



Tackling Cumulative Impacts: **EPA's Whole-of-Agency Approach**

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The U.S. Environmental Protection Agency (EPA) is embracing a whole-of-agency approach to understand and address cumulative impacts—the totality of exposures to both chemical and non-chemical stressors—to meet its mission to protect human health and the environment, and to fulfill Executive Orders aimed at advancing environmental justice.

Individuals, groups, and communities are exposed to many chemical and non-chemical stressors found in their everyday environment. Cumulative impacts are the totality and combination of these exposures from each stage of life throughout a lifetime and their effects on health, well-being, and quality of life.¹ Addressing cumulative impacts involves many facets, including acknowledging historical and current contributions to cumulative impacts in overburdened communities; identifying and applying relevant scientific and community engagement methods; understanding relevant legal authorities; and informing decisions in various contexts, such as national rulemaking or to inform place-based interventions.

A scientific consensus is emerging that cumulative impacts are a key component for addressing environmental justice. There is a pervasive, persistent, and inextricable nexus between cumulative impacts and communities more likely to contain people of color, low-income populations, and Indigenous populations. Such communities are also more likely located in urban and rural places where pollution sources are concentrated and social vulnerabilities abound.²⁻⁴ Scientific evidence supports what those with lived experience in such communities already know: environmental and social injustices and exposures to combinations of chemical and non-chemical stressors drive health disparities.⁵⁻⁹

Understanding and addressing cumulative impacts is central to EPA meeting its mission in the face of increasingly complex and interrelated environmental and public health

challenges. Doing so is also critical to advance the goals of Executive Orders (EOs; 13985,¹⁰ 14008,¹¹ 14091,¹² 14096¹³) issued by President Biden which direct federal agencies to advance racial equity and environmental justice (EJ), support underserved communities, address the climate crisis, and address gaps in science, data, and research related to EJ. Additionally, EO 14096 requires a government-wide approach to EJ that includes identifying, analyzing, and addressing disproportionate and adverse impacts, including those related to the legacy of racism and other structural drivers of inequity, cumulative impacts, and climate change.

Scientific research, legal and other analyses, rulemaking, and place-based actions underpin a whole-of-agency approach aimed at improving the health, well-being, and quality of life of overburdened communities.

Scientific Research

High-quality science provides the foundation for EPA policies, actions, and decisions. Within the EPA, the Office of Research and Development (ORD) conducts and funds cutting-edge research to advance the science to inform environmental decision-making.¹⁴ In September 2022, ORD published a report defining cumulative impacts and recommending research to advance EPA's understanding of and ability to assess cumulative impacts.¹ This report informed ORD's FY2023-2026 Strategic Research Action Plans.¹⁵ ORD also identified the need for complementary research on cumulative impacts within the broader scientific community.¹⁶

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ORD has long-standing biological, physical, and chemical expertise to further develop methods, tools, and data to understand the interactions and impacts of chemical and non-chemical stressors on human health and well-being, and we are further emphasizing this expertise in our cumulative impacts research portfolio. For example, ORD is generating data and models to understand exposures to chemical mixtures, analyzing the impacts of climate change on physical and mental health outcomes, and characterizing the multiple benefits of remediation and other nature-based solutions for communities.

ORD's research portfolio also leverages our growing social science expertise in community-engaged research, qualitative and mixed methods, translational research, and participatory science, to name a few. For example, social science expertise was essential to develop an effective tool to equitably increase resilience to disasters and climate change,¹⁷ and to demonstrate the value of using health impact assessment¹⁸ to incorporate EJ in decision-making. ORD, in collaboration with the agency's Mid-Atlantic regional office (EPA Region 2), recently established the Community-Engaged Research Collaborative for Learning and Excellence (CERCLE) in Edison, New Jersey. CERCLE will provide long-term, place-based capability to co-produce research designed to benefit communities, advance scientific knowledge, and serve as a model for addressing community challenges nationwide.¹⁹

ORD also promotes cumulative impacts research among the broader scientific community through the U.S. EPA's Science to Achieve Results (STAR) program.²⁰ Since 2017, ORD has awarded over US\$54 million in grant funding to 42 institutions for community-based research considering cumulative health impacts. Additionally, to inform future research and practice, the agency has engaged the National Academies of Sciences, Engineering, and Medicine to establish an ad hoc committee to explore the state-of-science of cumulative impact assessment and develop a consensus report with recommendations that will further define, refine, and advance the practice of cumulative impact assessment at the local, state, and national levels.²¹

Legal Analyses

Understanding cumulative impacts is essential to address inequities in how laws, policies, and programs are implemented, as well as to promote equal opportunity for underserved communities that have been denied fair, just, and impartial treatment. Whether and how EPA uses its legal authorities to address cumulative impacts depends on the statutory, regulatory, policy, scientific, and factual contexts at issue, as well as the resources available to the agency. Agency engagement and action can also spur that of state, tribal, and local governments, other federal agencies, and non-governmental stakeholders.

EPA's Office of General Counsel (OGC) developed two recent documents on the agency's legal authorities that can be used to address impacts to communities with EJ concerns: (1) *EPA Legal Tools to Advance Environmental Justice* (known as EJ Legal Tools) and (2) *EPA Legal Tools to Advance Environmental Justice: Cumulative Impacts Addendum* (known as the Cumulative Impacts Addendum), a follow-up document focused on authorities related to cumulative impacts.²² These documents build on and reflect changes in law and policy from a version released in 2011, *Plan EJ 2014: Legal Tools Development*, and together provide deeper analyses of authorities under environmental and other laws to advance EJ and equity.

EJ Legal Tools, issued in May 2022, highlights the environmental and other statutes EPA implements to achieve the agency's mission to protect human health and the environment for all communities and persons, and to ensure that the agency's EJ and equity agendas are integrated throughout the agency's policies, programs, and activities.

The *Cumulative Impacts Addendum*, issued in January 2023, is a more in-depth analysis of legal authorities available to the agency for considering and addressing cumulative impacts on communities with EJ concerns and other underserved populations. It serves as a compendium of the agency's legal authorities to identify and address cumulative impacts through a range of actions, including permitting, regulations, cleanup, emergency response, planning, state program oversight, grants, and administrative or judicial actions, in order to take into account the lived experience of communities disproportionately overburdened by multiple stressors.

Together, these documents describe the legal foundation and pathways to implement the agency's *Strategic Plan for EJ and equity* in programs across the EPA headquarters and regional offices. They also serve as a potential roadmap for state and tribal partners to incorporate EJ and cumulative impacts and provide transparency to the general public.

Rulemaking

While EPA analysts and scientists have increased both the frequency and breadth of EJ analyses,²³ evaluating the cumulative impacts of federal policies on vulnerable communities is particularly challenging within the regulatory context. Risk assessments, which often underpin the agency's ability to characterize the potential adverse health effects from exposures to environmental hazards, are typically conducted one chemical at a time. Even when more than one chemical is included, the analysis is still often focused on a single mode of action. Data and methodological limitations hinder analysts' ability to explicitly account for the role of other chemical and non-chemical stressors.

Given that the goal of an EJ analysis is to present a more holistic picture of underlying disparities in affected communities, a key question becomes how to do this effectively, while balancing available data and methods with scientific rigor, and the time it takes to develop high quality data and methods for risk assessments. A recent example may be instructive.

Hydrofluorocarbons (HFCs) are potent greenhouse gases used in air conditioning and refrigeration and for fire suppression. A recent rule phases out HFCs with high global warming potential that contribute to climate change. While direct exposure does not result in health effects, several potential EJ concerns emerged during rulemaking. First, HFC production relies on toxic chemicals as feedstocks and catalysts, and releases them into the environment, which can impact people living close to these manufacturing facilities. Second, the rule allows trading, which raises the possibility that changes in patterns of economic activity could increase toxic chemical emissions in some communities. Third, some substitutes with lower global warming potential also rely on toxic chemicals as inputs into their production.

Using existing data, the agency examined the demographic and risk characteristics for communities living near HFC production facilities. These communities tend to have a higher proportion of low-income individuals and people of color compared to the national average. Our analysis also found that, on average, these same communities experience higher cancer and respiratory risks from air toxics, not all of which stem from HFC production. In addition, these communities host multiple, and sometimes many, polluting non-HFC facilities. Finally, the EJ analysis cites evidence that vulnerability to the impacts of climate change also likely varies with race, ethnicity, and income.

Despite a paucity of risk and exposure information, this example illustrates how EPA can use currently available data and tools to begin to evaluate how a new environmental regulation may impact communities already overburdened by a combination of chemical and non-chemical stressors. Moving forward, it is important to continue to explore scientifically defensible approaches to evaluate cumulative impacts in a fit-for-purpose manner even when an expansive analysis of cumulative impacts is not feasible.

Place-Based Efforts

EPA's whole-of-agency cumulative impacts effort is most visible through the agency's regional offices, where every day regional office staff work across programs and with

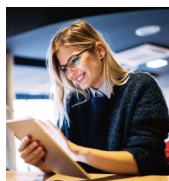
partners to address cumulative and disproportionate impacts in communities. Just two of many examples of such impacts are childhood asthma rates in communities with poor air quality, and lead exposure, where impacts across exposure pathways can have a profound effect on children's health and well-being for a lifetime. Regions and ORD are already collaborating to identify and respond in places where cross-program and whole-of-government action is needed to address significant disparities in lead exposure.²⁴

An agency-wide cumulative impacts approach will advance the agency's ability to cultivate routine cross-program, community-focused collaboration in regional offices that delivers efficient, effective, and equitable solutions to improve community health and well-being.

One successful example from agency work in Chicago illustrates the promise of community-focused response to cumulative impacts. This started in the early 2010s when the Southeast Environmental Task Force invited EPA to tour Southeast Chicago. The community's lived experience showed the need for a comprehensive response to the cumulative impacts of multiple stressors. As part of this response, the agency worked directly with Illinois EPA and Chicago's Department of Public Health to ensure area-wide compliance of existing facilities. Over 75 companies have been investigated in Chicago for Clean Air Act violations since 2014. EPA inspected 30 of these facilities in direct response to community concerns, including exposure to petcoke dust. Subsequent enforcement actions produced dramatic air quality improvements.²⁵

Conclusions

The work described here demonstrates how EPA is meeting the challenge of addressing cumulative impacts by applying its four core principles—follow the science, follow the law, be transparent, and advance equity and justice—in communities throughout the United States. Specifically, EPA's whole-of-agency approach to cumulative impacts addresses three major imperatives critical to meeting the agency's mission and fulfilling recent EOs from President Biden directing federal agencies to advance environmental justice: (1) account for the total exposure to all stressors, including the lived reality of disproportionately impacted communities, in agency analyses and decision-making, as practical and appropriate; (2) address historical and structural drivers affecting disproportionately impacted communities in agency analyses and decision-making, as practical and appropriate; and (3) work with communities to fulfill their visions for health, well-being, equity, sustainability, resilience, and quality of life.



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EPA continues to work to expand available data and reduce existing knowledge gaps to advance our understanding of the science of cumulative impacts. We are building agency capacity to employ cross-program, community-focused, collective action engaging both governmental and non-

governmental partners. Our greatest challenge and opportunity is changing policy and practice to build routine consideration of cumulative impacts into agency decisions to fully achieve our mission to protect human health and the environment. **em**

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