm rather than waiting for the research to be complete. This same approach has also been adopted by the US EPA’s National Environmental Justice Advisory Council.

Over the course of several months, a subcommittee researched the various methods for defining, assessing and addressing cumulative impacts. Subcommittee members interviewed key stakeholders throughout the nation who are leading efforts to address cumulative impacts, including academics, researchers, government officials, and community groups. The subcommittee also hosted a public meeting to gather feedback on proposed recommendations and findings of the subcommittee’s research to date. Some of the subcommittee members researched assessment tools for indicating cumulative burdens as a basis for regulatory and political action by the State. While this report was being completed, the NJDEP also undertook a review of existing policies and mandates related to cumulative impacts around the nation. The results of the State’s review have not yet been released publicly, but it is our hope that this report, together with the NJDEP report, can serve as complementary documents that will guide future agency actions.

The results of our research efforts are reflected in the recommendations delineated in this report. Recommendations are focused on both short and long-term efforts to reduce the cumulative impacts of air pollution through regulatory and permitting processes. We examine how other states, such as California, have made significant strides in controlling cumulative air pollution impacts through regulations.

After extensive review of the literature and in-depth interviews with experts in the field, it was clear that there is no single definitive or comprehensive model for assessing cumulative impacts. However, the committee has been able to identify a practical starting point. We recommend that the Cumulative Impact Reduction process begin in New Jersey by identifying “vulnerable” and “burdened” communities as key “hot spot” areas. For this hot spot identification, we recommend the Faber and Krieg model detailed in our report.

Also, the subcommittee looked carefully at legal mandates that could empower the State of New Jersey to undertake greater efforts to reduce and prevent cumulative impacts. We first looked to existing legal and regulatory authority to implement recommendations immediately. We recognize that relying on existing authority will require State executives to explicitly commit to exercising the State’s authority to intervene on behalf of EJ communities. In an effort to move toward mandatory requirements, we also examine

other possible avenues for implementation in the long-term, such as the creation of new legislation either in the form of a mini-NEPA (modeled after the National Environmental Policy Act) or an Environmental Justice Act.

The recommendations set forth in this report reflect a general consensus that the State should take a “bias for action” approach to addressing cumulative impacts in EJ communities rather than waiting for decades of technical research to be completed before acting in the interest of vulnerable and burdened residents. Within this framework of action, the State should consider multi-media approaches to assessing and mitigating cumulative impacts and employ a multi-agency approach to the problem.

While these recommendations are directed at NJDEP due to our direct charge as an advisory body to the agency, we strongly urge that these recommendations be taken up by multiple agencies in the state in order to fully understand and address the complex problems associated with cumulative impacts. Agencies such as the Department of Health and Senior Services, the Department of Transportation, the Department of Community Affairs, and the Economic Development Authority should coordinate efforts with the NJDEP and the Governor’s Office to identify key action items and resources for EJ communities in their respective agencies. The Governor’s Office should request the appointment of an EJ liaison in each of these agencies to participate in EJ efforts.

## **Key Recommendations**

### **1. IDENTIFY VULNERABLE AND BURDENED COMMUNITIES**

Adopt a modified version of the Faber & Krieg Model of Relative Risk Ranking using data already available to the joint NJDEP/NJDHSS Environmental Health Tracking program. This model is described in the body of this report. (See: “Defining and Identifying Burdened and Vulnerable Populations.”) We strongly urge the NJDEP to adopt this simple, relative risk model that can satisfactorily identify areas in need of relief. As a first step, we will be happy to brief NJDEP, NJDHSS and other interested staff in the model itself and some ways that it can be easily applied in New Jersey.

### **2. ADOPT REQUIREMENTS FOR ADDITIONAL ANALYSIS IN THESE HOT SPOT AREAS**

Scrutinize significant project applications in these hot spot areas to determine their environmental impact, taking into account existing environmental exposures in the impacted neighborhoods. Ultimately, the results of this analysis will inform the actions taken to reduce or eliminate existing impacts (see next recommendation). Screening techniques for this review should be adopted immediately. Soon thereafter, New Jersey leaders should consider establishing a new legislative mandate such as a mini-NEPA (modeled after the National Environmental Policy Act), which requires a comprehensive environmental assessment, including review of cumulative environmental and health impacts and demographics.

### **3. REDUCE OR ELIMINATE EXISTING IMPACTS IN BURDENED OR VULNERABLE NEIGHBORHOODS**

For new and modified sources, require additional controls or pollution prevention for polluting activities that exceed some set threshold or contribute to an existing problem in a burdened or vulnerable neighborhood. In some cases, the NJDEP may even reject a permit application in order to protect the residents of a hot spot neighborhood. For existing sources, enforce the *1991 Pollution Prevention Act*, which sets a toxics use reduction goal of 50%. Target resources from multiple state agencies to reduce burdens in these areas (e.g., enforcement sweeps, public health interventions, site remediation, funding for green space, energy retrofits, etc.).

### **4. REDUCE AIR POLLUTION BURDEN IN THE STATE OVERALL**

Take a statewide approach to reducing pollution--a departure from the typical regulatory case-by-case pollution permit review. Air pollution risks from individual sources in highly impacted EJ areas throughout the State are currently at or near acceptable levels, according to the standard risk management/risk assessment paradigms. Therefore, statewide tightening of key pollutant standards would particularly benefit EJ communities. A priority for EJ communities would be reduction of ultra-fine particulate matter. In addition, the State should set more stringent standards for EJ hot spots under the State Implementation Plan (SIP) for criteria air pollution. A SIP could even require emission reductions regardless of the absolute numerical value of health risk that is implied by these emissions.

### **5. IMPROVE TECHNICAL TOOLS**

While data collection and development of technical tools are resource-intensive activities, it is critical that the NJDEP make a concerted effort to target resources to better understand the most dire environmental conditions on the ground in hot spot areas. Priority must be given to collecting data and developing technical tools that address the most egregious cases of environmental harm in these EJ communities. NJDEP should partner with academic institutions and other state agencies to integrate databases and conduct research focused on cumulative impacts.

### **6. EDUCATE & INVOLVE MUNICIPAL OFFICIALS**

Municipalities and county governments oversee significant land use and development plans, and their decisions can exacerbate cumulative impacts. The NJDEP should work with ANJEC (Association of New Jersey Environmental Commissions) to develop an EJ hot spot tool kit for municipalities (e.g., an Environmental Assessment Worksheet) and provide training for mayors, municipal staff, and volunteer boards. In addition, NJDHSS should train local boards of health in ways to identify EJ hot spots and the effects of cumulative impacts of pollution on residents' health.

### **7. EMPOWER CITIZENS**

While we often hear the call for public participation as an important part of all public decision-making, it rarely takes a meaningful form, particularly in EJ communities. We call on NJDEP to take seriously the integration of resident participation and input into the decision-making process. A key to this effort will be to support the creation of local advisory groups in EJ communities to receive information and engage in discussions of

ongoing environmental decisions with the NJDEP and facility managers. The NJDEP should also institute a requirement for increased public review of proposed projects or permits in hot spot areas.

#### **8. EMPOWER UNION MEMBERS & WORKERS**

Workers employed in toxic facilities/toxic and hazardous jobs are often subjected to high and sustained volumes of pollution, primarily from fugitive air emissions and diesel pollution, and become ill from such exposures. Many of these workers also live in EJ communities. Therefore, the NJDEP must continue to work in cooperation with union officials and non-unionized workers in such facilities to help reduce and eliminate cumulative impacts in the workplace.

#### **9. RECOMMENDATIONS FOR PROGRAMS OUTSIDE OF NJDEP**

While the bulk of these recommendations are directed at NJDEP due to our direct charge as an advisory body to the agency, we strongly urge that other agencies in the state actively participate in efforts to understand and address the complex problems associated with cumulative impacts. Agencies such as the Department of Health and Senior Services, the Department of Transportation, the Department of Community Affairs, and the Economic Development Authority all have an important role to play if we consider the full extent of the issues facing EJ communities. Some specific recommendations include a mandate that each state agency, along with the Governor's Office, dedicate staff to work collaboratively with the NJDEP on tackling EJ issues and cumulative impacts in particular. Each agency should assign personnel that reports to the Governor's liaison and NJDEP on a regular basis with respect to EJ efforts.

## **INTRODUCTION: CUMULATIVE IMPACTS & ENVIRONMENTAL JUSTICE**

The terms "cumulative" and "cumulative effects" are becoming more widely used in environmental impact assessment. The popularity of the concept is understandable as our society comes to recognize that solitary insults to the environment considered in isolation cannot capture the full effect of the problems now before us. But what exactly do we mean by the term "cumulative"?

"Cumulative" means growing by successive additions. This could mean additions over time, additional pollutants, additional sources of pollution, or additional routes of impact. The term could also be used to describe an individual's integrated exposure to pollutants as he or she engages in daily activities and moves through successive micro-environments. This daily activity scenario incorporates all of the above accumulations as well as integration over the space defined by the individual's movements. In popular and even in technical usage, cumulative has been applied to each of these alone, to all of them together, and to various combinations. Often the meaning is clear from the context, but this is not always the case.<sup>1</sup>

U.S. Environmental Protection Agency (EPA) documents define the term "aggregate risk" as the risk from all routes of exposure to a single substance, and the term "cumulative risk" as the risk from all routes of exposure to a group of substances. They are silent on the issue of multiple sources.<sup>2</sup> In order to have a clear and intelligible discussion about cumulative impacts, it is important for the NJDEP to agree on the definition of terms that are used. Appendix A provides some examples from various sources that might be useful. The choice of definition is not as important as assuring that everyone involved in a single conversation are all using a term with the same definition in mind.

In the mid-1990s, the EPA also developed a "Cumulative Exposure Project" that incorporated multiple pollutants, multiple sources, and multiple pathways (air, food and drinking water), but did not directly address duration.<sup>3</sup> However, the EPA has not been able to extend this effort beyond the inhalation pathway which continues to be addressed by the National-Scale Air Toxics Assessment Project.<sup>4</sup>

Whatever the definition, it is clear that multiple environmental stressors have a deleterious impact on public health, particularly in environmental justice communities where the population is highly vulnerable. "Population vulnerability" stems from a variety of social and economic factors, ranging from lack of access to healthcare to

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<sup>1</sup> Pratt, Gregory C. 2000. Cumulative Impact. *Environmental Health Perspectives*. 108(4):A162.  
<http://www.ehponline.org/docs/2000/108-4/correspondence.html>

<sup>2</sup> Ibid

<sup>3</sup> US EPA, Cumulative Exposures Project, <http://www.greenlink.org/assess/pdfs/cumulativeexposure.pdf>

<sup>4</sup> The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing comprehensive evaluation of air toxics in the U.S. EPA developed the NATA in 2002 as a state-of-the-science screening tool that estimates the risk of cancer and other serious health effects from inhaling air toxics. Assessments provide a snapshot of the outdoor air quality and the risks to human health that would result if air toxic emissions levels remained unchanged. For more information on NATA: <http://www.epa.gov/ttn/atw/natamain/>

underlying medical conditions, coupled with excessive and disproportionately large amounts of pollution in the immediate neighborhood. For decades, environmental justice communities have lamented the lack of a more comprehensive approach to and understanding of the multiple pollution burdens they face. While environmental management agencies carve up environmental protection into media-based boxes, residents experience the complex web of environmental pollution across multiple-media over time.

One example where we can see the tremendous economic and societal costs related to cumulative environmental pollution is asthma, a major public health indicator. Asthma has been determined to have significant health, societal, and economic consequences. According to the National Institutes of Health, medical costs and lost productivity associated with asthma cost the national economy about \$15 billion each year. Asthma costs the New Jersey economy about \$450 million each year.<sup>5</sup> We also know that one of the main triggers for asthma is environmental pollution, and that Latino, African-American, and low-income children in urban areas of the state are more likely to have asthma.<sup>6</sup> In addition to asthma, research shows that each year, diesel pollution, which is generally associated with mobile sources of emissions in urban areas, can cause 880 premature deaths, 1,300 non-fatal heart attacks and over 100,000 lost workdays in New Jersey.<sup>7</sup>

Recent environmental health studies have also shown some evidence that individual stressors, such as lack of access to healthcare, and place-based stressors like neighborhood poverty can enhance individual susceptibility to the toxic effects of environmental pollutants.<sup>8</sup> Dr. Morello-Frosch found a significant relationship between PM 2.5 air pollution and low birth weight of babies born to California mothers.<sup>9</sup> This evidence points to the importance of considering socio-economic indicators alongside environmental stressors when assessing the public health impacts of pollution.

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<sup>5</sup> New Jersey DEP, Office of Science, Research and Technology. March 2003. Final Report of the New Jersey Comparative Risk Project, pp.6: <http://www.state.nj.us/dep/dsr/njcrp/other%20stressor%20analyses.pdf>  
US EPA, Office of Children's Health Protection, Fast Facts on Children's Environmental Health.

[http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CEH\\_Fast\\_Facts.htm/\\$file/CEH%20Fast%20Facts.doc](http://yosemite.epa.gov/ochp/ochpweb.nsf/content/CEH_Fast_Facts.htm/$file/CEH%20Fast%20Facts.doc)

<sup>6</sup> NJDEP, Air Toxics Program, Asthma Information: <http://www.state.nj.us/dep/airmon/airtoxics/asthma.htm>

<sup>7</sup> Clean Air Task Force, Diesel Soot Health Impacts, New Jersey:

<http://www.catf.us/projects/diesel/dieselhealth/state.php?site=0&s=34>

<sup>8</sup> Bell et al., 2007. Effect modification by race for association between PM<sub>2.5</sub> and decrease in birth weight among black versus white mothers. *Environmental Health Perspectives (EHP)*; 115(7): 989–995.

Ponce N, Hoggatt K, Wilhelm M, Ritz B. Preterm birth: the interaction of traffic-related air pollution with economic hardship in Los Angeles neighborhoods. *Am J Epidemiol.* 2005;162:140–148.

<sup>9</sup> Morello-Frosch, R., and Shenassa, E.D. 2006. The Environmental "Riskscape" and Social Inequality: Implications for Explaining Maternal and Child Health Disparities. *Environmental Health Perspectives* Volume 114, Number 8.

## **MODELS FOR ASSESSING CUMULATIVE IMPACTS**

Some of the members of the Subcommittee, together with members of the New Jersey Environmental Justice Alliance (NJEJA), researched existing models for assessing cumulative impacts. These models ranged from quantitative risk assessment models to more qualitative methods employed by community groups or researchers. After extensive review of the literature and in-depth interviews with experts in the field listed below, it was clear that there is no one definitive or comprehensive model for assessing cumulative impacts.

The Subcommittee interviewed the following key individuals regarding different models for assessing cumulative impacts.

- Dr. Jason Corburn, University of California, Berkeley, Assistant Professor in the Department of City and Regional Planning
- Dr. Rachel Morello-Frosch, University of California, Berkeley, Associate Professor, Community Health & Human Development
- Dale Shimp, CA Air Resources Board, Manager of the Environmental Justice Section
- Dr. Daniel Faber, Northeastern University, Associate Professor of Sociology and Director of the Green Justice Research Collaborative
- Dr. Shankar Prasad, Cal/EPA, Environmental Justice Coordinator
- Steve Anderson, NJDEP, Office of Policy and Planning & Jerald Fagliano, NJDHSS, Hazardous Site Health Evaluation Program
- Dr. Peter Montague (Environmental Research Foundation) & Dr. Nicky Sheats (Thomas Edison State College), NJ Environmental Justice Alliance

Interviews were conducted over the course of several months via phone and recorded by note takers.

After exploring the existing models and consulting with New Jersey agency officials regarding the availability of New Jersey-based data, we developed a list of available models described below. We recommend that the NJDEP, as a first step in addressing cumulative impacts, adopt a modified version of the Faber & Krieg model utilizing available New Jersey-based data.

The following is a description of some of the key models that were evaluated:

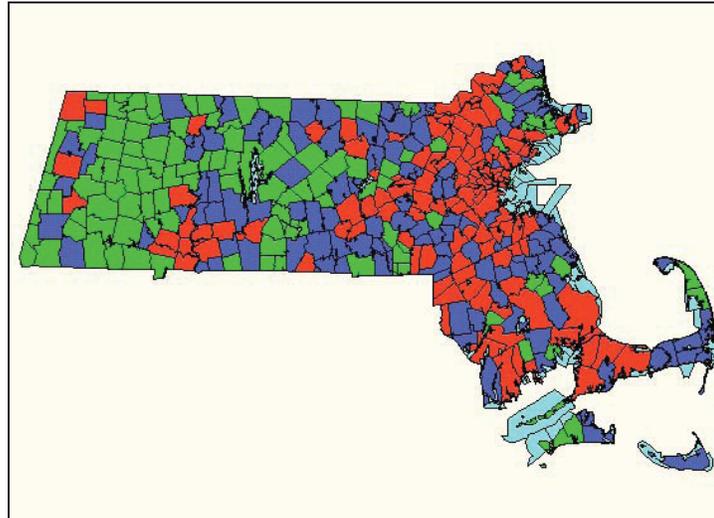
### ○ **Faber & Krieg Model**

Dr. Faber conducted a study of cumulative impacts in all Massachusetts municipalities by combining census data with a variety of environmental data, then tested for and identified both income-based and racially-based biases to the geographic distribution of seventeen different types of environmentally hazardous sites and industrial facilities.<sup>10</sup> He also

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<sup>10</sup> Faber, Daniel R. and Eric J. Krieg, 2002: Unequal Exposure to Ecological Hazards: Environmental Injustices in the Commonwealth of Massachusetts. *Environmental Health Perspectives*, Vol. 110, pages 277-288. Available at: <http://www.ehponline.org/docs/2002/suppl-2/toc.html>

developed a composite measure of cumulative exposure to compare the relative overall risks characteristic of each community. Subsequently, Faber and Krieg developed a point system to rank cumulative exposures from multiple media and sources for every municipality in the state, including smaller neighborhoods within larger cities. The study also controls for the intensity of hazards in each community by accounting for the area across which hazards are distributed.



**FIGURE 1:** MA municipalities ranked by Total Environmental Hazard Points. Areas in red represent highest hazard ratings, blue intermediate levels, and green lowest levels.

### **Pastor, Sadd, and Morello-Frosch – California Collaborative Model**

In 1998, the authors, along with other community partners in southern California, formed an academic-community partnership called “The Southern California Environmental Justice Collaborative” to address environmental justice issues facing communities in the Los Angeles Air Basin. The primary goal of the collaborative was to support research that would elucidate potential patterns of disproportionate exposures to environmental hazards among diverse communities in the region.<sup>11</sup>

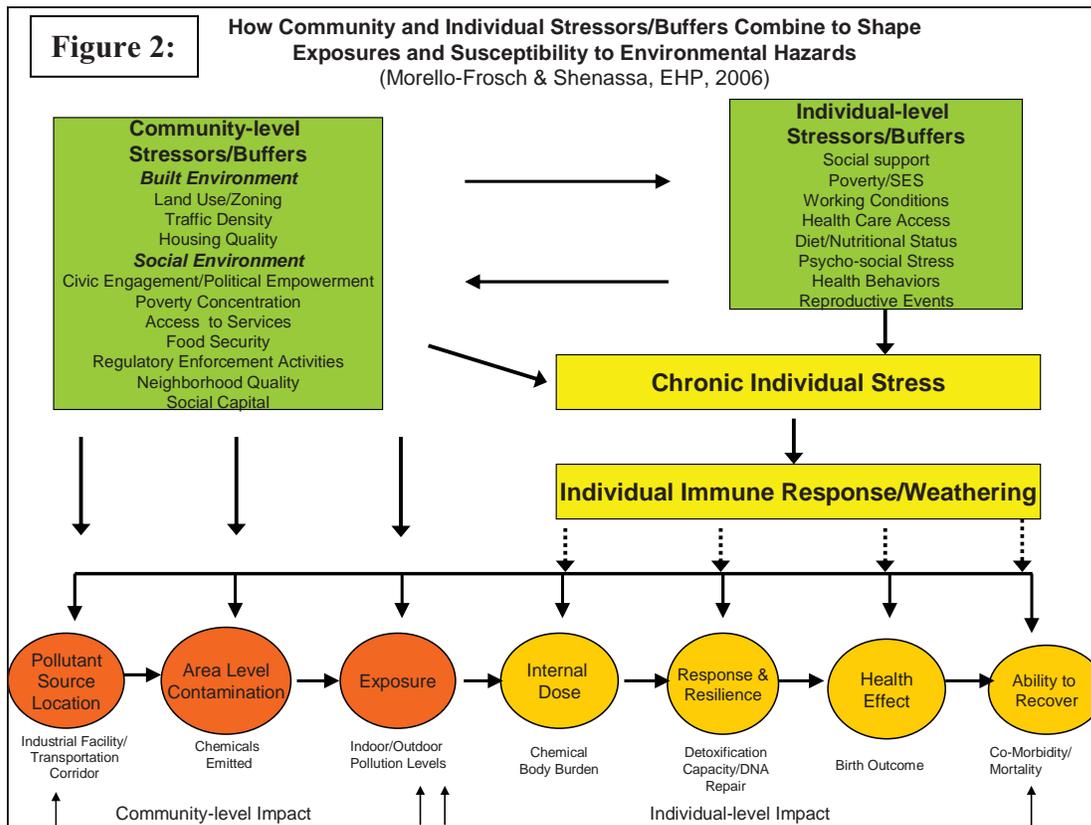
These researchers hypothesized that low-income and people of color groups face more environmental hazard exposures because they are more susceptible to poverty, age, poor nutrition, psycho-social stress, existing disease, etc. These groups are also less able to tolerate adverse exposures; therefore health effects are greater—leading to cumulative impacts and environmental health inequalities. They called this the “triple jeopardy” in which EJ communities are both more burdened environmentally and more susceptible from a socio-economic and health perspective. Below is a diagram illustrating how

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• Faber, Daniel R. and Eric J. Krieg, 2005: Unequal Exposure to Ecological Hazards: Environmental Injustices in the Commonwealth of Massachusetts. Report by the Philanthropy and Environmental Justice Research Project, Northeastern University, Boston.

<sup>11</sup> Morello-Frosch, R., Pastor Jr, M., Porras, C. and Sadd, J. 2002. Environmental Justice and Regional Inequality in Southern California: Implications for Future Research. *Environmental Health Perspectives Supplements*. Volume 110, Number S2

Morello-Frosch and Shenassa combined qualitative and quantitative indicators for assessing cumulative impacts.<sup>12</sup>

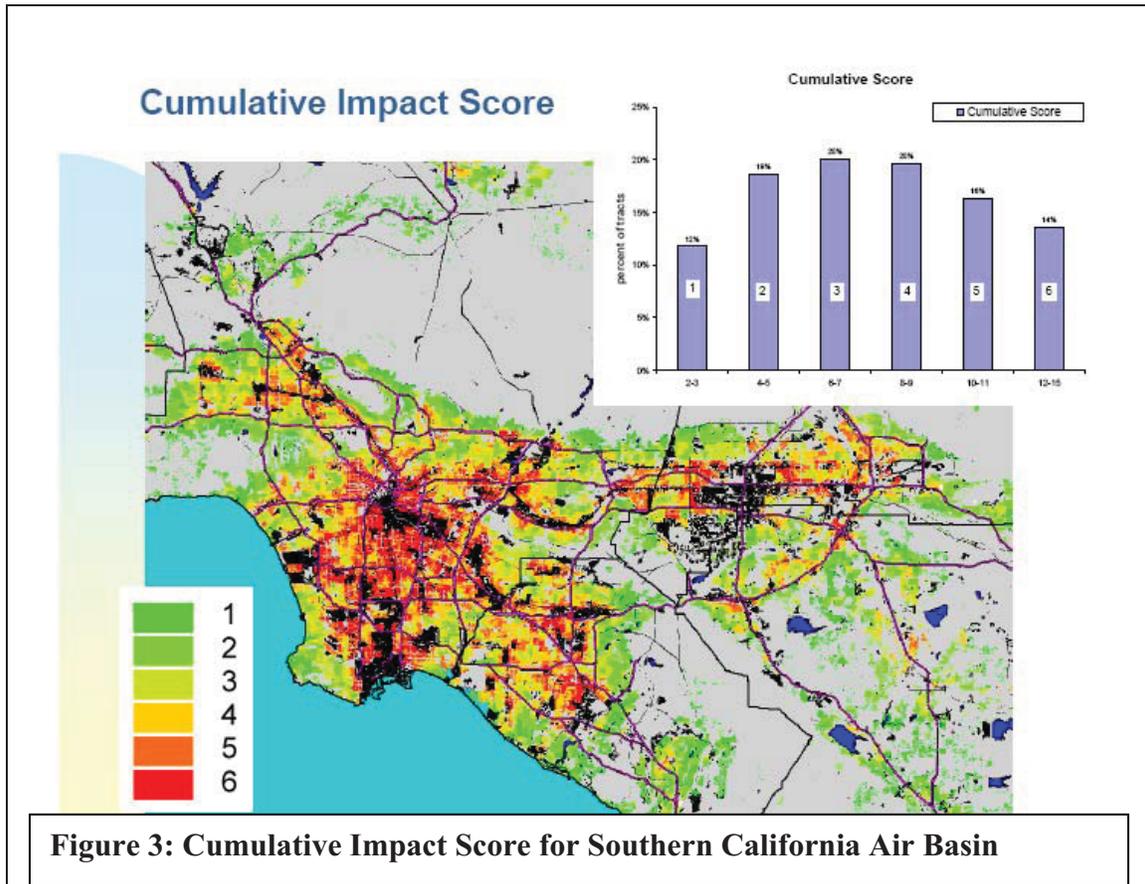


The study combined estimated long-term annual average outdoor concentrations of 148 air toxics, or hazardous air pollutants (HAP concentrations from mobile, industrial manufacturing and small sources were included) with demographic and land use information. They combined modeled concentration estimates with cancer toxicity information to derive estimates of lifetime cancer risks and analyzed their distribution among populations in the region.<sup>13</sup>

These same researchers then went beyond their initial studies of cancer risk to try to come up with a screening tool that would indicate locations and populations that may be of regulatory concern for disparate impacts. The categories of concern and analysis they selected included: (1) Hazard proximity and land use, (2) Health risk measures and, (3) Social Vulnerability (epidemiological literature and social determinants of health). They used this data to create composite maps of two regions, including six air basins where people are exposed in Southern California. They calculated ranked scores for each of the indicators in these three categories on a scale from 1 to 4 and then added them together and ranked into a score ranging from 1 to 6 with 6 representing the highest relative levels

<sup>12</sup> Morello-Frosch, R. and Shenassa, E.D. 2006. The Environmental "Riskscape" and Social Inequality: Implications for Explaining Maternal and Child Health Disparities. *Environmental Health Perspectives* Volume 114, Number 8.

of impact. Below is a map of the Southern California Air Basin that was modeled and ranked. The areas in red represent the areas with the highest cumulative impact scores.<sup>14</sup>



### U .S. EPA Framework for Cumulative Risk Assessment

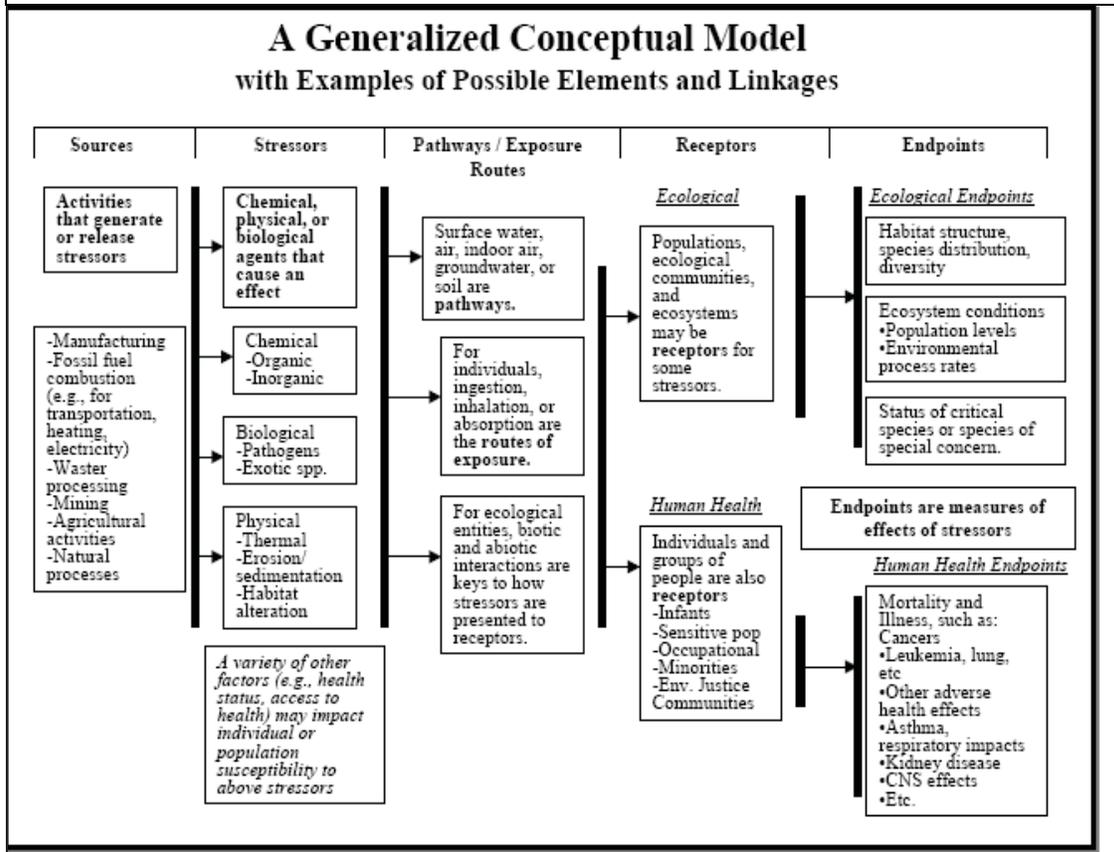
In a first step towards better understanding how to address cumulative effects of pollution, the USEPA developed a report called the “Framework for Cumulative Risk Assessment.”<sup>15</sup> This Framework identifies the basic elements of the cumulative risk assessment process and provides a flexible structure for conducting and evaluating cumulative risk assessment, and for addressing scientific issues related to cumulative risk. This framework has not been mandated or implemented by the USEPA and remains untested but it does at least begin to offer some guidance on how to approach multiple stressors together and also other stressors such as biological, physical, or even cultural, and how they affect cumulative risk. Below is a generic example of the framework’s elements taken from the Framework report.<sup>16</sup>

<sup>14</sup> Presentation by Manuel Pastor to the California Air Resources Board, [http://www.arb.ca.gov/cc/scopingplan/meetings/5\\_28notice/presentations/pastor\\_5\\_28.pdf](http://www.arb.ca.gov/cc/scopingplan/meetings/5_28notice/presentations/pastor_5_28.pdf)

<sup>15</sup> U .S. Environmental Protection Agency, *Framework for Cumulative Risk Assessment*, EPA/630/P-02/001F, Washington, DC, USEPA, May 2003, <http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=54944>

<sup>16</sup> Ibid, pp.26

**Figure 4: A generic conceptual model for cumulative risk assessment, USPEPA**



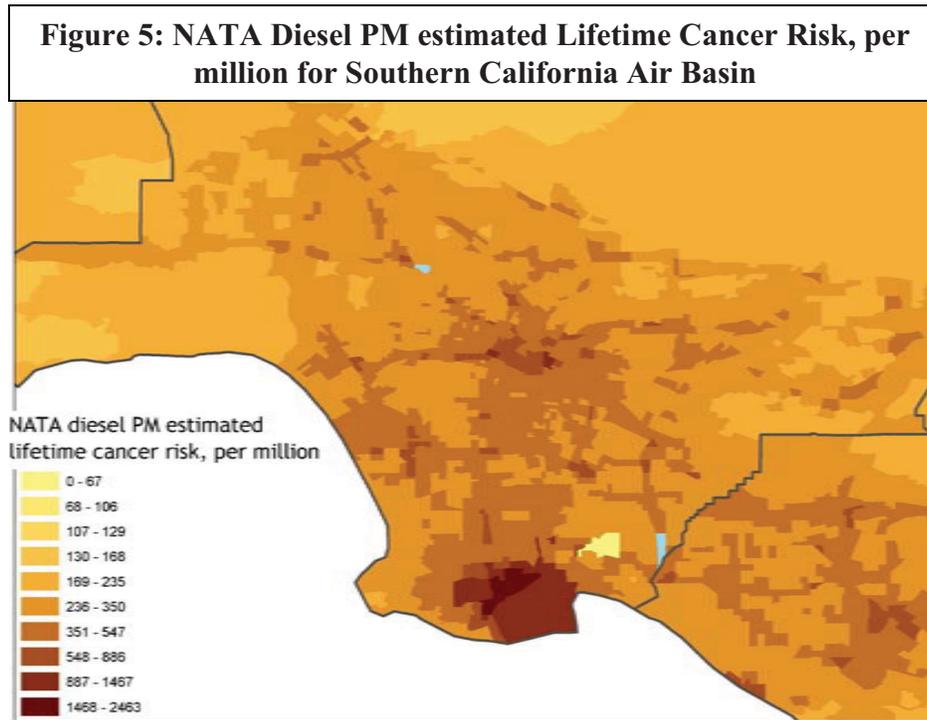
**US EPA the National Air Toxics Assessment (NATA) Model**

The purpose of the national assessment is to identify and prioritize air toxics, emission source types and locations which are of greatest potential concern in terms of contributing to population risk.<sup>17</sup> The NATA model is limited to air toxics data and is based on a dispersion model that estimates long-term annual average outdoor concentrations for 1999 of 32 air toxics and diesel particulates for each census tract in the US. This model includes mobile and stationary emissions sources, including: Manufacturing (e.g. refineries, factories), Non-Manufacturing (e.g. dry cleaners) and Mobile (on-road and off-road). “NATA assessments estimate the risk of cancer and other serious health effects from breathing air toxics. Assessments include estimates of cancer and non-cancer health effects based on chronic exposure from outdoor sources, including assessments of non-cancer health effects for Diesel Particulate Matter (PM). Assessments provide a snapshot of the outdoor air quality and the risks to human health that would result if air toxic emissions levels remained unchanged.”<sup>18</sup> The Figure below illustrates some of the NATA modeling results for the Southern California region, including the

<sup>17</sup> US EPA, Technology Transfer Network Air Toxics Web Site, <http://www.epa.gov/ttn/atw/nata1999/>

<sup>18</sup> US EPA, Technology Transfer Network Air Toxics Web Site, Technology Transfer Network Air Toxics Web Site, <http://www.epa.gov/ttn/atw/natamain/index.html>

City of Los Angeles, which shows on the map as having the highest levels of cancer risk (darkest shading).<sup>19</sup>



### **US EPA –Environmental Justice Strategic Enforcement Assessment Tool**

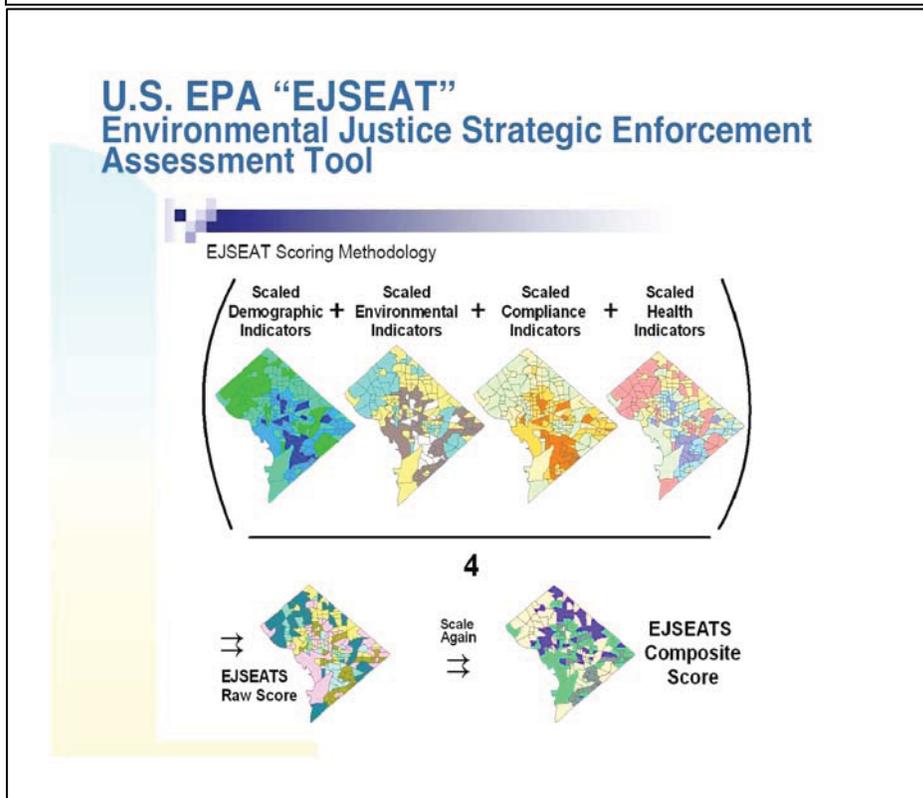
The Environmental Justice Strategic Enforcement Assessment Tool (EJSEAT) is part of a program designed to enable the EPA Office of Enforcement and Compliance Assurance (OECA) to consistently identify areas with potentially disproportionately high and adverse environmental and public health burdens. EJSEAT uses 18 select federally-recognized or managed databases and a simple algorithm to identify such areas.<sup>20</sup> This model assesses four indicator categories: 1) environmental (i.e. NATA cancer risks, PM levels, etc); 2) human health (infant mortality, low birth weight), 3) compliance (inspections, violations, etc); and 4) social demographics (poverty, minorities, etc.) to calculate a total score of burden. The figure on the next page illustrates the type of indicators that are compiled under this program to develop a composite score on a neighborhood level.<sup>21</sup>

<sup>19</sup> Presentation by Rachel Morello-Frosch and Michael Jerrett, June 13, 2008, to the California Office of Environmental Health Hazard Assessment, “Scientific Research Relevant to Cumulative Environmental Impacts”, <http://oehha.ca.gov/ej/pdf/MorelloFroschJerrett061308.pdf>

<sup>20</sup> US EPA, Office of Enforcement and Compliance Assurance (OECA), <http://www.epa.gov/compliance/resources/policies/ej/ej-seat.html>

<sup>21</sup> Presentation by Rachel Morello-Frosch, December 10, 2008, to the California Office of Environmental Health Hazard Assessment, “Examples of Tools: Screening for Cumulative Impacts by Community” ; [http://oehha.ca.gov/ej/pdf/morello2\\_121008.pdf](http://oehha.ca.gov/ej/pdf/morello2_121008.pdf)

**Figure 6: US EPA, EJ SEAT Scoring Methodology illustration**



**California Air Resources Board (CARB) – Wilmington, CA model**

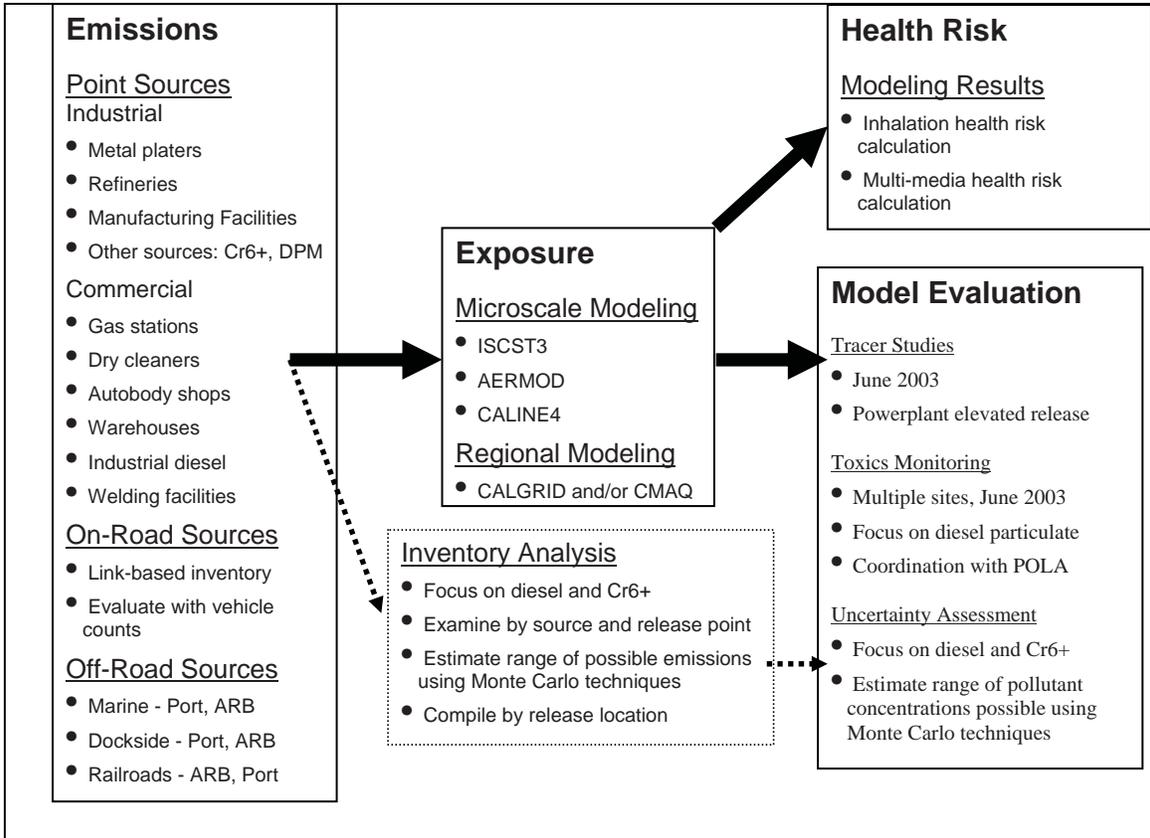
In 2007, the EJ Advisory Council reached out to the California Air Resources Board (CARB) in an attempt to learn about the cutting-edge research this agency had undertaken with respect to cumulative air impacts. Dale Shimp, the Manager for the Environmental Justice Section of CARB, along with some of his colleagues, presented the most up-to-date research their agency had compiled as part of a pilot project underway in Wilmington, CA. The goal of this pilot project was to assess the cumulative impacts of air pollution in the Wilmington area (known as an EJ community) taking into consideration several factors including:

- Combined impacts to a community of receptors - from all types of sources (and ideally all media)
- Stationary and mobile (roadways, off-road) AND regional background
- Can be 1 media (e.g., cumulative air impact assessment)
- Ideally multi-media (combined air, water, waste, etc. sources)

This assessment, while limited to air, was quite extensive in including multiple sources of air pollution at multiple scales using advanced modeling techniques to determine impacts at a fine scale. CARB developed the "Community Evaluation Tool" (COMET), which is a community-level air pollution cumulative risk modeling approach that can estimate cumulative risk at the neighborhood level. This model combines micro-scale modeling for facilities and roadway links; is source-centered by looking at "mini-grids" within census tracts; overlays micro-scale and regional results for air emissions; and estimates

air concentrations and cancer/chronic risk. When completely developed, COMET will be capable of reporting cumulative air pollution emissions, exposure, and cancer risk.

**Figure 7: BASIC COMPONENTS OF THE COMET MODEL (CARB).**



## **DEFINING AND IDENTIFYING BURDENED & VULNERABLE POPULATIONS**

Typically, regulators and risk assessors tend to see cumulative risks and impacts as a set of stressors (risks, impacts, burdens) for which there is a combined valuation. In the environmental risk assessment field, these combined valuations are usually expressed quantitatively. In the environmental impact assessment field, these combined valuations are usually qualitative in nature. However, most members of impacted communities, as well as the larger public, use the term “cumulative risks” or “impacts” to mean a collection of individual stressors that occur simultaneously and multiply.<sup>22</sup>

Using publicly available data, we can define and then identify populations in New Jersey who are (a) disproportionately burdened by pollution, or who are (b) especially vulnerable to harm from pollutants because of their circumstances. This would require seeking data at the smallest geographical scale consistent with data reliability -- preferably the census tract level. Using these two key determinants fits well with the model of cumulative impact assessment set forth by the National Environmental Justice Advisory Council (NEJAC) and the models being piloted in Southern California by researchers such as Morello-Frosch. *“The [USEPA’s] Cumulative Risk Framework is important because, for the first time, it opens the scope of risk assessment to include the environmental, health, social, and cultural factors that are key to understanding community risk. It allows for a focused discussion of multiple sources of physical impact, as well as the social and cultural factors included in the concept of vulnerability.”*<sup>23</sup>

By "vulnerable populations" we mean populations who may be more susceptible to the adverse effects of exposures because they are infants, children, women of childbearing age, elderly, ailing, of low income, or subject to socioeconomic stressors such as occupation, race, ethnicity and other aspects of the "social determinants of health" as defined by the World Health Organization.

By "burdened populations" we mean populations who are disproportionately subjected to multiple stressors (e.g., diesel soot, ground-level ozone, lead, brownfields, pesticides, mold, contaminants in drinking water, and other toxic exposures). The exact delineation of environmental stressors included in this list for New Jersey would be subject to discussion but could begin with those stressors for which there are some available data to draw upon.

To help define “hot spot” areas where vulnerable and burdened populations exist together, we found a useful model proposed by Dr. Daniel Faber of Northeastern University. Dr. Faber essentially selected available state-level environmental, socio-

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<sup>22</sup> A Report Prepared by the National Environmental Justice Advisory Council, Cumulative Risks/Impacts Work Group. December 2004. *Ensuring Risk Reduction in Communities with Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts*. pp26.  
<http://epa.gov/oecaerth/resources/publications/ej/nejac/nejac-cum-risk-rpt-122104.pdf>,

<sup>23</sup> Ibid, pii. The EPA’s formal definition of vulnerability, i.e., susceptibility/sensitivity, differential exposure, differential preparedness, and differential ability to recover, allows an analytical framework to understand how a disadvantaged community may face greater impacts from pollution than the general population. Vulnerability and health disparities are integrally related concepts, and in some ways, health disparities are both an outcome of and a contributor to vulnerability.

economic and health indicators to produce a relative assessment of impacts and vulnerability across the entire state.<sup>24</sup> We suggest that NJDEP adopt a similar hybrid model using both qualitative and quantitative information to begin to assess relative risk rather than a standard risk assessment tool. This would allow the state to make initial determinations about the areas of greatest concern requiring immediate attention with respect to cumulative impacts. The categories of data that could be used to identify areas of concern would include (1) census tracts burdened by pollution, (2) census tracts vulnerable because of health problems, (3) census tracts vulnerable because of social determinants of health, (4) census tracts with limited availability of prevention services, and (5) basic demographic information.<sup>25</sup> (Table 1)

<b>TABLE 1: DATASETS to IDENTIFY AREAS of CONCERN</b>
<b>Category 1: Identifying census tracts burdened by pollution</b>
1.1. Lead in blood of children age 6 or younger
1.2. Resource Conservation & Recovery Act (RCRA) sites
1.3. Toxic Release Inventory (TRI) sites
1.4. U.S. EPA National Priorities List (NPL) sites
1.5. Power Plants
1.6. Treatment, Storage & Disposal Facilities (TSDFs)
1.7. Brownfields
1.8. Known Contaminated Sites
1.9. Municipal Incinerators
1.10. Resource recovery landfills
1.11. Incinerator ash landfills
1.12. Sewer Service Areas
1.13. Dry cleaners
1.14. Sewage treatment plants
1.15. Gasoline stations
1.16. Municipal solid waste landfills
1.17. Trash transfer stations
<b>Category 2: Identifying census tracts vulnerable because of health problems</b>
2.1. Total cancer incidence rate
2.2. Total cancer death rate
2.3. Asthma: hospitalization rate

<sup>24</sup> Faber & Krieg. 2002.

<sup>25</sup> New Jersey Department of Health and Senior Services. 2007. Strategic Plan to Eliminate Health Disparities in New Jersey. [http://www.precaution.org/lib/nj\\_plan\\_to\\_eliminate\\_hd.070322.pdf](http://www.precaution.org/lib/nj_plan_to_eliminate_hd.070322.pdf)

- Environmental Research Foundation. March 1, 2007. *Good Health for All: A Campaign to Prevent and Eliminate Health Disparities*. <http://tinyurl.com/22j5by>
- Montague, P. *Routine Toxic Exposures in New Jersey*. Environmental Research Foundation. [http://www.precaution.org/lib/toxic\\_exposures.doc](http://www.precaution.org/lib/toxic_exposures.doc)
- World Health Organization. 2003. *Social Determinants of Health*. 2<sup>nd</sup> Ed. Edited by Richard Wilkinson and Michael Marmot. [http://www.precaution.org/lib/sdoh\\_solid\\_facts\\_2nd\\_edn.030601.pdf](http://www.precaution.org/lib/sdoh_solid_facts_2nd_edn.030601.pdf)

2.4. Asthma: emergency department visits
2.5. Chronic lower respiratory disease
2.6. Carbon monoxide poisonings
2.7. All-cause mortality rate
2.8. Coronary heart disease rate
2.9. Low birth weight rate
2.10. Infant mortality rate
2.11. Birth defect rate
2.12. Some measure of violence/crime
<b>Category 3: Identifying census tracts vulnerable because of social determinants of health</b>
3.1. Age of housing
3.2. Proportion of population who are children
3.3. Proportion of population over age 60
3.4. Poverty rate
3.5. Median family income
3.6. Racial and ethnic composition of population
3.6. Unemployment rate
3.7. Some measure of parks/recreational space
<b>Category 4: Availability of prevention services</b>
4.1. Childhood lead screening rate
4.2. Other?
<b>Category 5: Basic information</b>
5.1. Total population of census tract
5.2. Size (area) of census tract

## **LEGAL AND REGULATORY TOOLS**

Statutory, regulatory, and programmatic fragmentation inherent in environmental protection regimes undermines a unified approach towards addressing cumulative impacts and presents major obstacles to positive action in highly impacted communities.<sup>26</sup> In preparing this report, we called on several legal experts familiar with environmental justice issues to consider existing and potential future legislative and regulatory mandates that could address cumulative impacts. The following reflects their preliminary review of the issues and some possible recommendations.

Currently there are no definitive legal mandates to assess cumulative impacts of pollution from multiple sources in New Jersey. Even examining air quality alone, there are no current mechanisms in place to regulate multiple air pollution sources (stationary, mobile, etc.) in any geographic area in combination. While we believe that the NJDEP, in fact, has the legal authority and discretion to implement many of the regulatory recommendations put forth in this report, the addition of stronger, more explicit laws and regulations targeting cumulative impacts in EJ communities would strengthen the state's mandate.

There are existing federal authorities that may be used to address cumulative impacts, e.g. the *Resource Conservation and Recovery Act (RCRA)*. When construing the nature of the RCRA permitting authorities, the EPA Environmental Appeals Board found “... *that when the Region has a basis to believe that operation of the facility may have a disproportionate impact on a minority or low-income segment of the affected community, the Region should, as a matter of policy, exercise its discretion to assure early and ongoing opportunities for public involvement in the permitting process.*”<sup>27</sup> The Board also found that RCRA allows the Agency to take “... *a more refined look at its health and environmental impacts assessment in light of allegations that operation of the facility would have a disproportionately adverse effect on the health or environment of low-income or minority populations.*”

Section 404 of the federal *Clean Water Act* has comparable discretionary authority to consider disproportionate burdens on people of color and low-income communities. The Army Corps of Engineers must conduct a broad “public interest review” that includes, “...*among other things, aesthetics, general environmental concerns, safety, and the needs and welfare of the people.*” The Clean Air Act’s Title V operating permits are similarly broad, including “*such other conditions as are necessary to assure compliance with applicable requirements of this chapter.*”

According to NEJAC, “There is no one statute providing the ‘silver bullet’ that can be applied to all sources of pollution in communities with environmental justice issues.” Thus there remain significant challenges to the rigorous and full implementation of these broad powers. The NEJAC report, for example, points out that although RCRA and the Clean Air Act (CAA) give broad discretion to states to do what is “necessary” to protect

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<sup>26</sup> NEJAC, Cumulative Risks/Impacts Work Group. December 2004. pp27

<http://epa.gov/oecaerth/resources/publications/ej/nejac/nejac-cum-risk-rpt-122104.pdf>

<sup>27</sup> Ibid, pp.46

health and the environment, the programs that turn that discretion into action are limited in terms of the sources subject to their jurisdiction, the time frames for amending permits, and in many cases, the size of the sources agencies have authority to regulate.

The federal *Toxic Substances Control Act* (TSCA) can require evaluation of cumulative impacts as part of pre-manufacture notices, but this requirement is prospective and does not cover existing risks. Existing risks can be addressed under TSCA's testing authority, but as a practical matter this testing provision has focused on a defined universe of common and toxic chemicals; chemicals added to the agenda will not be evaluated in the short term. The federal *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) and the Clean Air Act have "imminent and substantial endangerment" provisions, but both EPA and the states have construed these terms to apply to serious, current emergencies that would not capture emissions with long-term, cumulative impact.<sup>28</sup>

Passing a legislative mandate with explicit provisions for investigating and regulating cumulative impacts would strengthen the State's authority over this complex issue and give agencies like NJDEP and DHSS greater flexibility to explore mechanisms for tackling cumulative impacts. Such a law should include provisions for identifying vulnerable and burdened populations. This analysis would then trigger other regulatory measures in these hot spot areas.

### *Legislative Options*

1. Enact a mini-NEPA This would be patterned after the National Environmental Policy Act (NEPA) process which requires federal agencies to consider the environmental impacts of their proposed actions and reasonable alternatives to those actions. This evaluation generally takes the form of an Environmental Impacts Assessment along with an extensive public participation process.<sup>29</sup> This comprehensive environmental assessment should include a review of cumulative environmental and health impacts as well as socioeconomic data of the effected populations. Most states have long since adopted some form of a mini-NEPA which allows the state to conduct more stringent analysis of permits, including cumulative impacts. More than half of all the states require their own environmental impact statements before they will issue major permits including New York, Connecticut and Massachusetts. California, for example, requires an environmental impact statement for both public and private projects that require major state permits. This process, while not a comprehensive solution to tackling cumulative impacts, will give New Jersey some useful tools to begin to examine the question of cumulative impacts for major permitted projects.
2. Enact an Environmental Justice Act which mandates the assessment of cumulative impacts along with other strategies to address environmental injustices.
3. Utilize existing regulatory tools to expand the role of cumulative impact assessments.

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<sup>28</sup> Bernstein, T. Nov. 2001, Environmental Law Institute. *Opportunities for Advancing Environmental Justice: An Analysis of U.S. EPA Statutory Authorities*. [http://www.elistore.org/reports\\_detail.asp?ID=41](http://www.elistore.org/reports_detail.asp?ID=41)

<sup>29</sup> US EPA. Compliance and Enforcement Home. National Environmental Policy Act Home. FAQs. [www.epa.gov/Compliance/resources/faqs/nepa/index.html](http://www.epa.gov/Compliance/resources/faqs/nepa/index.html)

## **RECOMMENDATIONS**

The following recommendations reflect a “bias for action” which calls on government to take a proactive approach in addressing potential harm before all of the science behind cumulative impacts is complete. The harm facing environmental justice communities from cumulative impacts necessitates an immediate and urgent call for action from a myriad of government agencies using a diverse set of tools. The problem requires that the NJDEP, in particular, break from the standard, single-media approach to pollution. Instead, the NJDEP should adopt a multi-media, multi-pronged approach that emphasizes precaution, utilizes existing regulatory tools, and looks to expand and experiment with new ways to understand and address cumulative impacts.

The first critical component of tackling this work is to find a methodology or tool by which to identify and assess cumulative impacts. This report recommends that the agency integrate the concepts of “vulnerable” and “burdened” communities in this initial step. Once these vulnerable and burdened communities (which are sometimes referred to as “hot spots”) are identified, new and modified sources in these areas should be subject to additional analysis; and, when their impacts exceed some quantitative or qualitative benchmark, additional actions should be taken to reduce those impacts. In some cases, the lead agency might actually deny the permit. Existing sources in these hot spot communities should also be placed on a “toxics diet” that would gradually reduce pollution overall in these communities which are subject to multiple insults.

We also recommend that the NJDEP adopt new programs and regulations that will reduce the pollution burden in the state overall. The population of the whole state will benefit from these programs, but the greatest relief will be felt in hot spot communities where environmental pollution in multiple media are at or near health thresholds for multiple pollutants. In addition, we point out needs in the areas of developing new technical tools, educating municipal officials, and empowering citizens and workers that are critical to a comprehensive program to protect our most vulnerable and burdened populations.

These recommendations are spelled out below in extended outline form. The recommendations focus on key opportunities for immediate action (which are highlighted) as well as longer term approaches that can be developed over time as research and resources evolve. Finally, these recommendations, although focused on the environmental protection department, will require the involvement of other key government entities in order to be fully implemented and achieve significant levels of relief in EJ communities.

### **1. IDENTIFY VULNERABLE AND BURDENED COMMUNITIES**

The first step in being able to address cumulative impacts is to find some way of expressing what and where those cumulative impacts are. This is a critical step which can paralyze activity if there is no “bias for action” principle in place. While the state can spend many more years developing the most advanced scientific screening model or waiting for researchers to perfect a definitive model, communities in peril will suffer. Instead, we strongly urge the NJDEP to adopt a simple, relative risk model that can satisfactorily identify areas in need of relief using readily accessible data.

***Short Term:***

- The NJDEP should adopt a modified version of the Faber & Krieg model beginning with the indicators referenced in Table 1 proposed by Dr. Montague and Dr. Sheats as a first step to identify relatively impacted areas of the state. These indicators reflect datasets that exist in New Jersey and can be used to identify vulnerable and burdened populations for further action.

***Mid Term:***

- Once these areas are identified, other recommendations listed below can be implemented, such as those pertaining to permit reviews, targeting of enforcement actions, site remediation prioritization, pollution prevention, and resource allocation.

***Long Term:***

- This process of identifying burdened and vulnerable communities should be further refined over time. The state of New Jersey should support academic research that will continue to develop these cumulative risk assessment tools for use in New Jersey.

**2. ADOPT REQUIREMENTS FOR ADDITIONAL ANALYSIS AND ACTION IN THESE HOT SPOT AREAS**

Once areas are identified as vulnerable or burdened (aka “hot spots”) using some version of a Faber & Krieg Model, applications for significant projects in these hot spot areas should be scrutinized to determine how they may affect environmental quality in the neighborhood. These applications must be thoroughly evaluated before permits are issued or projects are approved by state, county or municipal agencies.

***Short term:***

- Screening techniques for this review should be adopted using authority under existing laws and regulations.

***Mid Term:***

- Where appropriate, the permit applicant should do an Environmental Impact Study or an Environmental Health & Economic Study to show the potential for health and economic impacts. (The applicant might be able to substitute adherence to the requirements of N.J.A.C. 7:27-8.4 (f) of the “Guidance on Preparing a Risk Assessment for Air Emissions” in some instances; see NJDEP Technical Manual 103 Section for more details.)

***Long Term:***

- Establish a new legislative mandate under a New Jersey mini – NEPA (modeled after the National Environmental Policy Act) which requires a comprehensive environmental assessment, including review of cumulative environmental and health impacts and demographics.

**3. REDUCE OR ELIMINATE EXISTING IMPACTS IN BURDENED OR VULNERABLE NEIGHBORHOODS.**

***Short term:***

- For new and modified sources, require additional controls or pollution prevention for polluting activities that exceed some set threshold or contribute to an existing problem in a burdened or vulnerable neighborhood. Additional requirements could

take any number of forms. They may differ, depending on whether the polluting activities are part of a new operation applying for a permit, or an existing source that is substantially contributing to local impacts. The key in this case is to use all available avenues within the State's purview to address cumulative impacts. In some cases, the Department may even reject a permit application in order to protect the residents of a hot spot neighborhood.

- For existing sources, enforce the Pollution Prevention Act codified as State policy for toxics use reduction. This Act sets a toxics use reduction goal of 50% and expressly provides NJDEP with authority to require certain industries to implement pollution prevention across multiple media. Require all affected industries in hot spot areas to submit pollution prevention plans to the NJDEP and prioritize pollution prevention initiatives within the agency across all programs.
- Prioritize site remediation for contaminated sites concentrated in hot spot areas and require stringent clean-up standards
- For all source categories, the Department should increase enforcement and compliance activities in hot spot areas and require increased penalties and more frequent inspections for repeat violators.

**Mid term:**

- Require existing permitted facilities in hot spot areas to go on a "toxics diet" if their impact exceeds a standard health risk threshold like cancer risk. A Toxics Diet would include requirements for pollution prevention and other measures. A Toxics Diet could also take the form of a % reduction in allowable emissions each time that a permit comes up for renewal. This should be a multi-media requirement, running across multiple programs in the NJDEP.
- One key example that the Department can consider is a strategy implemented by the California Air Resources Board pertaining to their *Control of Air Toxic Contaminants from Existing Sources Rule 1402*.<sup>30</sup> In this case, CARB reduced the maximum allowable cancer risk from an existing facility from 100 in one million to 25 in one million; reduced the allowable non-cancer risk measured by a hazard index from 5.0 to 3.0; added a new requirement for a maximum cancer burden of 0.5;<sup>31</sup> established a process to reduce toxic emissions from eight specific industries; and enhanced public notification and toxic emissions inventory requirements for these industries.
- The Department should also make facility-wide risk assessments a **requirement** for applications for new or renewed Operating Permits (Air Program). The current rule makes such assessment voluntary.
- In addition, the Department should increase resources allocated to hot spot areas under existing programs such as Green Acres, site remediation funds, pilot projects, and community-based research and technical assistance grants.

**Long term:**

- Adopt the Massachusetts TURI model which provides funding and education so that industries are motivated to clean up their production processes. (See Appendix D)

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<sup>30</sup> South Coast Air Quality Management District, March 2000. AQMD STRATEGIES TO REDUCE TOXIC AIR POLLUTION FACT SHEET. [http://www.aqmd.gov/news1/2000/Toxics\\_Fact\\_Sheet.htm](http://www.aqmd.gov/news1/2000/Toxics_Fact_Sheet.htm)

<sup>31</sup> The cancer burden represents the expected number of cancer cases that will result from the facility during a 70-year period.

#### **4. REDUCE AIR POLLUTION BURDEN IN THE STATE OVERALL**

The NJDEP should take a statewide approach to reducing pollution--a departure from the typical regulatory case-by-case pollution permit review. Air pollution risks from individual sources in highly impacted EJ areas throughout the State are currently at or near acceptable levels, according to the standard risk management/risk assessment paradigms. Therefore, statewide tightening of key pollutant standards would particularly benefit EJ communities. A priority for EJ communities would be reduction of ultra-fine particulate matter.

##### ***Short term:***

- Target stricter standards for specific pollutants that are especially harmful, such as particulate matter 2.5, ultra-fine particulate matter, mercury and arsenic, and require additional controls for these pollutants.

##### ***Mid term:***

- Require more stringent standards for hot spots under the *State Implementation Plan (SIP)* for criteria air pollution. For example, the Department could institute Indirect Source Review as part of the state's SIP to reduce pollution from mobile and especially "indirect" or "magnet" sources. It would require emission reductions regardless of the absolute value of health risk that is implied by these emissions.
- The Department should consider other strategies such as: installation of particulate filters for diesel backup generators; clean fleet regulations for private fleets of diesel-powered trucks and other vehicles; and a moratorium on the issuance of air pollution permits for areas that do not achieve attainment of the Annual Fine PM Standard by April 5, 2010 (sooner than existing attainment date).

##### ***Long term:***

- Institute a 12.0 ug/m<sup>3</sup> Annual Fine Particulate Standard for New Jersey.

#### **5. IMPROVE TECHNICAL TOOLS**

Our research revealed that this complex issue of cumulative impacts necessitates a wide range of technical data and models to begin to assess and regulate impacts. While the research is still evolving, it is clear that a key factor propelling government action on cumulative impacts issues is the availability of data to make definitive arguments in favor of tighter regulations and more immediate action. While data collection and development of technical tools are resource intensive activities, it is critical that the NJDEP make a concerted effort to target resources, to better understand the most dire environmental conditions on the ground in hot spot areas. Priority must be given to collecting data and developing technical tools that address the most egregious cases of environmental harm in these EJ communities.

##### ***Short term:***

- Improve emissions inventories, modeling and data analysis tools by expanding pollution inventories to include unregulated source operations and facilities.
- Collaborate with the Department of Health and Senior Services and academic institutions, such as the Environmental and Occupational Health Sciences Institute (EOHSI) and others, to conduct more integrated health and environmental analysis of cumulative impacts in environmental justice communities.

**Mid term:**

- Support community-based research projects that identify burdens, conduct micro-scale, locally based monitoring, and advocate solutions.
- Collect more multi-media data on pollution sources across the state.

**Long term:**

- Increase air monitoring in hot spots areas.
- Pilot cumulative impacts studies based on national research models like those in California

## **6. EDUCATE & INVOLVE MUNICIPAL OFFICIALS**

In the course of our public hearing it became clear that municipalities play a key role in addressing cumulative impacts. In many instances, cumulative impacts are the result of a combination of large regulated source emissions together with non-traditional sources such as mobile air emissions, small industries like dry cleaners or auto shops, and a patchwork of land use decisions that combine to create deleterious effects. Municipalities and county governments oversee significant land use and development plans, and their decisions can exacerbate cumulative impacts. However, these entities can also be important allies in mitigating the problem of cumulative impacts. Models already exist for this type of review at the Municipal Level.

For example, local boards of health could get involved in land-use decisions, specifically using Health Impact Assessments (HIA) following the recommendations of the National Association of Local Boards of Health (NALBOH).<sup>32</sup> The HIA should address the questions: "What are the health consequences of a land use or development decision?" AND, "How will these effects be distributed among the affected population?" In California, the Air Resources Board developed an *Air Quality and Land Use Handbook* (Handbook), which is intended to serve as a general reference guide for evaluating, and reducing air pollution impacts associated with new projects that go through the land use decision-making process.<sup>33</sup> A similar document could be used to assist municipalities identified as encompassing hot spot areas.

**Short term:**

- The NJDEP should reach out to the League of Municipalities, New Jersey Urban Mayors' Association (under Thomas Edison State College's John S. Watson Institute for Public Policy), Association of New Jersey Environmental Commissions (ANJEC) and DHSS to explore ways to provide educational programs and environmental analysis tools for municipalities and their associated boards and commissions.

**Mid term:**

- Convene a Mayor's conference to educate Mayors about the problem of cumulative impacts and how it effects urban populations

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<sup>32</sup> National Association of Local Boards of Health. 2006. *Land Use Planning for Public Health: The Role of Local Boards of Health in Community Design and Development*. <http://www.cdc.gov/HEALTHYPLACES/publications/landuseNALBOH.pdf>

<sup>33</sup> California Environmental Protection Agency, California Air Resources Board. April 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*. <http://www.arb.ca.gov/ch/handbook.pdf>

- Present this same information at the League of Municipalities annual conference and to the New Jersey Urban Mayors' Association.
- Develop a simple brochure or pamphlet that describes the issues succinctly for the Mayors (so they can take it home and share it).
- Develop a cumulative impacts primer that can guide a discussion of policy initiatives

***Long term:***

- The NJDEP should work with organizations such as (ANJEC) to develop an Environmental Justice hot spot tool kit for municipalities (e.g. an Environmental Assessment Worksheet) to consider environmental and health impacts of projects. Components of the Municipal Toolkit that could be developed with ANJEC include: materials for educating elected officials and their staffs, and training tools for educating Health Officers, Planning Boards, and Environmental Commissions.

## **7. EMPOWER CITIZENS**

Empowering residents to become involved in the assessment and alleviation of cumulative impacts is critical. Researchers we spoke with such as Dr. Jason Coburn emphasized their research findings, which point to the rich knowledge and resources that residents bring to the resolution of EJ problems. In Dr. Coburn's research, residents were actively engaged in defining risks, collecting data about cumulative impacts, and coming up with creative and practical solutions to address impacts. While we often hear the call for public participation as an important part of all public decision-making, it rarely takes a meaningful form, particularly in EJ communities. We call on NJDEP to take seriously the integration of resident participation and input into the **decision-making process**.

***Short term:***

- Help support the creation of local advisory groups in EJ communities to receive information, communicate with and engage in discussions of ongoing environmental decisions with the NJDEP and facility managers.
- The NJDEP should also institute a requirement for increased public review of proposed projects or permits in hot spot areas.<sup>34</sup>

***Mid term:***

- Facility managers should be required to hold an annual public meeting at which their operations are presented and concerns about such operations are addressed by the public.
- Residents should have the power to "Say No" to polluting projects in already burdened or vulnerable communities through open public participation processes.

***Long term:***

- Support community-based participatory research where residents collaborate with regulators on data collection, hazard identification and remediation.
- Create a neighborhood air toxics abatement fund.
- Provide Technical Assistant Grants to communities for environmental assessments of proposed projects.

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<sup>34</sup> The New York State Department of Environmental Conservation instituted a requirement for increased public review of proposed projects in environmental justice communities. Go to NYSDEC, Environmental Justice and Permits webpage, <http://www.dec.ny.gov/public/36929.html>, to learn more.

- Fund pilot projects and EJ projects in hot spot communities that involve residents of the respective communities

## **8. EMPOWER UNION MEMBERS & WORKERS**

Workers employed in toxic facilities are often subjected to high and sustained volumes of pollution, primarily through fugitive air emissions and other inhalation sources, such as diesel exhaust. Not only do these workers often become ill from such exposure, they may also live in affected communities.<sup>35</sup> To protect these workers, their families and neighbors, the NJDEP must continue to work in cooperation with union officials and with workers in non-unionized facilities, to help reduce and eliminate adverse health impacts in the workplace. Workers can be the in-house sentinels that alert officials to environmental violations; and they can make recommendations about eliminating or decreasing environmental emissions into “fenceline” communities. They can identify alternatives to using and handling on-site storage and movement of toxic and hazardous materials, which would help reduce and prevent cumulative impacts.

## **9. RECOMMENDATIONS FOR PROGRAMS OUTSIDE OF NJDEP**

While the bulk of these recommendations are directed at NJDEP due to our direct charge as an advisory body to the agency, we strongly urge that other agencies in the state actively participate in efforts to understand and address the complex problems associated with cumulative impacts. Agencies such as the Department of Health and Senior Services, the Department of Transportation, the Department of Community Affairs, and Economic Development Authority all have an important role to play if we consider the full extent of the issues facing EJ communities. Some specific recommendations follow.<sup>36</sup>

### ***Short term:***

- Each state agency, along with the Governor’s Office, should dedicate staff to work collaboratively with the NJDEP on tackling EJ issues and cumulative impacts in particular. Each agency should assign personnel that reports to the Governor’s liaison and NJDEP on a regular basis with respect to EJ efforts.
- Researchers from DHSS should work directly with NJDEP to develop a cumulative impacts assessment model and report out about this work regularly to the Environmental Justice Advisory Council

### ***Midterm:***

- The DHSS should take steps to address environmental Health Disparities as part of

<sup>35</sup> New Jersey DHSS, Occupational Health and Safety Statistics, 126,000 New Jersey workers suffered from job related non-fatal injuries in 2006. <http://www.state.nj.us/health/ohs/njohstats.shtml>

<sup>36</sup> We recommend the following state departments and agencies be considered for inclusion in any future EJ interagency mandate: **Departments** - Agriculture, Children and Families, Community Affairs, Education, Health & Senior Services, Labor & Workforce Development, Public Advocate, Transportation; **Agencies** - Board of Public Utilities, Office of the Clean Air Council, Commission on Science and Technology, Economic Development Authority, Educational Facilities Authority (NJEFA), Emergency Management, Energy Master Plan, Environmental Infrastructure Trust, Garden State Preservation Trust, Global Warming, Office of the Governor, Highlands Council, Housing and Mortgage Finance Agency, Interstate Environmental Commission, Meadowlands Commission, Redevelopment Authority (NJRA), Schools Development Authority, Transit, New Jersey, Transportation Trust Fund Authority (TTFA), Turnpike Authority. The State of New Jersey, <http://www.nj.gov/nj/gov/deptserv/>

their “Eliminating Health Disparities Initiative” that was mandated by the Legislature on September 1, 2004 in C.26:2-167.1.

***Long term:***

- Academic institutions, such as EOHSI, NJIT, UMDNJ, and others should help provide the scientific data needed to identify hot spots, the effects of cumulative health impacts on affected populations that endure disproportionate pollution exposure, and work with affected communities and EJ advocates on promulgating solutions to such problems.
- DHSS should update their occupational illness and mortality studies. Such studies would include data on illnesses that may have been exacerbated not only by pollution exposure in the workplace, but also by exposures from also living in EJ communities, especially hot spot areas.
- Develop interagency environmental justice projects targeting specific hot spot communities. For example, DCA, SCC, DHSS, and NJDEP could form a task force to address school siting issues in urban areas.

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## **APPENDIX A: Definitions & Key Terms**

In order to have a clear and intelligible discussion about cumulative impacts, it is important to agree on the definition of terms that are used. Appendix A provides some examples from various sources that might be useful. The choice of definition is not as important as assuring that everyone involved in a single conversation are all using a term with the same definition in mind.

**AGGREGATE RISK:** The risk from all routes of exposure to a single substance. (USEPA 1999)

**BURDENED POPULATIONS:** Populations that are disproportionately subjected to multiple stressors (e.g., diesel soot, ground-level ozone, lead, brownfields, and other toxic exposures).

**COMMUNITY-BASED PARTICIPATORY RESEARCH:** The National Institute for Environmental Health Sciences defines community-based participatory research as “a methodology that promotes active community involvement in the processes that shape research and intervention strategies, as well as the conduct of research studies.” Community-based participatory research can be an extremely useful tool not only to obtain valuable information for cumulative risk/impact assessments, but also to empower the affected community and to engender more effective prevention/intervention efforts.

**CUMULATIVE IMPACT:** 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. (CalEPA 2005)

**CUMULATIVE IMPACT:** The impact on the environment that results from incremental effects of the project in addition to other past, present, and reasonably foreseeable future projects regardless of what person undertakes the other projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. (Minnesota Part 4410)

**CUMULATIVE IMPACT:** Environmental impacts may manifest themselves in a cumulative manner in the following ways: (Pratt 2000)

- Incremental impact of a single source, pollutant, and pathway;
- Combined impact of multiple sources of a single pollutant via one pathway;
- Combined impact of multiple pollutants from a single source via one pathway;
- Combined impact via multiple pathways of a single pollutant from a single source;
- Combined impact of multiple pollutants from multiple sources via a single pathway;
- Combined impact of multiple sources via multiple pathways of a single pollutant;
- Combined impact of multiple pollutants via multiple pathways from a single source;
- and
- Combined impact of multiple pollutants from multiple sources via multiple pathways.

**CUMULATIVE RISK:** The risk from all routes of exposure to a group of substances. (USEPA 1999)

**ENVIRONMENTAL JUSTICE:** Environmental justice refers to the idea that all individuals, groups or communities deserve protection from environmental hazards regardless of their race, ethnicity or economic status. Various national studies show communities of color and low-income communities are exposed to a disproportionate amount of industrial pollution and other environmental hazards. Promoting environmental justice means that no population of people should be forced to shoulder a disproportionate share of burdens from pollution or environmental hazards due to a lack of political or economic strength. (NJDEP 2006)

**HOT SPOT:** An area of great concern and requiring immediate attention because of its apparent or suspected large volume of pollution and/or pollution impacts.

**PRECAUTIONARY APPROACH:** Taking anticipatory action to protect public health or the environment if a reasonable threat of serious harm exists based upon the best available science and other relevant information even if absolute and undisputed scientific evidence is not available to assess the exact nature and extent of the risk. (CalEPA 2005)

**PROPORTIONAL RESPONSE:** The concept of proportional response is a direct outgrowth of the NEJAC Work Group's thinking on conducting cumulative risk analysis in the context of a bias for action and its promotion of a collaborative problem-solving model for addressing cumulative risks and impacts. First, the idea of proportional response seeks to match the needs of communities and tribes with an appropriate level or type of analysis and action at any given point. In other words, analysis should be commensurate with community needs and the nature of the intervention to be taken. Secondly, response must be proportional to the harm caused.

**STRESSORS:** A stressor is a physical, chemical, biological, or other entity that can cause an adverse response in a human or other organism or ecosystem. Exposure to a chemical, biological, or physical agent (e.g., radon) can be a stressor, as can the lack of, or destruction of, some necessity, such as a habitat. The stressor may not cause harm directly, but it may make the target more vulnerable to harm by other stressors. A socioeconomic stressor, for example, might be the lack of needed health care, which could lead to adverse effects. Harmful events, such as automobile crashes, could also be termed stressors. Obviously, calculating risks from different types of stressors can use widely differing methods, including probabilistic estimates of disease via dose-response relationships or looking up rates in statistical tables of historical events, among others.<sup>13</sup>

**QUALITATIVE ANALYSIS:** An integrated analysis of cumulative risk and impacts will require making both quantitative and qualitative judgments. This report notes that there exists a body of literature in the area of environmental impacts analysis and cumulative impacts analysis that may prove to be useful to such an integrated analysis. For example, the White House Council on Environmental Quality (CEQ) published a report entitled

“Considering Cumulative Effects under the National Environmental Policy Act” in which CEQ provided eight principles and eleven methods for conducting cumulative effects analysis.<sup>37</sup>

**RISK ASSESSMENT:** A tool created to compare and rank environmental problems based on the potential for environmental and public health impacts. Traditionally, risk assessments draw together a number of experts in fields such as toxicology, economics, and natural resources. These experts are expected to use “pure science” to assess the risk to public health from contaminants, and identify appropriate resource investment or mitigation measures. This approach does not generally allow for public participation or input into the process.

**VULNERABILITY:** The concept of vulnerability goes to the heart of the meaning of environmental justice. Vulnerability recognizes that disadvantaged, underserved, and overburdened communities come to the table with pre-existing deficits of both a physical and social nature that make the effects of environmental pollution more, and in some cases unacceptably, burdensome. As such, the concept of vulnerability fundamentally differentiates disadvantaged, underserved, and overburdened communities from healthy and sustainable communities. Moreover, it provides the added dimension of considering the nature of the receptor population when defining disproportionate risks or impacts. The EPA’s formal definition of vulnerability, i.e., susceptibility/sensitivity, differential exposure, differential preparedness, and differential ability to recover, allows an analytical framework to understand how a disadvantaged community may face greater impacts from pollution than the general population. Moreover, it takes on new meaning when linked to concepts like health disparities. Vulnerability and health disparities are integrally related concepts and in some ways, health disparities are both an outcome of and a contributor to vulnerability.

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<sup>37</sup> Council on Environmental Quality, <http://epa.gov/oecaerth/resources/publications/ej/nejac/nejac-cum-risk-rpt-122104.pdf>

## **APPENDIX B: Massachusetts Toxics Use Reduction Institute (TURI) Model**

A model for New Jersey pollution prevention in Environmental Justice Communities is Massachusetts's Toxics Use Reduction Institute (TURI), based at the University of Massachusetts Lowell. This state-funded public/private partnership provides funding and education so that private businesses are motivated to clean up their production processes. It also funds community organizations that urge the public to decrease use of unnecessary toxins. TURI is outside of the Massachusetts state enforcement agency but shares the common goal of cleaning up environmental toxins. On its website [www.turi.org](http://www.turi.org), the Toxics Use Reduction Institute divides its mission into three sections:

- *Research, test and promote alternatives to toxic chemicals used in Massachusetts industries and communities*
- *Provide resources and tools for a safer place to live and work*
- *Promote economic competitiveness through improved efficiency, compliancy stability and reduced risk*

TURI employs pollution prevention experts and owns labs and a library with extensive databases.

- *Research in consortia, supply chain and peer networks, or through grants to academic researchers and industries.*
- *Training for TUR professionals, community group and trade associations in core planner training, sector specific technologies and methods, and management tools.*
- *Technical Support from the TURI Library and our experts*
- *Laboratory Services offering performance testing of non-toxic and less-toxic cleaning alternatives for specific, client-defined applications.*
- *Grants to industry, community groups and researchers in academia*

**An example of TURI Laboratory Services is its service to find** safer solvents for cleaning processes. The service is free for Massachusetts companies and costs \$200 for out-of-state applicants. The client sends in a sample product and the TURI lab will test more eco-friendly solvents on it. This inexpensive lab fee addresses the needs of small businesses that would likely plead lack of funds for switching to the most up-to-date, least-toxic cleaning solvents.

**TURI Data** -TURI has a Toxic Release information database by company or community, toxins identification and [www.p2gems.org](http://www.p2gems.org) , a guide to pollution reduction websites.

**Grants for Community Education** - TURI empowers communities to understand and reduce their own toxics. Because community involvement in toxics reduction is always needed in overburdened EJ communities, TURI's grants for community education would be ideal for New Jersey's EJ communities. TURI provides:

- *Grants to non-profit organizations and municipalities*
- *Education, training and outreach on toxic use reduction methods and alternatives*
- *Resources to assist communities and individuals to reduce toxic*

## **APPENDIX C: New Jersey's Inherently Safer Technology Rule**

In response to a broad-based public campaign spearheaded by the New Jersey Work Environment Council (WEC), in 2007 the NJDEP agreed to adopt a new rule to help minimize or eliminate the potential for a release of an “extraordinarily hazardous substance (EHS).” The new rule requires Inherently Safer Technology (IST) principles or techniques that can be incorporated in a “covered process.” (A covered process is any activity involving use, storage, manufacturing, handling, or on-site movement of an EHS material that meets or exceeds the threshold quantity under the rules of the state’s *Toxic Catastrophe Prevention Act {TCPA}*.) This includes:

- Reducing the amount of EHS material that may be released;
- Substituting less-hazardous material;
- Using EHS in the least-hazardous process conditions or form; and
- Designing equipment and processes to minimize potential for equipment failure and human error.

The rule applies to about 94 New Jersey facilities that are regulated under TCPA, including chemical, plastic, pesticide manufacturing, oil refineries, major food processing plants, paper mills, water, and wastewater treatment plants. Reductions in the use, storage, manufacturing, handling, or on-site movement of an EHS material will reduce the risk of an accidental release, or attack, making more than 1.2 million people working in and/or living near such facilities safer. It will also help reduce the cumulative impacts that result from the consistent use of EHS material in the production process.

These facilities are now required to do an IST review report and submit it to NJDEP. The report “...shall identify available IST alternatives or combinations of alternatives that minimize or eliminate the potential for an EHS release.” The IST rule is a step forward in protecting “fenceline” communities and workers employed in toxic and hazardous facilities, but the rule does not mandate using IST once the IST review report has been completed. New Jersey is the only state in the nation with IST requirements.

The mandatory use of alternatives to extremely hazardous materials would help make communities and the work environment healthier and be a welcome addition to a “toxics diet.”

## **APPENDIX D: Impacts on Workers**

While this report focuses on the cumulative impacts experienced by residential populations, it should be noted that workers employed in hazardous and toxic industries, such as petro-chemical, chemical, pesticide manufacturing, ports and other such industries, often suffer from some of the same types of environmental pollution exposures, if not more, than residential populations. Such occupational exposures translate into health problems, such as asthma and other respiratory diseases, cancer, heart disease and heart attacks, and premature deaths, along with the loss of thousands of workdays and the loss of income.<sup>38</sup>

According to the federal Bureau of Labor Statistics, about 130,000 New Jersey workers are injured or made ill on the job every year. Among them are truck drivers who work from our ports. The full health impacts on these workers has yet to be calculated, but port truck drivers are exposed to large amounts of diesel air pollution as their vehicles idle for hours waiting to off-load and on-load at the ports, and while they make deliveries. Most of the drivers are Black and Latino, with many being immigrants. Most earn low wages, have to pay to maintain their trucks, have no health insurance, and live in EJ communities. They represent both a vulnerable and burdened group, and are in double jeopardy of cumulative health impacts because of the work they do and where they live.

The ports' truck drivers represent only one example of workers whose health is comprised by cumulative pollution impacts in the workplace, and often also at home. Workers employed as school bus drivers, in chemical plants, in oil refineries, as sanitation workers, and who work for companies that use extraordinarily hazardous substances are at risk for incurring cumulative impacts. Unfortunately, immigrant workers are less likely to report workplace illnesses than their American-born counterparts, although they are among the most vulnerable to employer exploitation. This compounds the problem of obtaining reliable data on the extent of occupational illnesses and their link to environmental impacts.

At some point, an in-depth examination of the occupational health impacts, and possible disparities, on New Jersey workers should be undertaken to gain a more comprehensive, holistic profile of cumulative impacts on workers, especially workers who live in EJ communities.

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<sup>38</sup> U.S. House of Representatives, the Honorable George Miller, Chairman. A Majority Staff Report by the Committee on Education and Labor. June 2008. "HIDDEN TRAGEDY: Underreporting of Workplace Injuries and Illnesses"