EPA
United States
Environmental Protection
Agency

Plan EJ 2014

Science Tools Development

Plan EJ 2014 is EPA's roadmap for integrating environmental justice into its programs and policies.

SCIENCE TOOLS DEVELOPMENT

Implementation Plan

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PLAN EJ 2014 AT A GLANCE

Plan EJ 2014 is the U.S. Environmental Protection Agency (EPA)'s roadmap to integrating environmental justice into its programs and policies. The year marks the 20th anniversary of the signing of Executive Order 12898 on environmental justice. Plan EJ 2014 seeks to:

- Protect the environment and health in overburdened communities.
- Empower communities to take action to improve their health and environment.
- Establish partnerships with local, state, tribal, and federal governments and organizations to achieve healthy and sustainable communities.

As the EPA's overarching environmental justice strategy, Plan EJ 2014 has three major sections: Cross-Agency Focus Areas, Tools Development Areas, and Program Initiatives.

The Cross-Agency Focus Areas are:

- Incorporating Environmental Justice into Rulemaking.
- Considering Environmental Justice in Permitting.
- Advancing Environmental Justice through Compliance and Enforcement.
- Supporting Community-Based Action Programs.
- Fostering Administration-Wide Action on Environmental Justice.

The Tools Development Areas are:

- Science.
- Law.
- Information.
- Resources.

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Goals At-A-Glance

To substantially support and conduct research that employs participatory principles and integrates social and physical sciences aimed at understanding and illuminating solutions to environmental and health inequalities among overburdened populations and communities in the United States.

1.0 INTRODUCTION

Under Plan EJ 2014, the U.S. Environmental Protection Agency (EPA) has committed to building a strong scientific foundation for supporting environmental justice and conducting disproportionate impact analysis, particularly methods to appropriately characterize and assess cumulative impacts. These efforts will help to ensure that EPA brings the best science to decision making around environmental justice issues.

This Science Tools Development Implementation Plan discusses overarching goals, strategies, and activities, including a science and research agenda for the Agency. The science and research activities described in this plan build upon discussions and recommendations from "Strengthening Environmental Justice and Decision-Making: A Symposium on the Science of Disproportionate Environmental Health Impacts" (March 17-19, 2010) and the workshop on "Analytical Methods for Assessing the Environmental Justice Implications of Environmental Regulations" (June 9-10, 2010). The March 2010 Symposium was the principal event for the Agency to identify science needs for environmental justice and stimulate ideas for innovative research to meet those needs.

1.1 Goals

Our goal is that, within five years, EPA will substantially support and conduct research that employs participatory principles and integrates social and physical sciences aimed at understanding and illuminating solutions to environmental and health inequalities among overburdened populations and communities[1] in the United States. This goal supports our vision that all Agency decisions will make use of the information, data, and analytic tools produced. Our goal has two specific elements:

1. Improve the scientific basis for environmental regulatory and policy decisions in order to ensure that everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.
2. In order to increase the relevance of science to policy making, transform how EPA formulates, designs, prioritizes, conducts, and fosters more citizen participatory, inclusive, co-production of knowledge, and collaborative processes within the scientific research enterprise.

[1] In Plan EJ 2014, EPA uses the term "overburdened" to describe the minority, low-income, tribal, and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks as a result of greater vulnerability to environmental hazards. This increased vulnerability may be attributable to an accumulation of both negative and lack of positive environmental, health, economic, or social conditions within these populations or communities.

1.2 Strategies

We have five major strategies to achieve our goals.

1. Apply integrated transdisciplinary and community-based participatory research approaches with a focus on addressing multi-media, cumulative impacts and equity in environmental health and environmental conditions.
2. Create mechanisms to incorporate perspectives from community-based organizations and community leaders into EPA's research agendas and engage in collaborative partnerships with them on science and research to address environmental justice.
3. Leverage partnerships with other federal agencies on issues of research, policy, and action to address health disparities.
4. Build and strengthen the technical capacity of Agency scientists on conducting research in partnership with impacted communities and translating research results to inform change.
5. Build and strengthen technical capacity of community-based organizations and community environmental justice and health leaders to address environmental health disparities and environmental sustainability issues.

1.3 Discussion

Multiple aspects of the physical environment in which we live, learn, work, and play can put certain groups of people "at higher risk." Also, individuals and groups may experience disadvantages related to their gender, lifestage, socioeconomic status, race, ethnicity, disability, education, geographic location, or other characteristics historically linked to discrimination or exclusion. This complex interaction between the physical environment and other conditions of social disadvantage contributes to known social disparities in environmental health outcomes.

Since 1994, as stated in the Executive Order 12898 (EO 12898), it has been incumbent upon all federal agencies including EPA to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations that may result from their programs, policies, and activities. The concept of disproportionate environmental health impacts and burdens refers to the finding that some populations systematically experience higher levels of risks and impacts than the general population. (Brulle and Pellow 2006) This perspective recognizes that multiple factors, including social, psychosocial, economic, physical, chemical, and biological determinants may contribute to disproportionately high and adverse human health or environmental impacts.

The importance of science in environmental decision making at EPA emphasizes the need for data and information that is sound and defensible, reproducible, and informative. For environmental justice stakeholders, it is even more important that the science underlying EPA's decisions appropriately accounts for the multiple exposures to chemical stressors and cumulative impacts from multiple exposures that they experience in their communities. Further, the social and real world context in which exposures to environmental contaminants occur also needs to be explicitly considered and reflected in EPA's scientific research and analysis as emerging evidence demonstrates that social context may enhance the toxic effects of both single and multiple environmental contaminant exposures. Such considerations require new models for assessing the toxicity of environmental hazards, advanced methods for analyzing complex interactions between multiple stressors, and enhanced access to community-level wisdom and resources.

These emerging needs indicate that new ways of conducting scientific inquiry to inform environmental decision are needed at EPA. Such expansion and advancement of EPA's scientific agenda, methods, models, research inquiry approaches, and information resources is necessary for the Agency to adequately address environmental justice stakeholder's concerns about environment, sustainability, and health inequalities. These advancements take on additional importance when viewed in the context of the Agency's mandate to achieve environmental justice as required by EO 12898, and its ability to effectively contribute towards *Healthy People 2020*'s overarching goals to achieve health equity, eliminate health disparities, improve the health of all groups, and create social and physical environments that promote good health for all.[2]

Conversely, health and environment status can influence, for example, the social and institutional arrangements, which can lead to both negative and positive outcomes cumulatively impacting the health of a community. The cumulative impact has greater and farther-reaching consequences than any one factor or event alone; this is particularly evident among vulnerable low-income and underserved populations. In order to determine the positive and negative health and environmental impacts during some of the social processes described above, the scientific research requires both quantitative and qualitative approaches.

The goals, strategies, and activities for this implementation plan build upon the science recommendations articulated at the March 2010 symposium, *Strengthening Environmental Justice Research and Decision-Making: A Symposium on the Science of Disproportionate Environmental Health Impacts,* and the subsequent "100-Day Challenge" Report developed by the Agency in response to recommendations generated

[2] *Healthy People* is a set of goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.

from the symposium. A consistent theme throughout the March 2010 symposium was the linkages between science and policy. These discussions were framed within the context of identifying research and scientific needs that are necessary to ensure that environmental justice concerns and social disparities in environmental health are incorporated in EPA's decisions for the purpose of advancing EPA policy on environmental justice. Several conceptual frameworks have been published in the last few years that relate environmental justice and health disparities to upstream, structural determinants of health (CSDH 2008; Gee and Payne-Sturges 2004; Krieger 2001; Habermann and Gouveia 2008; Morello-Frosch 2002; Morello-Frosch and Shenassa 2006; Schulz et al 2002; Wakefield and Baxter 2010).

Symposium participants suggested several actions that EPA and other federal agencies take in order to reduce data gaps in the area of environmental justice, overcome limitations in the theories and methods for conducting research on environmental health disparities and particularly research supported by the federal government, and overcome limitations in practice of risk assessment at EPA. The science recommendations from environmental justice advocates and other stakeholders are captured in Appendix C.

1.4 Organizational Structure

The specific science and research actions described in Section 2.0 were developed through a cross-Agency workgroup for the Agency's 100-Day Report follow-up to the March 2010 Symposium. Representation on the workgroup included the Office of Air and Radiation (OAR), the Office of Chemical Safety and Pollution Prevention (OCSPP), the Office of Policy (OP), the Office of Solid Waste and Emergency Response (OSWER), the Office of Water (OW), the Office of Research and Development (ORD), and Regions 6, 7, 8, and 10. Region 7 serves as ORD's Lead Region.

Going forward, ORD, as lead for the Science Tools Development Implementation Plan, proposes to establish a more permanent structure within ORD, which we are planning to name the Environment Health and Society Workgroup. This workgroup will serve as ORD science experts and points of contact on environmental justice, environmental disparities, and disproportionate impacts science issues. ORD's National Center for Environmental Research (NCER) and the Office of Science Policy (OSP) will jointly sponsor and co-chair this new workgroup. The co-chairs will also lead the Plan EJ 2014 Science Tools Development Workgroup and monitor the Science Implementation Plan for Plan EJ 2014. ORD is considering re-constituting the intra-Agency group on science for the 100-Day Report to serve as the Plan EJ 20114 Science Group. ORD will coordinate with all the Plan EJ 2014 implementation workgroups to ascertain how current activities can be better tailored or leveraged to address Plan EJ 2014 workgroups' science needs under the five strategies (listed in Section 1.2) and to identify future science activities.

2.0 IMPLEMENTATION

Below we describe several major science and research activities under the five strategies. These activities will be carried out with existing resources, provided these resources remain available.

2.1 Activities

Building Scientific Capacity Among Tribal Environmental Professionals

EPA has a long history of supporting capacity building among tribal environmental professionals, primarily through its partnership with the Institute for Tribal Environmental Professionals (ITEP) at Northern Arizona University. The Office of Air and Radiation (OAR) has supported this project for over 15 years. Consistent with our trust responsibility to tribes, OAR works with Tribes to increase their capability to address their environmental concerns. OAR supports the training and educational efforts of ITEP in the areas of air quality and climate change impacts and adaptation planning, as well as the work of the Tribal Air Monitoring Support (TAMS) Center, which builds and strengthens the technical capacity of tribal staff. The TAMS Center cross-trains tribal air professionals on air monitoring, indoor air quality, radon and asthma. EPA is building on this model to develop an Environmental Justice Community Learning Center.

Strategy 1: *Apply integrated transdisciplinary and community-based participatory research approaches with a focus on addressing multi-media, cumulative impacts and equity in environmental health and environmental conditions.*

Activity 1.1: Establish an Integrated Transdisciplinary ORD Research Program on Environment and Community Health – *Sustainable and Healthy Communities Research Program.*

The new Administration at EPA and in particular in ORD recognizes that fragmented research programs cannot solve 21st century environmental challenges including disparities in environmental health. ORD is leading the way by integrating 12 research programs that were mostly media-specific into four transdisciplinary programs aligned with EPA's new Strategic Plan. As part of this re-structuring, ORD is fully establishing and supporting a new integrated transdisciplinary research program on environment and community health known as "Sustainable and Healthy Communities." This program seeks to adopt a more holistic view of environment and health as its conceptual framework, take on research projects that address many of the topics raised at the Symposium, and conduct research in a manner consistent with principles of community-based participatory research. Both ORD intramural and extramural resources from existing human health, land, sustainability, and ecosystems research programs would be directed to support this new program. For this new research program to be successful, implementation of many of the recommended actions on capacity building within ORD and incorporating community perspectives is critical.

As part of the new Sustainable and Healthy Communities Research Program (SHCRP), EPA's new Science to Achieve Research (STAR) grant solicitations are being considered to support tribal community environmental health research and to establish Centers of Excellence on Environment and Health Disparities to examine the joint impacts of social and physical environmental conditions, processes and systems on health in collaboration with the National Institutes of Health's (NIH) National Center on Minority Health and Health Disparities (NCMHD)

Benefits to EPA Stakeholder Communities

- ORD's new research program is responsive to suggestions from stakeholders to create and institute a new scientific research approach that develops a more holistic understanding of the environmental and health. This approach will also integrate perspectives from community residents and leaders, community-based non-governmental organizations (NGOs), and community health and environmental quality advocates in the development of EPA's scientific research agendas, as well as in data collection, conduct of risk and exposure assessments, and risk management decisions.
- The hallmark of the integrated proposed transdisciplinary approach is "systems thinking," which seeks to understand the complex interactions between social, natural, and built environmental systems, conditions and policies that impact human health and well-being. To explicitly address environmental justice concerns, this program will need to direct its attention to how these complex interactions result in unequal environmental health conditions or disproportionate impacts among (diverse) disadvantaged population groups, communities, neighborhoods and individuals.
- Anticipated outcomes of this program include new information and tools to support more holistic environmental decision making at national, regional, state, tribal, and local levels. It is anticipated that this program will also inform strategies for alleviating systemic drivers of racial and socio-economic disparities in environmental health outcomes and access to healthy environments.

Impacts on EPA Programs and Activities

- The Assistant Administrator for ORD announced the re-structuring of ORD's 12 media-specific research programs into four integrated programs in Fall 2010. The Sustainable and Healthy Communities Research Program is an important part of this effort. This new program is currently in the early stages of organizing and development. Input from EPA program offices will be sought in early 2011. Then in late spring, input from outside stakeholders will be solicited. Bringing together diversity of disciplines to plan and implement integrated research programs will make EPA more effective at developing sustainable solutions to complex, 21st century environmental problems. It will create a culture where different disciplines are encouraged to find innovative solutions and will make EPA's research more timely, relevant and responsive to the short-, medium- and longer-term needs of our partners and stakeholders. Several external advisory committees continue to recommend this approach.

Timeframe

- Establish and fully support a Sustainable and Healthy Communities Research Program (Fiscal Year [FY] 2011).
- Incorporate ideas and concerns from stakeholders and representatives from disproportionately impacted communities and populations (FY 2011).
- Issue joint Request for Applications (RFA) or other funding mechanisms to collaborate with NIH National Institute on Minority Health and Health Disparities to establish Centers of Excellence on Environment and Health Disparities (FY 2012).

Activity 1.2: Develop technical guidance, analytic methods, tools and data to advance the integration of environmental justice in EPA's decision making.

EPA's regulatory decision making is informed by scientific data and analysis. To facilitate the process of using scientific data, EPA scientists and decision makers, as well as communities, community advocates and other stakeholders, require consistent and systematic guidance on how to conduct these analyses. They also depend on scientifically valid tools and methods, as well as information communicated by environmental data. While the guidance, methods, tools, and data for advancing environmental health protection has been an area of significant investment by EPA, these tools of the trade have not been fully adapted or developed to specifically address environmental justice issues.

EPA's commitment to integrating environmental justice in all of its decisions, policies, and programs has resulted in investments to develop technical guidance, analytic methods, tools, and data. For example, EPA is in the process of developing guidance entitled "Technical Guidance for Incorporating Environmental Justice into Rulemaking Activities" through Plan EJ 2014's Incorporating Environmental Justice into Rulemaking Implementation Plan. This document is expected to aid EPA staff and managers in incorporating environmental justice into EPA's analytical frameworks such as risk assessment, and economic analysis, and other scientific and policy assessments.

EPA's OAR is piloting several kinds of analyses that are useful in informing managers about the potential environmental justice implications of air rulemakings. OAR is evaluating and testing several analytical approaches including: (1) proximity-based socio-demographic analyses, which highlight the characteristics of those living closest to sources of air pollution; (2) exposure and health risk modeling that breaks out data based on socio-demographic characteristics (e.g., race, income); and (3) benefits mapping that shows the distribution of benefits of a regulation to various socio-demographic groups. OAR expects to learn from their experiences in using these approaches. OAR will revise its methods accordingly, as it seeks to do a better of job of identifying rules that may present environmental justice concerns and to understand more fully the

implications of air rules on overburdened populations. OAR's experiences will help to inform the overall Agency effort to develop the technical guidance.

ORD plans to evaluate existing tools developed by ORD scientists with respect to appropriateness and ease of use for lay experts in communities. To improve access to Agency tools, ORD plans to work with stakeholders to develop a series of free regionally-based trainings on EPA's information and assessment tools. ORD also plans to partner with EPA regional offices, other federal agencies, and consortia of environmental justice and community health non-profits and community-based organizations to host community-based tools workshops and Regional Tools Summits. There will be a specific focus on tools to evaluate environmental justice and health disparities policies and programs.

ORD proposes to continue to develop cumulative risk/impact assessment techniques and analytics, tools, and mapping methods that can be applied at multiple geographic scales. For example, ORD has committed $8 million in research investment through STAR grants on cumulative risk assessment methods that incorporate community social contexts (non-chemical stressors) and indicators of population vulnerability (see http://www.epa.gov/ncer/cumulativerisk). The Agency will ensure research results from these new STAR grants on cumulative risks, and chemical and non-chemical stressors are well disseminated and used by EPA program offices.

ORD's Office of the Science Advisor (OSA) and the National Exposure Research Laboratory (NERL) have launched an initiative to develop a web-based cumulative risk assessment tool, the Community Cumulative Assessment Tool (CAAT). This tool will enable a more complete and thorough evaluation and understanding of physiological and socioeconomic stressors that result in cumulative impacts in U.S. communities and populations. This broader framework for decision making leads to inherently more sustainable outcomes as a result of a more complete understanding of the factors constituting and contributing to risk in identified populations.

The CCAT is designed to implement a multi-media approach to cumulative risks in communities facing environmental justice issues; and will leverage datasets, research, and certain Geographic Information System (GIS) capabilities that were developed for C-FERST in the Communities and Cumulative Risk Research Program in ORD. The CCAT will also reflect the cumulative impact considerations outlined in the "Technical Guidance for Incorporating Environmental Justice into Rulemaking Activities" and provide insight on environmental justice to the Risk Assessment Forum (RAF) Technical Panel developing the EPA Cumulative Risk Assessment (CRA) Guidelines. The project is directly responsive to the recognition that vulnerability and health disparities are

interrelated and must be studied within the risk assessment paradigm. The developers of the CCAT will engage with environmental justice and community-based stakeholders to inform the development of the CCAT and related Agency cumulative risk assessment guidelines. This approach purposely builds skills among EPA scientists to design research and risk assessment protocols informed by collaboration with affected communities.

At the March 2010 Symposium, participants requested EPA to develop easy-to-use GIS tools. ORD's National Atlas of Ecosystem Services is developing an Urban Atlas, which will include high-resolution mapping for 100-250 populated areas selected along several gradients of concern (e.g., size, location, demographics, and environmental and health condition). It will feature selected small towns and rural communities, including rural Tribal lands. By mapping the current availability of "green" infrastructure and applying existing models for pollutant removal, water storage, and other functions, ORD's National Atlas will estimate the extent to which ecosystem services contribute to the basic needs of populated places.

> Additionally, the Atlas will reveal under-served areas where management to enhance specific ecosystem services would benefit community health and well-being. This local component of the Atlas will include demographic mapping to identify overburdened sub-populations that may benefit disproportionately from "green" infrastructure and/or are disproportionately underserved. The Atlas will permit stratification of urban and other populated areas to develop separate estimates of ecosystem services for communities identified as socially vulnerable. Additionally, it will incorporate accessible health data to map aspects of population susceptibility to diminished or degraded services. EPA is conducting this project in collaboration with multiple federal agencies, including the U.S. Forest Service, the U.S. Geological Survey, and the Centers for Disease Control and Prevention, as well as academic and other educational organizations. EPA regions and ORD's Human Health Research Program are interacting with communities to identify priority issues and build capacity for working with mapping tools to inform risk evaluation and management decisions.

EPA's ORD is also developing an Environmental Quality Index tool for measuring county level environmental quality, which will increase understanding about how multiple stressors simultaneously contribute to health disparities in minority, low-income, tribal, and indigenous[3] populations.

[3] When these terms are used in this document, they refer to entities and individuals in the United States only

Benefits to EPA Stakeholder Communities

- The development of guidance, methods, tools, and data to advance the integration of environmental justice into EPA's decision-making processes is responsive to several comments provided by stakeholders. For example, these activities address suggestions that EPA consider the areas of policy, capacity building, and promoting healthy and sustainable communities. These stakeholder comments recommend EPA to: (1) develop analytic and assessment tools and data collection approaches that can be used by community health advocates and environmental justice groups; (2) adopt multi-media cross-program approaches to addressing cumulative environmental exposures in stakeholder communities, as well as restructuring risk assessment to better account for multiple stressors; (3) increase community capacity to assess their environment; (4) develop a more holistic understanding of environment and health; and (5) integrate environmental justice in all its decisions. Better integration of environmental justice into EPA's decisions directly benefits communities impacted by EPA's regulatory activities. The overarching goal of developing these tools of the trade is to aid EPA staff to develop regulatory options that fully protect the health and environment of all people, as well as help communities to better understand their environmental problems.
- Community-based "stakeholders" will benefit from CCAT through access to improved information that integrates their own understanding of local conditions with data drawn from EPA's databases. Depending upon application, benefits may include improved capacity to collaborate with Agency experts, identify priorities, and pursue risk reduction strategies to improve public health and the environment.
- Key outcomes of the Urban Atlas will be to inform community members and decision makers as to how natural resources are critical community assets, and how their absence or degradation may be contributing to cumulative burdens on human health and well-being. Furthermore, the integrated, multi-media approach of the Urban Atlas will provide information on the co-benefits accrued to the community when applying ecosystem services to mitigate specific environmental contaminants or other priority health risks.

Impacts on EPA programs and activities

- These actions are also responsive to several core focus areas of EPA's Plan EJ 2014 and the principles on environmental justice articulated in EPA's Strategic Plan for 2011-2015. It is also responsive to the mandate in EO 12898 which requires that EPA identify and address disproportionately high and adverse human health or environmental effects of its policies, programs and activities on minority, low income, and tribal populations.
- Results produced by the new research grants on cumulative risks and impacts will demonstrate successful approaches to incorporating

community knowledge into the development of such tools and the application of qualitative approaches and social science methods into cumulative impact assessments. EPA's programs will benefit from the development of the CCAT through engaging with stakeholders to address the community-based assessment of cumulative risks with environmental justice concerns.

- Intensive engagement with environmental justice stakeholders will improve the incorporation of these issues in the design of the CRA Guidelines. The CCAT will improve the capacity of EPA regional risk assessors to assist communities in understanding the complexity of risk, and provide the means by which to identify priorities. Also the CRA-EJ software will assist programs in implementing the planned "Technical Guidance for Incorporating Environmental Justice into Rulemaking Activities" by facilitating a step-by-step approach to evaluating cumulative risks and impacts. More broadly the CRA Guidelines will affect risk-based decision making across the full range of EPA's programs, nationally, regionally, and more locally. The CCAT is a project under the RAF CRA Technical Panel, and will directly incorporate environmental justice into CRA and thus introduce environmental justice risk-based considerations throughout EPA's policies and decision making.
- The process for developing these tools, data, methods, and guidance will lead to innovative approaches and tools for incorporating environmental justice concerns in EPA's regulatory and policy decision making. Other innovations include identifying research needs and data gaps on topics such as environmental public health indicators to assess disparities, equity impact assessment methods, metrics to assess inequities in risk assessments to support rule making, and policy and program evaluation. ORD plans to bridge these data gaps through both intramural and extramural research programs.
- Initial community interaction for the development of the Urban Atlas will proceed through EPA's existing initiatives such as the CARE and Environmental Justice Showcase Communities programs and the EPA/U.S. Department of Housing and Urban Development (HUD)/U.S. Department of Transportation (DOT) Partnership for Sustainable Communities, and their EPA liaisons. Information about ecosystem services will expand options for improving community health and well-being, and clarify economic and other trade-offs involved in alternate environmental mitigation and remediation decisions. The selection of focal areas along several gradients is designed to facilitate the application of observed linkages between community welfare and ecosystem services to additional populated places of concern to EPA.

Timeframe

- Develop final draft of technical guidance by FY 2013.
- Develop and refine screening tools that identify air rules that raise potential environmental justice concerns (FY 2011).
- Determine the analytical tools are most appropriate for particular types of air rulemaking (FY 2011-12).
- Identify any additional analytical tools that may be needed to better understand the environmental justice implications of air rulemakings (FY 2011-12).
- Host community-based tools workshop(s) and Regional Tools Summits with focus on environmental justice and health disparities, to solicit recommendations and inform EPA's actions on tools under Plan EJ 2014 (FY 2012-13).
- Develop final Environmental Quality Index (Long term).
- Beta test a prototype of the CCAT in early 2012.
- Complete first phase of the Urban Atlas will be completed in FY 2013; incorporate additional populated areas will begin in FY 2012 and FY 2013, contingent upon funding.

Strategy 2: *Incorporate perspectives from community-based organizations and community leaders into EPA research agendas and engage in collaborative partnerships on science and research to address environmental justice.*

A few initiatives are highlighted here to better engage with communities in EPA science activities and implementation of regulatory programs.

Activity 2.1: Establish Community Engagement Initiative.

OSWER has launched the Community Engagement Initiative (CEI), www.epa.gov/oswer/engagementinitiative/, which is designed to enhance OSWER and regional offices' engagement with local communities and stakeholders (e.g., state and local governments, tribes, academia, private industry, other federal agencies, non-profit organizations) to help them meaningfully participate in government decisions on land cleanup, emergency preparedness and response, and the management of hazardous substances and waste.

Activity 2.2: Re-engage with National Environmental Justice Advisory Committee.

ORD intends to establish a health and research workgroup or subcommittee within National Environmental Justice Advisory Committee (NEJAC) to advise the EPA Administrator and ORD in the area of scientific research, health impacts, and environmental risks and exposures that directly relate to environmental justice. An initial task of the workgroup will be to advise ORD on the development of the Sustainable and Health Communities Research Program.

Activity 2.3: Support Community-based Participatory Research.

Participatory research methods will be integrated into the new ORD research program on Sustainable and Healthy Communities and new extramural research solicitations to support CBPR are under consideration. A significant feature of the Sustainable and Health Communities Research program will be community and regional based projects. Applying participatory research methods will be the hallmark of this new program within ORD. Community-based participatory research (CBPR) fosters more complete understandings of the existing interactions between environmental conditions, human health and ecosystems. Researchers, practitioners, community members, and funding institutions have increasingly recognized the importance of comprehensive, holistic, and participatory approaches to environmental research and later stages of intervention. For EPA, applying CBPR in its scientific research and program planning promises to lead to more appropriate solutions for the persistent and uneven social disparities in health as well as access to clean and safe environments.

Benefits to EPA Stakeholder Communities

- These actions are in agreement with suggestions from environmental justice stakeholders to integrate perspectives from community residents and community leaders in the development of the EPA's scientific research agendas as well as in data collection.
- OSWER's CEI will include direct outreach to state and local governments, tribes, academia, private industry, other federal agencies, and non-profit organizations. The CEI is designed to help stakeholders have meaning participation in EPA's decisions on land cleanup, emergency preparedness and response, and the management of hazardous substances and waste. It will also improve OSWER efforts to protect human health and the environment through site cleanups and other risk reduction activities.
- Re-establishing a NEJAC health and research workgroup or subcommittee would provide a critically needed formal mechanism for environmental justice stakeholders, community-based organizations to provide input and feedback into the EPA/ORD research initiatives. Presently, ORD lacks any mechanism for public input into its research agenda. If concerns about environmental and health inequalities are not "on the table" they will be not be addressed by the EPA research enterprise. However it must be recognized that a NEJAC subcommittee cannot be the only approach for soliciting the contribution of environmental justice stakeholders. ORD will need to identify additional approaches for soliciting input and collaborating with environmental justice stakeholders (e.g., through regional outreach, the Regionally Applied Research Effort (RARE) program, and partnering with EPA program offices and other federal agencies). Creating formal mechanisms for receiving stakeholder input assures that community wisdom, perspectives and values are duly considered and accommodated in the development of

ORD's new program. Moreover, such mechanisms assure that the results of this program, which subsequently influence decision making at EPA, also consider robust community input.

Impacts on EPA programs and activities

- Nearly all of OSWER programs and activities will be impacted by the various CEI actions. The CEI is designed to enhance OSWER and regional offices' engagement with local communities and stakeholders, and to help them meaningfully participate in government decisions on land cleanup, emergency preparedness and response, and the management of hazardous substances and waste.
- The first task for this NEJAC workgroup could be to advise ORD on developing the Sustainable and Healthy Communities Research Program initiative, which is currently being discussed. Since this research program is in its early stages of development, engaging a NEJAC workgroup now could be extremely beneficial to ORD to help set the course, identify critical research questions that should be addressed and how best to solicit input and potential partnerships with community-based organization and environmental justice leaders such as hosting public forums on the *Sustainable Community Environments and Public Health* research program.

Timeframe

- Each of the CEI actions has defined deliverables and timeline for their completion. Nearly all of the actions have significant deliverables due in FY 2011.
- Incorporate ideas and concerns from stakeholders and representatives from disproportionately impacted communities and populations (FY 2011).
- Establish a NEJAC workgroup on research by FY 2012.
- Issue joint RFA or other funding mechanism to collaborate with NIH National Institute Minority Health and Health Disparities to establish national research Centers of Excellence on Environment and Health Disparities (FY 2012).

Strategy 3: *Leverage partnerships with other federal agencies on issues of research, policy, and action to address environmental and health disparities.*

Environmental justice and related concerns for health inequalities are complex and multi-dimensional. Solutions to these societal problems require intersectoral and intergovernmental actions. Environmental justice is not solely EPA's responsibility, just as health disparities cannot be seen solely as a U.S. Department of Health and Human Services problem. At present, governmental approaches to promoting and managing health and it determinants, namely the environment, are fragmented. Symposium participants recognized in order to achieve environmental justice, a multi-stakeholder, multi-system approach is required. Within federal agencies, we need to strengthen federal interagency collaboration to improve research that can impact

environmental and health practice, programs, and policy and formulate solutions for communities.

Activity 3.1: Join the Federal Collaboration on Health Disparities.

EPA's ORD will actively participate on the interagency Federal Collaboration on Health Disparities Research (FCHDR) and represent EPA on the Executive Steering Committee (http://minorityhealth.hhs.gov/fchdr/). The Executive Committee of the FCHDR was created to bring together selected agency representatives to seek practical solutions to advance health disparities research, and foster greater federal coordination, collaboration, and communication around the elimination of health disparities.

Federal departments represented on the Executive committee include:

- U.S. Department of Education
- National Institute on Disability and Rehabilitation Research
- U.S. Department of Housing and Urban Development
- U.S. Department of Justice
- U.S. Department of Veterans Affairs
- U.S. Environmental Protection Agency
- National Science Foundation
- U.S. Department of Health and Human Services (HHS), Centers for Disease Control and Prevention
- HHS, Health Resources and Services Administration
- HHS, National Institute for Minority Health and Health Disparities
- HHS, Office of Minority Health

The FCHDR's goal is to ensure that health disparities research is conducted as an integrated and inclusive field of study, rather than as an aggregate of independent research activities occurring in separate research domains. FCHDR members will work together to explore needs and opportunities for pooling scientific expertise and resources to conduct, translate, and disseminate research most needed to accelerate the elimination of health disparities.

FCHDR goals and strategies are to:

1. Identify health disparities challenges including the scientific and practical evidence most relevant to underpinning future policy and action.
2. Increase and maintain awareness about federal government efforts and opportunities to address health disparities.
3. Determine how evidence can be translated into practice to address health disparities and promote innovation.
4. Advise on possible objectives and measures for future research, building on the successes and experiences of health disparities experts.
5. Publish reports that will contribute to the development of the FCHDR strategic vision and plan.

Activity 3.2: Engage with President's Task Force on Environmental Health Risks and Safety Risks to Children.

EPA's OAR, the Office of Children's Health Protection (OCHP), ORD, and others are collaborating and participating with other federal agencies on the newly re-established President's Task Force on Environmental Health Risks and Safety Risks to Children. One focal area of their work is on asthma disparities among minority and disadvantaged children. In early December 2010, a Federal Workshop on Asthma Disparities was held in Washington, D.C., to foster interagency coordination on development and implementation of a detailed Federal Action Plan to address asthma disparities.

Benefits to EPA Stakeholder Communities

- More coordinated federal approach to research, policy, and action to address environmental justice health disparities.

Impact on EPA programs and activities

- EPA's participation in these three federal initiatives will identify and create opportunities to combine resources to tackle issues of disparities in health and access to clean environments; and will increase access and exposure of all EPA offices, including ORD, to non-traditional EPA disciplines such as social science and concepts such as social determinants of health.

Timeframe

- ORD's participation with the federal collaboration is ongoing.
- Participation with other federal agencies on the President's Task Force on Environmental Health Risks and Safety Risks to Children to work on asthma disparities among minority and disadvantaged children that can be addressed through interagency coordination on development and implementation of a detailed Federal Action Plan (FY 2011- 2015).

Strategy 4: *Build and strengthen the technical capacity of EPA scientists on conducting research and related science activities in partnership with impacted communities and translating research results to inform change.*

Along with efforts to increase technical capacity in communities, EPA needs to build up its capacity to work with communities in order for real progress to be made. Several recommendations from the Symposium address this issue and call for EPA to:

- Train EPA staff on effective outreach and dialog with communities;
- Develop capacity within the Agency.
- Provide training for EPA risk assessors and managers on community engagement.
- Consider using qualitative approaches in risk assessment.
- Establish multi-disciplinary teams to work on issues.
- Encourage multidisciplinary teams in environmental health research.

- Explore approaches for interacting with communities that can build collective efficacy and social capital.
- Support participation of communities as equal partners in research; include them as equal partners in the co-production of knowledge.
- Include community representatives and perspectives in the design of studies/research.

Social science disciplines like social epidemiology indicate that EPA needs to look more at upstream factors – social processes that ultimately process the disparities in risks and health outcomes.

Activity 4.1: Provide training to EPA scientists on CBPR.

Both ORD and OSWER intend to provide training to scientists on principles of community-based participatory research, health disparities, and environmental justice. Both offices will look for opportunities to collaborate on providing training for staff. For example, OSWER's Community Involvement and Program Initiatives Branch (CIPIB) sponsors a Community Involvement University (CIU) to provide training courses for Superfund Program Community Involvement Coordinators (CIC) and other EPA and EPA-affiliated staff. Participants are provided with the necessary skills, techniques, and practices to engage the community in the Superfund process. CIU offers a variety of courses each year at regional offices and at national conferences or training events. These courses could be offered to ORD scientists and modified to address community-engagement in more of the research context.

In order to design appropriate capacity training program, ORD will first evaluate current understanding and research capacity of ORD sciences regarding principles of community-based participatory research, health disparities, and environmental justice. ORD will then design and implement training for its staff.

Activity 4.2: Build Social Science Capacity within ORD.

The National Center for Environmental Research (NCER) is developing an ORD research agenda for behavioral and social sciences as they impact and affect environmental protection as well as the evolution of environmental policy. Environmental justice consideration will be critical to this research agenda. ORD will conduct Individual and focus group interviews of behavioral and social science experts to solicit their thoughts and identify the most relevant current research as well as known gaps in four areas: behavioral economics, decision theory, management science, and risk perception. Following the expert interview, NCER will host a workshop with the scientific leaders identified through the interview phase (30-50 people).

NCER plans to establish a cooperative agreement with a professional society concerned with applying the social science research to contemporary environmental health issues. This effort is intended to

help ORD devise approaches and methods for truly incorporating the social sciences into its research and assessment activities. Activities under the cooperative agreement could include:

- Providing training to ORD staff on incorporating qualitative approaches and social science methods into cumulative impact assessments.
- Developing approaches to incorporate community knowledge in such tools for cumulative impact assessments.
- Offering webinars and training to cultivate analytical skills among ORD staff to examine the social and economic systems that create cumulative adverse environmental impacts in communities.

Activity 4.3: Develop Environmental Justice Risk Management Training for OPP.

The Office of Pesticide Programs (OPP) has created a new training module as a part of its regular staff training program to ensure that environmental justice and sensitive population considerations are fully incorporated and more clearly characterized in the pesticide risk assessment process. The training module consists of two components: (1) addressing general background on environmental justice, and (2) integrating environmental justice considerations through OPP risk management to address environmental justice issues identified by the risk assessments.

Benefits to EPA Stakeholder Communities

- Impacted communities and environmental justice leaders should see improved interactions with Agency scientists.
- The goal of OPP's training is to provide the tools to better identify potential environmental justice issues. Enhanced risk assessment methodologies will result from a closer and more focused look at the toxicity and exposure patterns specific to each pesticide and pesticide use that could present a disproportionate risk. Areas now considered in pesticide risk assessment (hazard assessment, dietary exposure, occupational and resident exposure, incident data) will be considered through an environmental justice lens.

Impact on EPA programs and activities

- We anticipate that the capacity of Agency scientists to conduct research in partnership with impacted communities, to understand and employ social science methods in environmental research, and translate research results to inform change will be greatly improved. This will help ORD's Sustainable and Healthy Communities Research Program meet its objectives.
- The OPP training program will improve how environmental justice is incorporated by risk managers. This training is expected to influence pesticide registration and re-registration decisions to more robustly incorporate environmental justice considerations. To date, 10 training sessions on the first component and a total of 160 OPP staff completed the training.

Timeframe

- Host scientist to scientist workshop on behavioral and social sciences (late FY 2011).
- Design a research capacity training program for ORD scientists, which could include self-paced training on community-based and participatory research CBPR offered by Michigan Public Health Training Center and joint courses through OSWER's Community Involvement University (FY 2012–2013).
- Complete the new OPP module on risk management training by early FY 2012. The goal will be to have 100 percent of risk assessors and managers trained by the end of FY 2012.

Strategy 5: *Build and strengthen technical capacity of community-based organizations and community environmental justice and health leaders to address environmental health disparities and environmental sustainability issues.*

Community capacity has been defined as "a set of dynamic community traits, resources, and associational patterns that can be brought to bear for community-building and community health improvement" (Norton et al 2002). "Community capacity building activities" are those designed to increase community capacity and emphasize (1) assets and empowerment (versus disease and deficiency); (2) the role of bottom-up, community-determined processes and agendas (versus top-down/externally determined ones); and (3) the processes for developing community competence.

The commissioned paper on community-capacity presented at the March 2010 Symposium identified important domains of action to strengthen community capacity, including leadership, participation, skills, resources, social and organizational networks, sense of community and understanding of community history, community power, community values, community cohesion, language capacity, and community information.
(See
http://www.epa.gov/ncer/events/calendar/2010/mar17/papers.html)

In addressing all of these domains, strategies for enhancing community capacity may include training and technology transfer, technical assistance, community-based participatory research, empowerment approaches, community organizing, and social action. Commissioned paper authors noted that capacity-building strategies that give more control to communities (e.g., CBPR, empowerment, and community organizing) may more fully address the fundamental causes of environmental disparities than more Agency-controlled processes (e.g., training and technical assistance).
(See
http://www.epa.gov/ncer/events/calendar/2010/mar17/presentations/freudenberg.pdf)

These community-driven strategies are more labor and resource intensive and require a higher level of commitment from communities, researchers, and agencies, as well as a new set of capabilities on the part of Agency personnel with regard to the skills needed to, for example, facilitate meetings, communicate clearly, and create an atmosphere of inquiry and trust.

In order to more effectively reduce disparate environmental exposure and engage the public in making environmental policy decisions, the EPA must engage relevant constituencies in participation processes early, provide these constituencies with the resources and information that can contribute to effective participation, and ensure that the outcomes reflect participation. Specifically, helping communities develop the capacities to create, access, use, and interpret scientific information and changing Agency practices to better incorporate community voices in scientific activities and decisions will be a key and proper task for EPA. EPA, therefore, proposes the following actions to establish programs and provide federal government support to increase technical and scientific capacity in communities.

Activity 5.1: Build Awareness and Community Capacity to Address Asthma Disparities.

In response to the growing asthma problem where minority, low-income, tribal, and indigenous populations are disproportionately affected, EPA's OAR established the Asthma Program to promote scientific understanding of environmental asthma triggers and ways to manage them. The program collaborates with partners to support research and educate the public about asthma and ways to manage environmental triggers. Partners include government agencies, universities and research centers, the health care community, nonprofit organizations, and community programs. Major program activities center around the Communities in Action for Asthma Friendly Environments initiative, and include support for real time peer-to-peer learning, technology transfer and resources for community-based asthma programs through an online network (www.AsthmaCommunityNetwork.org), "pacing" events (National Asthma Forum, regional events and webinars), and support to non-profit organizations focused on health care provider training, improving school environments and raising public awareness about asthma (see also Supporting Community-Based Action Programs, Strategy 2, Activity 3).

Activity 5.2: Build Tribal Community Capacity to Monitor Air Quality.

OAR has a long history of supporting capacity building among tribal environmental professionals, primarily through its partnership with the Institute for Tribal Environmental Professionals (ITEP) at Northern Arizona University, which OAR has supported for over 15 years. Consistent with our trust responsibility to tribes, OAR works with tribes to increase their capability to address their environmental concerns. OAR supports the training and educational efforts of ITEP in the areas of air quality and

climate change impacts and adaptation planning, as well as the work of the Tribal Air Monitoring Support (TAMS) Center, which builds and strengthens the technical capacity of tribal staff. The TAMS Center cross-trains tribal air professionals on air monitoring, indoor air quality, radon, and asthma (see also Supporting Community-Based Action Programs, Strategy 2).

Activity 5.3: Increase Citizen Participation in Science and Decisions.

ORD proposes to create a program, in partnership with other governmental agencies, private non-profits, professional societies, and private foundations, to develop the capacity of community leaders to understand the role of science in decision making and influence the decision-making process and on the use of data and other information to document disparities and concerns in their communities.

Activity 5.4: Establish Centers of Excellence on Environment and Health Disparities.

Several new extramural research solicitations are under consideration to fund research that address specific research needs and topics raised at the March 2010 Symposium and that fully employ CBPR approaches such as establishing Centers of Excellence on Environment and Health Disparities. The aim for these Centers will be to examine the joint impacts of social and physical environmental conditions and processes on health, link with community health clinics to increase their capacity to address occupational and environmental health concerns of their constituents, and design policy solutions to ameliorate and prevent disparities.

Activity 5.5: Build diverse environmental workforce and enhancing the capacities of Minority Academic Institutions (MAI) to engage in scientific research and workforce training

The National Center for Environmental Research's (NCER) Fellowship Program is implementing several initiatives to strengthen EPA's efforts to encourage and support environmental justice research among the next generation of environmental scientists and engineers. For example, Environmental justice research topics are highlighted in the STAR Fellowships RFA and environmental justice considerations have been included as review criteria under "Broader Societal Impacts" for all fellowship applications.

As part of the Greater Research Opportunities (GRO) fellowship, NCER has a goal of enhancing capacity at academic institutions that are not well funded for environmental research capacity, including HBCUs. ORD considers ineligible those institutions identified as receiving more than $35 million in annual federal research. NCER has increased resources allotted to the GRO program to increase GRO funded students, which can enhance our efforts in this area.

OSWER will support research through the Faculty and Student Teams (FaST) Program, a cooperative effort between the U.S. Department of Energy (DOE) Office of Science and the National Science Foundation (NSF). Faculty from colleges and universities with limited research facilities and those institutions serving populations, women and minorities underrepresented in the fields of science, engineering, and technology are encouraged to apply for the FaST program. The FaST program will support a team comprised of one faculty member and two to three undergraduate students. The program provides hands-on research opportunities in the DOE or EPA national laboratories during the summer. The faculty member identifies a mutually beneficial research area amenable to collaboration by the faculty member and the laboratory scientist.

The EPA Region 6 University-Community Partnerships initiative will facilitate and nurture a partnership between universities and community groups to increase overburdened communities' capacity to address their environmental challenges through technical assistance. Memorandums of Understanding (MOU) are in place between EPA Region 6 and the University of Texas El Paso (UTEP) and EPA Region 6, EPA's Office of Water and Texas A&M Kingsville.

Within the federal government, EPA has been a leader in the use of collaborative approaches to accomplish strategic goals and objectives. Learning from this rich experience can help the Agency realize the full potential of collaborative processes and accelerate environmental progress. The ability to collaborate effectively with MAIs will become more important as the growing complexity of environmental problems will require diverse approaches to developing innovative solutions. Failure to tap into MAIs represents a missed opportunity for advancing environmental protection and stewardship. For example, MAIs in the Southeast and the Southwest could be leveraged for strategic projects targeting climate change impacts and adaptation, and engaging populations that are vulnerable to climate change.

Benefits to EPA Stakeholder Communities

- These capacity-building actions can help the public to address environmental health issues and to allow them to effectively participate in environmental health decision making and will increased confidence that concerns about the power dynamics between academic, government researchers, and communities will be taken seriously.
- Actions undertaken by the Asthma Program will equip stakeholder communities and organizations to assess, organize and sustainably deploy community resources to reduce or eliminate exposure to asthma triggers, and improve health outcomes and the quality of life for people with asthma. The actions help support and strengthen the capacity of health care and environmental professionals, schools, and community-based organizations to develop comprehensive asthma

care strategies in partnership with impacted communities and to spread their results to accelerate improvements across the national asthma care landscape.

- Through the partnership with ITEP, tribes are better able to fashion their own responses to environmental issues including climate change, and have a better understanding of how they can effectively participate in the environmental decision making of federal, state and local regulatory agencies.
- Research through the proposed Centers of Excellence will be specially aimed at benefiting disadvantaged, undeserved, and environmentally overburdened communities or groups.
- Requiring NCER fellowship applicants to consider and explain the environmental justice implications of their research will help develop a new generation of environmental scientists, engineers, and policy makers who are cognizant of environmental justice -related issues that can arise in research and thus adjust approaches accordingly to promote broad environmental protection.
- Increasing the reach of the GRO program will promote research and training at Minority Serving Institutions (MSIs), which may have special expertise on environmental justice matters.
- Through the Region 6 partnerships with University of Texas and Texas A&M Kingsville, EPA will increase knowledge about best approaches for community–university partnerships.

Impact on EPA programs and activities

- The Communities in Action initiative and the online Network, Asthma Community Network will surface important, field-tested community strategies that the Asthma Program will use to bolster the Agency's national asthma education and outreach efforts.
- When tribal perspectives are effectively communicated, EPA is more cognizant of Tribal issues and is able to make more informed and responsive decisions concerning its rules, programs and policies. As tribes take more responsibility for implementing air programs, EPA may be able to reduce some of its implementation efforts.
- The proposed research-oriented activities will help institute program development and strategic institutional change within EPA. The goal is to increase democratization in the conduct of and community access to EPA/ORD research. The proposed activities will produce: (1) consistent and validated principles of community engagement in research for ORD and EPA programs; (2) improved science and research results that are more relevant to environmental problems faced by the public and more effectively translated to inform policy change and intervention; and (3) inclusion of environmental justice considerations as review criteria that serve as a model for other competition-based EPA programs. These results will promote a culture that considers environmental justice implications in all agencies funding actions and activities.
- The process of increasing the reach of the GRO program will translate into stronger outreach to MSIs and highlight the critical role MSIs play

in the nation's research and development enterprise to solve pressing environmental protection challenges.

- The intent of Region 6's existing MOU's are to: (1) improve the quality of environmental science and technical education; (2) increase the relevance of UTEP research projects to EPA's environmental and public health mission; and (3) increase number of culturally diverse students electing to pursue graduate study and research careers in areas including science, engineering, and mathematics. It is expected that UTEP's capacity to develop environmental specialists for potential EPA employment will be significantly enhanced while important contributions will be made to EPA's overall research and developmental programs.

Timeframe

- Support and grow an online community network of stakeholders that serves as a real time resource for mentoring and collaboration to support community asthma management programs (FY 2011 and ongoing).
- Develop web-based tools that facilitate collaboration, problem solving, and learning among leaders of asthma programs (FY 2011 and ongoing).
- Facilitate knowledge transfer among stakeholders through EPA sponsorship of "pacing" events, including the National Asthma Forum, regional events and webinars for community-based asthma programs (FY 2011 and ongoing).
- Train health care professionals to improve their ability to integrate the assessment of environmental factors into a comprehensive, culturally appropriate asthma care plan, based on national standards of care (FY 2011 and ongoing).
- Continue funding for ITEP and the TAMS Center (ongoing).
- Continue OAR involvement in developing ITEP's curriculum and training, and oversight of the TAMS Center (ongoing).
- Institute a pilot program on "meet the decision-makers" on environmental health and environmental justice that would accommodate up to 15 community leaders (FY 2013).
- Issue joint RFA or other funding mechanism to collaborate with NIH National Institute Minority Health and Health Disparities to establish national research Centers of Excellence on Environment and Health Disparities (FY 2012).
- Highlight Environmental Justice Research topics in the STAR Fellowships RFA (ongoing).

2.2 Community Engagement and Stakeholder Partnership Plan

Community outreach and engagement plans are integrated into the individual science actions described above. The most significant science actions that will include community outreach and partnerships are ORD's Sustainable and Health Communities Research Program, OSWER's Community Engagement Initiative and the extramural research funding under consideration.

3.0 DELIVERABLES

Strategy 1: Apply integrated transdisciplinary and community-based participatory research approaches with a focus on addressing multi-media, cumulative impacts, and equity in environmental health and environmental conditions.

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 1.1: Establish an Integrated Transdisciplinary ORD Research Program on Environment and Community Health – *Sustainable and Healthy Communities Research Program.*	▪ Research program framework developed (ORD - SHCRP Team).	▪ February 2011
	▪ Regional listening sessions to gather input from communities. Incorporate ideas and concerns from stakeholders and representatives from disproportionately impacted communities and populations (ORD - SHCRP Team).	▪ Spring 2011
	▪ RFA to support Extramural research on Tribal Community Health (ORD – NCER).	▪ FY 2012
	▪ RFA to support Extramural research to support Centers of Excellence on Environment and Health Disparities (ORD – NCER).	▪ FY 2012
Activity 1.2: Develop technical guidance, analytic methods, tools and data to advance the integration of environmental justice in EPA decision making.	▪ Environmental Justice Technical Guide (ORD, OEJ, OP).	▪ FY 2013
	▪ Community Cumulative Assessment Tool (CCAT) (ORD - NERL and OSA).	▪ Early FY2012
	▪ Environmental Quality Index Tool (ORD – NHEERL).	▪ Long-term
	▪ Regional Tools Summits (ORD - OSP and SHCRP Team).	▪ FY 2012 – 2013
	▪ Environmental justice screening tools for air rules (OAR).	▪ FY 2011 – 2012
	▪ Urban Atlas (ORD – NHEERL).	▪ First phase complete FY13

Strategy 2: Incorporate perspectives from community-based organizations and community leaders into the EPA's research agendas and engaging in collaborative partnerships on science and research to address environmental justice.

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 2.1: Establish Community Engagement Initiative (OSWER).	▪ Conduct training of OSWER staff on CBPR (OSWER).	▪ Ongoing
Activity 2.2: Re-engage National Environmental Justice Advisory Committee.	▪ Establish a research workgroup under NEJAC to advise ORD on the development of the Sustainable and Health Communities Research Program (ORD - NCER and OSP; OEJ).	▪ FY 2012
Activity 2.3: Support Community-Based Participatory Research.	▪ RFA to support extramural research on Tribal Community (ORD-NCER). ▪ RFA to fund Extramural research to support Centers of Excellence on Environment and Health Disparities (ORD – NCER). ▪ Regional listening sessions to gather input from communities. Incorporate ideas and concerns from stakeholders and representatives from disproportionately impacted communities and populations (ORD - Rick Linthurst and SHCRP Team).	▪ FY 2012 ▪ FY 2012 ▪ Spring 2011

Strategy 3: Leverage partnerships with other federal agencies on issues of research, policy and action to address environmental and health disparities.

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 3.1: Join the Federal Collaboration on Health Disparities.	▪ Potential collaboration on research funding with sister federal agencies; better coordination of research needs on health disparities across federal government (ORD).	▪ Ongoing
Activity 3.2: Engage with President's Task Force on Environmental Health Risks and Safety Risks to Children.	▪ Federal Action Plan to address asthma disparities (OCHP, ORD, OAR).	▪ FY 2011-2015

Strategy 4: Build and strengthen the technical capacity of EPA scientists on conducting research and related science activities in partnership with impacted communities and translating research results to inform change.

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 4.1: Provide training to EPA scientists on CBPR.	▪ Survey ORD scientists' needs and awareness about CBPR(ORD - OSP and NCER).	▪ FY 2012 – 2013
	▪ Develop a training plan for ORD scientists (ORD - OSP and NCER).	▪ FY 2012 – 2013
	▪ Collaborate with OSWER to modify and offer courses under the Community Involvement University (ORD and OSWER).	▪ FY 2012 – 2013
Activity 4.2: Build Social Science Capacity within ORD.	▪ Host scientist to science workshop on behavioral and social sciences (ORD-NCER).	▪ FY 2011 – 2012
	▪ An ORD research agenda for behavioral and social sciences (ORD-NCER).	▪ FY 2012 – 2013
	▪ Cooperative Agreement with a Social Science professional society (ORD- NCER).	▪ FY 2012 – 2013

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 4.3: Develop Environmental Justice Risk Management Training for OPP.	▪ Training module to ensure environmental justice and sensitive population considerations are fully incorporated and more clearly integrated throughout OPP risk management processes (OPP).	▪ By early FY2012
	▪ 100% of OPP risk assessors and managers properly trained on environmental justice in risk management (OPP).	▪ End of FY2012

Strategy 5: Build and strengthen technical capacity of community-based organizations and community environmental justice and health leaders to address environmental health disparities and environmental sustainability issues.

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 5.1: Build Community Capacity to Address Asthma Disparities.	▪ Establish an online community network available to stakeholders as a year-round resource for mentoring and collaboration and designed to support community asthma management programs (OAR).	▪ FY 2011 and ongoing
	▪ Develop web-based tools that facilitate collaboration, problem solving, and learning among leaders of asthma programs (OAR).	▪ FY 2011 and ongoing
	▪ Hosting the National Asthma Forum and Awards Program and regional pacing events for community-based programs (OAR).	▪ FY 2011 and ongoing
	▪ Train health care professionals, to improve their ability to integrate the assessment of environmental factors into a comprehensive, culturally appropriate asthma care plan, based on national standards of care (OAR).	▪ FY 2011 and ongoing

ACTIVITIES	DELIVERABLES	MILESTONES
Activity 5.2: Build Tribal Community Capacity to Monitor Air Quality.	▪ Continue funding for ITEP and the TAMS Center (OAR).	▪ Ongoing
Activity 5.3: Increase Citizen Participation in Science and Decisions.	▪ Cooperative agreement to support a citizen scientist fellowship program – a meet the decision makers" on environmental health and environmental justice (ORD-NCER).	▪ FY 2013
Activity 5.4: Establish Centers of Excellence on Environment and Health Disparities.	▪ RFA to support Extramural research to support Centers of Excellence on Environment and Health Disparities (ORD – NCER)	▪ FY 2012
Activity 5.5: Build diverse environmental workforce and enhancing the capacities of MAI to engage in scientific research and workforce training.	▪ Highlight environmental justice research topics in the STAR Fellowships RFA. Include environmental justice considerations as review criteria under "Broader Societal Impacts" for all fellowship applications (ORD-NCR)	▪ Completed and ongoing
	▪ Support research through the FaST Program and provide university faculty and students to have hands-on research opportunities in DOE or EPA national laboratories (OSWER)	▪ Ongoing
	▪ Establish a University-Community Partnerships initiative to provide technical assistance to local community groups and increase number of culturally diverse students electing to pursue graduate study and research careers (Region 6).	▪ To be determined (TBD)

4.0 REPORTING

There is no overall reporting plan for the science activities at this time. However, program reporting may occur by the individual program offices responsible for each activity. For information, please contact Devon Payne-Sturges, 703-347-8055, Payne-Sturges.Devon@epa.gov; or Chris Saint, 202-564-9839, Saint.Chris@epa.gov.

APPENDIX

Appendix A: References

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Appendix B: Acronyms

CARE	Community Action for a Renewed Environment
CBPR	Community-Based Participatory Research
CEI	Community Engagement Initiative
C-FEST	Community-Focused Exposure and Risk Screening Tool
CIC	Community Involvement Coordinator
CIPIB	Community Involvement and Program Initiatives Branch
CIU	Community Involvement University
CCAT	Community Cumulative Assessment Tool
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EO 12898	Executive Order 12898
EPA	U.S. Environmental Protection Agency
FaST	Faculty and Student Teams (Program)
FCHDR	Federal Collaboration on Health Disparities Research
FY	Fiscal Year
GIS	Geographic Information System
GRO	Greater Research Opportunities (fellowship)
HBCU	Historically Black Colleges and Universities
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
ITEP	Institute for Tribal Environmental Professionals
MAI	Minority Academic Institutions
MOU	Memorandum of Understanding
MSI	Minority Serving Institution
NCER	National Center for Environmental Research
NCMHD	National Center on Minority Health and Health Disparities
NEJAC	National Environmental Justice Advisory Committee
NERL	National Exposure Research Laboratory

NGO	Non-governmental organization
NHEERL	National Health and Environmental Effects Research Laboratory
NIH	National Institutes of Health
NSF	National Science Foundation
OAR	Office of Air and Radiation
OCHP	Office of Children's Health Protection
OCSPP	Office of Chemical Safety and Pollution Prevention
OP	Office of Policy
OPP	Office of Pesticide Programs
ORD	Office of Research and Development
OSA	Office of the Science Advisor
OSP	Office of Science Policy
OSWER	Office of Solid Waste and Emergency Response
OW	Office of Water
RAF	Risk Assessment Forum
RARE	Regional Applied Research Effort Program
RFA	Request for Applications
SHCRP	Sustainable and Healthy Communities Research Program
STAR	Science to Achieve Research (grant)
TAMS	Tribal Air Monitoring Support (Center)
UTEP	University of Texas El Paso

Appendix C: Recommendations from the Science of Disproportionate Impacts Analysis Symposium (Washington, DC, March 17-19, 2010)

Symposium participants recommended several actions to reduce research or data gaps, overcome limitations in the theories and methods for conducting environmental research, particularly research supported by federal government, and limitations in practice of risk assessment. The science recommendations are described below. The first sentence is a summary statement meant to capture the main points of the individual recommendations from the Symposium that follow, including recommendations from the Environmental Justice-Caucus letter that was sent to Lisa Garcia, Senior Advisor to EPA Administrator for Environmental Justice.

1. Create and institute a new scientific research approach to develop more holistic understanding of environment and health. One of the potential outcomes of this new framework is to inform environmental policies related to environmental justice and address environmental health disparities. Several recommendations from the symposium point to EPA to adopt a more holistic view of the environment and the impacts on population health: "[the] EPA/ORD's research agenda needs to be reframed, inequality and inequity needs to be a part of the discussion [and research]; there needs to be a shift to not only look at risks and exposures, but to consider root and fundamental causes, need to start where it (inequality) begins; [the] EPA likes to start the analysis and research at a level that does not address the history and root causes of health endpoints, risks and exposures; analyze the environment in a broader context, evaluate the interaction between the social and the physical environments; a better framework is needed for combining physical and psychosocial science in research and practice; use social determinants of health and health disparities research framework to conduct research on cumulative impacts/risks; encourage multidisciplinary teams in environmental health research; develop the science of interactive effects; social science disciplines like social epidemiology indicate that [the] EPA needs to look more at upstream factors – social processes that ultimately process the disparities in risks and health outcomes; develop measures for the social environment; test the validity of available vulnerability indices and tools; encourage multidisciplinary approach to research and analysis; address the role of institutionalized racism in poor community environmental health; encourage the consideration of environmental justice in land use planning; and conduct research with direct policy implications - not research for the sake of research."

Further, the Environmental Justice-Caucus participants recommend that "[the] EPA should develop a plan to ensure incorporation of the concept

of vulnerability, particularly its social and cultural aspects in the Agency's research agendas" and "… in consultation with environmental justice constituencies, incorporate community principles in its funding guidelines for research in environmental health and planned and existing actions that adversely impact public health and quality of life."

2. Integrate perspectives from decision makers such as community residents, community leaders, community-based NGOs and community health and environmental quality advocates in the development of EPA's scientific research agendas as well as in data collection, conduct of exposure/risk assessments and risk management decisions.
A common recommendation articulated in both the Environmental Justice-Caucus letter and through discussions the Symposium is the need to incorporate community perspectives in the development of EPA's science/research agendas and in the conduct of exposure/risk assessments. Signatories to the Environmental Justice-Caucus letter recommend that "[the] EPA and other publicly funded research require the expertise of environmental justice communities in the research design, implementation, recommendations and programmatic design that may result from the research" and "[the] EPA should develop a plan to ensure incorporation of the concept of vulnerability, particularly its social and cultural aspects in the Agency's research agendas." Related recommendations from the Symposium state "include community representatives and perspectives in the design of studies/research; communities would like to be involved as [the] EPA sets its research priorities and agenda as well as the regulatory agenda and priorities; and there needs to be a research workgroup formed within the NEJAC." Although the following recommendations from the Symposium stem from discussions on regulatory actions and capacity building, they also suggest that EPA/ORD needs to approach its research planning and its contributions to the development of Agency risk assessment guidance differently: "create effective mechanisms to listen to community concerns; develop culturally competent outreach processes. Hire local community folks with cultural expertise and community knowledge; and improve incorporation of exposure information for smaller communities and population groups in national risk assessments."

3. Create EPA funding mechanisms for community-based participatory research (CBPR) and transdisciplinary research, with a specific focus on studies that will benefit disadvantaged, undeserved, and environmentally overburdened communities or groups. The Environmental Justice-Caucus letter states that "affected communities need to be involved in the conduct of research to insure that that results are disseminated in an effective and understandable manner and that research recommendations are reviewed by the community." Similar recommendations were made at the Symposium including "support/fund community originated and owned research; increase support/funding for community based participatory research; support participation of communities as equal partners in research; include them as equal

partners in the co-production of knowledge; include community representatives and perspectives in the design of studies/research."

Further, Environmental Justice-Caucus letter recommends that EPA should also "develop a set of guidelines for federal environmental health research that would require community participation with binding ethical and Title VI guidelines for federally funded researchers in [environmental justice] communities and tribal nations." This is consistent with comments raised at the symposium encouraging "federal funders of University researchers to address the unequal power dynamic that often arises between Universities and impacted communities that are subject of environmental and public health research."

4. Collaborate with other federal government agencies on research, policy-making and other kinds of actions to address environmental health disparities. Many comments were made about the need to strengthen interagency efforts: "to address [environmental justice], need interagency collaboration; government approach to promoting and managing health is fragmented; agencies need to work together to formulate solutions for communities; other agencies should integrate [environmental justice] in all their activities."

5. Enhance the capacities of Minority Academic Institutions (MAI) to engage in scientific research and workforce training. For instance, help MAI institutions to provide training opportunities for minority students in relevant scientific disciplines. Several statements were made at the Symposium that there was a lack of diversity in the academic institutions represented at the meeting and as presenters. HBCUs need to be involved in this new and expanded area of research on environmental health disparities.

6. Develop and implement a multi-media approach to cumulative contamination exposures in environmental justice communities. **Restructure risks assessment practice to better account for multi-stressors that cumulatively impact community and population health and recognize that the concepts that vulnerability and health disparities are interrelated.** These recommendations from the Environmental Justice-Caucus letter echo many of the concerns and other recommendations raised at the Symposium on the topic of cumulative impacts. Comments from the Symposium include "communities see their environment as a whole not pieces; [the] EPA needs to address the issue of non-concordance between risk assessment results and community experience; vulnerability should be an integral part of cumulative risk assessment even it must be analyzed using qualitative measures; incorporate social vulnerabilities and cultural risks in risk assessments and cumulative risks/impact assessments; incorporate background risk in risk assessment; consider using qualitative approaches in risk assessment; adopt a quality of life approach; risk assessment should move away from individual lifestyles to one that considers the social context; focus on

health and well-being as opposed to risk, illness and death; [the] EPA should recognize that stressors in communities that are unaccounted for are not considered in risk assessments; adopt a systems approach to risk assessment and decision making; and [the] EPA should use information on cumulative impacts in all its decisions."

7. Establish programs and provide federal government support to increase technical and scientific capacity in communities. This capacity building can help the public to address environmental health issues and to allow them to effectively participate in environmental health decision making. The Environmental Justice- – Caucus letter recommends that "grant/funding programs be expanded to provide support directly to [environmental justice] communities, [environmental justice] organizations and networks, Tribes and Native organizations to assess and act on [environmental justice] issues." Additionally Symposium participants advocated that "[the] EPA include community-based organizations, leaders and residents in the co-production of knowledge and the scientific bases for environmental decision-making; make resources available to develop technical skills of community leaders on science and decisions; develop technical expertise within the communities; and commit resources to develop networks and centers/consortia with universities to support community groups with technical matters and participation in decision-making."

8. Develop analytic and assessment tools, and data collection approaches that could be used by community health advocates and environmental justice groups. Availability of appropriate tools and training on use of such tools would also help increase technical capacity of communities. For example recommendations include "work with local governments to provide access to data sources; influence their [local governments] data collection approaches; develop mapping tools that communities can use; encourage community engagement in the collection of data by government; explore the approach of using communities to collect data to overcome limitations of government data such as privacy issues and poor geospatial resolution; and develop zoning maps that are accessible to communities; regional councils of government can provide accurate city level data for community research."

9. Build capacities and skills among EPA/ORD staff and scientists to conduct research and other science related activities in equal partnership with impacted communities. This step must include diversifying EPA's technical and scientific expertise in the social sciences. Concomitant with efforts to increase technical capacity in communities, EPA/ORD needs to build up its capacity to work with communities in order for real progress to be made. Several recommendations from the Symposium address this issue: "train EPA staff on effective outreach and dialog with communities; develop capacity within the [A]gency; provide training for EPA risk assessors and managers

on community engagement; consider using qualitative approaches in risk assessment; multi-disciplinary teams are needed to work on issues; encourage multidisciplinary teams in environmental health research; social science disciplines like social epidemiology indicate that EPA needs to look more at upstream factors – social processes that ultimately process the disparities in risks and health outcomes; explore approaches for interacting with communities that can build collective efficacy and social capital; support participation of communities as equal partners in research; include them as equal partners in the co-production of knowledge; and include community representatives and perspectives in the design of studies/research."

10. EPA and other agencies should integrate environmental justice in all EPA activities, including policy making, regulatory actions, research and public outreach. An important place for intervention for environmental justice is regulation and rule-making. Example recommendations from the Symposium on the use of science and information to address environmental justice concerns in decision making include "develop measures of environmental health disparities to monitor temporal and spatial trends in disparities, and also whether environmental regulation is effective; stratify research data by race and income to better analyze disparate impacts; account for differences in the effect of lead on hypertension which is more pronounced in chronically stressed individuals in regulatory assessments and policies; develop tools for equity assessment; test the validity of available vulnerability indices and tools; base decisions on good science that passes the tests of reliability, repeatability and peer review; good data are legally defensible; and present policy choices and equity impacts to Administrator as a standard consideration in decision-making."

For more information on Plan EJ 2014, visit the U.S. Environmental Protection Agency's Office of Environmental Justice website at: http://www.epa.gov/environmentaljustice/plan-ej/