



ENVIRONMENTAL JUSTICE SCIENCE, DATA, AND RESEARCH PLAN

A Report by the
ENVIRONMENTAL JUSTICE SUBCOMMITTEE
of the
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

July 2024

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The National Science and Technology Council (NSTC) is the principal means by which the Executive Branch coordinates science and technology policy across the diverse entities that make up the federal research and development enterprise. A primary objective of the NSTC is to ensure science and technology policy decisions and programs are consistent with the President's stated goals. The NSTC prepares research and development strategies that are coordinated across federal agencies aimed at accomplishing multiple national goals. The work of the NSTC is organized under committees that oversee subcommittees and working groups focused on different aspects of science and technology. More information is available at <http://www.whitehouse.gov/ostp/nstc>.¹

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About the NSTC Environmental Justice Subcommittee

The purpose of the Environmental Justice (EJ) Subcommittee is to address the need for a coordinated federal strategy to identify and address gaps in science, data, and research related to environmental justice. Among other tasks, the EJ Subcommittee shall prepare, and update biennially, an Environmental Justice Science, Data, and Research Plan (Research Plan). The scope of the EJ Subcommittee may include addressing topics related to cross-agency coordination and communication regarding observations, modeling, exposure science, participatory science (including community and citizen science), Indigenous Knowledge, and health research concerning air, water, and land pollution and other environmental stressors, including their cumulative impacts. Further, the EJ Subcommittee will inform and support strategies to identify, eliminate, mitigate, and prevent environmental injustice at the federal, Tribal, state, territorial, and local levels.

¹ Office of Science and Technology Policy. *National Science and Technology Council (NSTC) | OSTP | the White House*. www.whitehouse.gov/ostp/ostps-teams/nstc. Accessed 18 July 2024.

² Office of Science and Technology Policy. *Office of Science and Technology Policy*. <https://www.whitehouse.gov/ostp/>. Accessed 18 July 2024.

About this Document

This EJ Subcommittee Research Plan provides principles, information, and resources that can assist agencies in advancing the goals of Executive Order 14096 on *Revitalizing Our Nation's Commitment to Environmental Justice for All* in their activities related to science, data, and research, as appropriate under their respective authorities, missions, and consistent with applicable law. The activities described in this document are reviewed through the Office of Management and Budget annual budget process and subject to available resources.

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³ Office of Science and Technology Policy. *Request for Information: Development of a Federal Environmental Justice Science, Data, and Research Plan*. Regulations.gov, Docket ID: OSTP-CE-2023-0012. www.regulations.gov/docket/OSTP-CE-2023-0012/document.

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Abbreviations and Acronyms

AI/AN	American Indian/Alaska Natives
BLS	Bureau of Labor Statistics
BOEM	Bureau of Ocean Energy Management
CARE	Collective benefit, Authority, Responsibility, and Ethics
CBPR	community-based participatory research
CDC	Centers for Disease Control and Prevention
CDO	Chief Data Officers
CEJST	Climate and Economic Justice Screening Tool
CEQ	Council on Environmental Quality
COMR	community-owned and managed research
CROCUS	Community Research on Climate and Urban Science
DOE	Department of Energy
DOT	Department of Transportation
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
FAIR	Findable, Accessible, Interoperable, and Reusable
HHS	Department of Health and Human Services
IK	Indigenous Knowledge
LMS	Learning Management Systems
MOU	Memorandums of Understanding
NEJAC	National Environmental Justice Advisory Council
NGO	non-governmental organization
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NSTC	National Science and Technology Council
OIRA	Office of Information and Regulatory Affairs
OMB	Office of Management and Budget
OPM	Office of Personnel Management
OSTP	Office of Science and Technology Policy
PCAST	President’s Council of Advisors on Science and Technology
RFI	Request for Information
SDOH	Social Determinants of Health
SOW	Statements of Work
TRI	Toxic Release Inventory
US	United States
WHEJAC	White House Environmental Justice Advisory Council

Executive Summary

In an environmentally just nation, justice and resilience are cornerstones of society. Every individual receives just treatment and has meaningful opportunities to participate in decisions that impact their health and environment. Access to clean air, safe water, and culturally appropriate, nutritious food transcends social and economic barriers. Investments in clean energy infrastructure create equitable pathways for thriving, while addressing legacy and current pollution safeguards the health of all people. Abundant and accessible public green spaces foster a restorative connection with nature. The Biden-Harris Administration is taking action to ensure that as a nation that promises justice, liberty, and equality for all people, the United States is well positioned to make this vision of environmental justice a reality.

“Restoring and protecting a healthy environment—wherever people live, play, work, learn, grow, and worship—is a matter of justice and a fundamental duty that the Federal Government must uphold on behalf of all people.”

- President Biden, Executive Order 14096

Science, data, and research activities play important roles in the achievement of environmental justice. They provide a critical evidence base upon which federal agencies can develop their decisions, ensuring that actions are informed, targeted, and effective. They can also provide members of the public with information about their environments and the benefits or harms that those environments contain. Current gaps in science, data, and research, however—for example in the questions asked, the quality and types of data used, or the communication of findings—can hinder the ability to make informed decisions. Advancing understanding, addressing information gaps, and applying knowledge are critical for guiding the nation towards creating and sustaining environments in which all people can thrive.

In his signing of [Executive Order \(EO\) 14096](#) – Revitalizing Our Nation’s Commitment to Environmental Justice for All,⁴ President Biden highlighted the need for federal activities across the whole of government, including those related to science, data, and research, to advance environmental justice. This EO charged the White House Office of Science and Technology Policy to establish an Environmental Justice Subcommittee (EJ Subcommittee) of the National Science and Technology Council, in consultation with the Chair of the White House Council on Environmental Quality (CEQ), to develop a coordinated Environmental Justice Science, Data, and Research Plan (Research Plan).

As the first Research Plan developed under EO 14096 by the EJ Subcommittee, this document roots itself in the deep history of science, data, and research efforts that have analytically demonstrated patterns of, and solutions for, environmental injustice across the United States. The Research Plan has been informed by engagement with agency representatives, external invested parties, literature reviews, the recommendations of federal advisory committees, and the work of other interagency groups. The Research Plan benefitted from public comments and listening sessions.

To support federal agencies⁵ in the advancement of environmental justice, the EJ Subcommittee has developed the Research Plan as a series of high-level recommendations for identifying and addressing longstanding gaps, barriers, and missing science, data, and research relevant to environmental justice.

⁴ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*. Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁵ Federal agencies include those with science, data, and research portfolios (including grant funding and technical support) relevant to EJ. See also *Ibid.*, Sections 2(a), 4(h).

The recommendations have been developed to make the most of opportunities in federal science, data, and research that are ripe for rapid advancement.

The recommendations are organized into four thematic areas:

- **Enhancing meaningful involvement and engagement of the public.** Federal agencies should prioritize the identification and/or enhancement of concrete pathways for members of the public to provide input and feedback across all stages of science, data, and research activities—taking into account barriers to participation.
- **Fortifying just treatment, equitable access, and protection from environmental injustice.** Federal agencies should strengthen their science, data, and research activities by more fully integrating the social determinants of health, cumulative impacts, qualitative methods, enhanced privacy protections, and ethical standards into their science, data, and research activities to help strengthen and improve analyses used to inform decisions relevant to the advancement of environmental justice.
- **Strengthening work and partnership with non-federal entities.** The federal government holds tremendous power in setting expectations and standards for science, data, and research activities and in convening and creating communication channels between federal and non-federal entities. Federal agencies can enhance relationships and pave the way for more effective and sustainable science, data, and research collaborations relevant to environmental justice by engaging with entities in ways that match their unique responsibilities, missions, resource requirements, and governance structures.
- **Institutionalizing environmental justice.** Federal agencies can deepen their ability to identify and address gaps and inadequacies in science, data, and research related to environmental justice by building cultures and practices that aim to ensure that all communities reap the benefits of scientific discovery, research efficacy, and innovation. Integrating processes to assess and address implicit bias, increasing opportunities to translate science into action, expanding staff training to include community engagement strategies, and building multidisciplinary teams with expertise (including expertise gained through lived experiences) can help agencies better ask and answer questions relevant to advancing environmental justice.

The development of this Research Plan comes at a pivotal moment for our nation. The Biden-Harris Administration recognizes that science, data, and research activities provide unique opportunities to understand the scope and impact of past injustices and can help forge the just landscapes of the future. The recommendations in this Research Plan are designed to be applicable to *all* agencies, and to assist them in considering the research, data, and science needs relevant to *all* people and communities—including people of any income, race, color, age, national origin, Tribal affiliation, or disability—and are intended to be implemented as expeditiously as possible. They were developed with a spirit of deep humility, an honoring of the work that had led to this point, and a steadfast resolve to propel meaningful action for the advancement of knowledge and partnerships to support environmental justice in communities across the country.

Introduction

To fulfill our nation’s promises of justice, liberty, and equality, every person must have clean air to breathe; clean water to drink; access to safe, healthy, and culturally appropriate food to eat; and an environment that is healthy, sustainable, climate-resilient, and free from harmful pollution and chemical exposure. Even as many communities in the United States have prospered and thrived in recent decades, many other communities have been left behind.

Science, data, and research activities play an important role in restoring and protecting a healthy environment—wherever people live, play, work, learn, grow, and worship. These activities do so by illuminating the pathways through which historically unjust systems have perpetuated and continue to perpetuate injustices that can lead to disparate experiences and outcomes; and by identifying opportunities to reduce disparities and assess the effectiveness of policy interventions.

[Executive Order \(EO\) 14096](#)⁶ on *Revitalizing Our Nation’s Commitment to Environmental Justice for All* highlighted the need for federal activities across the interagency, including those related to science, data, and research, to advance environmental justice (EJ). As such, it directed the Office of Science and Technology Policy (OSTP) to establish an EJ Subcommittee (“EJ Subcommittee”) of the National Science and Technology Council (NSTC) to address the need for a coordinated federal strategy that identifies and addresses gaps in science, data, and research activities (i.e., any federally funded⁷ science,⁸ data,⁹ or research¹⁰ activities) related to EJ.

⁶ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*. Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁷ In this research plan, federally funded science, data, and research activities include funding for both intramural and extramural research. As articulated by the U.S. Government Accountability Office (GAO), federal agencies fund two types of researchers—intramural and extramural. Intramural researchers include agency scientists who conduct research, such as in agency laboratories and clinics. Extramural researchers include scientists and research personnel working at universities, academic medical centers, and other research institutions who receive grants and other types of federal funding to conduct research. Citation: U.S. Government Accountability Office. *Federal Research: Additional Actions Needed to Improve Public Access to Research Results*. GAO-20-81, U.S. Government Accountability Office, 21 Nov. 2019, www.gao.gov/products/gao-20-81.

⁸ In this research plan, the terms “science” and “scientific” refer to the full spectrum of scientific endeavors, including basic science, applied science, evaluation science, engineering, technology, economics, social sciences, and statistics, as well as the scientific and technical information derived from these endeavors. Citation: Scientific Integrity Fast-Track Action Committee. *Protecting the Integrity of Government Science*. Executive Office of the President, 2022. www.whitehouse.gov/wp-content/uploads/2022/01/01-22-Protecting_the_Integrity_of_Government_Science.pdf.

⁹ In this research plan, data means information collected, processed, maintained, disseminated, managed, or regulated by a federal agency, including that which are reported to a federal agency. Citation: Congressional Research Service. *Federal Data Management: Issues and Challenges in the Use of Data Standards*. R48053, Library of Congress, 29 Apr. 2024. <https://crsreports.congress.gov/product/details?prodcode=R48053>.

¹⁰ In this research plan, research refers to systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge. Activities can meet this definition whether or not they are conducted or supported under a program that is considered research. Citation: Scientific Integrity Framework Interagency Work Group. *A Framework for Federal Scientific Integrity Policy and Practice*. Executive Office of the President, Jan. 2023. www.whitehouse.gov/wp-content/uploads/2023/01/01-2023-Framework-for-Federal-Scientific-Integrity-Policy-and-Practice.pdf.

Box 1. Definitions of environmental justice and federal activities.

As defined in Section 2 of EO 14096, “environmental justice” means the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other federal activities that affect human health and the environment so that people: (i) are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards, including those related to climate change, the cumulative impacts of environmental and other burdens, and the legacy of racism or other structural or systemic barriers; and (ii) have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices.

Section 2 of the EO also defines federal activities as any agency rulemaking, guidance, policy, program, practice, or action that affects or has the potential to affect human health and the environment, including an agency action related to climate change. Federal activities may include agency actions related to: assuring compliance with applicable laws; licensing, permitting, and the reissuance of licenses and permits; awarding, conditioning, or oversight of federal funds; and managing federal resources and facilities. This may also include such activities in the District of Columbia and the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and other territories and possessions of the United States.

The NSTC EJ Subcommittee, launched in 2023, is led by OSTP in consultation with CEQ. OSTP, CEQ, the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation (DOT) serve as the current co-chairs of the Subcommittee. The Subcommittee is comprised of representatives from 14 federal agencies and components of the Executive Office of the President. One of the core objectives of the EJ Subcommittee is the development of an EJ Science, Data, and Research Plan (“Research Plan”).

EO 14096¹¹ directs the EJ Subcommittee to prepare, and update biennially, a Research Plan to:

- analyze any gaps and inadequacies in data collection and scientific research related to EJ;
- identify opportunities for agencies to coordinate with the research efforts of state, Tribal, territorial, and local governments; academic institutions; communities; the private sector; the nonprofit sector; and other relevant actors to accelerate the development of data, research, and techniques—including consideration of Indigenous Knowledge¹²—to address gaps and

¹¹ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 5(a)(iii). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹² As described in the [OSTP-CEQ Indigenous Knowledge guidance](#), “Indigenous Knowledge is a body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes and Indigenous Peoples through interaction and experience with the environment. It is applied to phenomena across biological, physical, social, cultural, and spiritual systems. Indigenous Knowledge can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation. Indigenous Knowledge is developed by Indigenous

inadequacies in data collection and scientific research that may affect agencies' ability to advance EJ;

- provide recommendations to agencies on the development and use of science, data, and research to support EJ policy;
- provide recommendations to the Chair of CEQ on data sources to include in the Climate and Economic Justice Screening Tool;
- provide recommendations to agencies on ethical standards, privacy protections, and other requirements for the development and use of science, data, and research addressed in the Research Plan, including recommendations with respect to engaging in consultation with and obtaining consent of Tribal Nations; and
- provide recommendations to agencies on a variety of topics related to research and EJ, including participatory science, U.S. territories, public accessibility, disaggregation of environmental risk exposure, data challenges related to racial discrimination, disability, aging, cumulative impacts, subsistence and cultural practices of Tribal and Indigenous populations, and meaningful engagement.

Development of the Research Plan

In developing this Research Plan, the EJ Subcommittee was guided by EO 14096 Section 3, which includes a robust charge on meaningful engagement that directs federal agencies to provide timely opportunities for members of the public to share information or concerns, and to fully consider public input as part of decision-making processes. The EJ Subcommittee engaged with external entities through conversations with individuals and groups, listening sessions,¹³ and through a 90-day Request for Information (RFI)¹⁴ comment period.

Peoples including, but not limited to, Tribal Nations, Native Americans, Alaska Natives, and Native Hawaiians. Each Tribe or Indigenous community has its own place-based body of knowledge that may overlap with that of other Tribes. Indigenous Knowledge is based in ethical foundations often grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. Indigenous Knowledge is inherently heterogeneous due to the cultural, geographic, and socioeconomic differences from which it is derived, and is shaped by the Indigenous Peoples' understanding of their history and the surrounding environment. Indigenous Knowledge is unique to each group of Indigenous Peoples and each may elect to utilize different terminology or express it in different ways. Indigenous Knowledge is deeply connected to the Indigenous Peoples holding that knowledge. Citation: Office of Science and Technology Policy and Council on Environmental Quality. *Guidance on Federal Agency Implementation of Indigenous Knowledge Consideration and Application*. Executive Office of the President, 30 Nov. 2022. www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf.

¹³ Including sessions held at the National Congress of American Indians, the National Environmental Justice Conference and Training Program, and other agency-specific listening sessions.

¹⁴ Office of Science and Technology Policy. *Request for Information: Development of a Federal Environmental Justice Science, Data, and Research Plan*. Regulations.gov, Docket ID: OSTP-CE-2023-0012, www.regulations.gov/docket/OSTP-CE-2023-0012/document.

The work of the EJ Subcommittee was also informed by other related efforts, including the work of the Ocean Policy Committee¹⁵ and NSTC Subcommittees on Equitable Data,¹⁶ Open Science,¹⁷ Indigenous Knowledge,¹⁸ and the Framework for Scientific Integrity Policy and Practice.¹⁹ This Research Plan was also guided by recommendations of the White House Environmental Justice Advisory Council,^{20,21} the National Environmental Justice Advisory Council (NEJAC),^{22,23,24,25} literature reviews, input from agencies and the NSTC Air Quality and Community Health Research Subcommittee, and engagement with the White House Council on Native American Affairs. These engagement activities provided an opportunity for the NSTC EJ Subcommittee to shape recommendations on science, data, and research

¹⁵ Ocean Policy Committee. *Ocean Justice Strategy*. Executive Office of the President, Dec. 2023. www.whitehouse.gov/wp-content/uploads/2023/12/Ocean-Justice-Strategy.pdf?cb=1701982354.

¹⁶ The NSTC Subcommittee on Equitable Data was created pursuant to EO 14091 [EO 14091](https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government) on *Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*. These efforts build on the work of the Equitable Data Working Group that had been created under EO 13985 [EO 13985](https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government) on *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*. Where relevant, the 2024 progress report of the NSTC Subcommittee on Equitable Data and the 2021 recommendations of the Equitable Data Working Group are cross-referenced. Citations: Office of Science and Technology Policy, National Science and Technology Council, Subcommittee on Equitable Data. *A Vision for Equitable Data Recommendations From the Equitable Data Working Group*. Executive Office of the President, www.whitehouse.gov/wp-content/uploads/2022/04/eo13985-vision-for-equitable-data.pdf; EO 13985. *Advancing Racial Equity and Support for Underserved Communities through the Federal Government*. Federal Register, vol. 86, no. 14, 20 Jan. 2021, 86 FR 7009. <https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government>; EO 14091. *Further Advancing Racial Equity and Support for Underserved Communities through the Federal Government*. Federal Register, vol. 88, no. 35, 16 Feb. 2023, 88 FR 10825. <https://www.federalregister.gov/documents/2023/02/22/2023-03779/further-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal>.

¹⁷ Office of Science and Technology Policy. *FACT SHEET: Biden-Harris Administration Marks the Anniversary of OSTP's Year of Open Science*. www.whitehouse.gov/ostp/news-updates/2024/01/31/fact-sheet-biden-harris-administration-marks-the-anniversary-of-ostps-year-of-open-science. Accessed 18 July 2024.

¹⁸ Office of Science and Technology Policy and Council on Environmental Quality. *Guidance on Federal Agency Implementation of Indigenous Knowledge Consideration and Application*. Executive Office of the President, 30 Nov. 2022. www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf.

¹⁹ Office of Science and Technology Policy, National Science and Technology Council, Scientific Integrity Framework Interagency Work Group. *A Framework for Federal Scientific Integrity Policy and Practice*. Executive Office of the President, Jan. 2023. www.whitehouse.gov/wp-content/uploads/2023/01/01-2023-Framework-for-Federal-Scientific-Integrity-Policy-and-Practice.pdf.

²⁰ U.S. Environmental Protection Agency. *White House Environmental Justice Advisory Council | US EPA*. www.epa.gov/environmentaljustice/white-house-environmental-justice-advisory-council. Accessed 18 July 2024.

²¹ White House Environmental Justice Advisory Council. *White House Environmental Justice Advisory Council Final Recommendations: Justice40 Climate and Economic Justice Screening Tool and Executive Order 12898 Revisions*. Executive Office of the President, 21 Apr. 2021. www.epa.gov/sites/default/files/2021-05/documents/whiteh2.pdf.

²² National Environmental Justice Advisory Council. *Letter of Recommendations on Air Quality and Community Monitoring*. U.S. Environmental Protection Agency, 23 Nov. 2022. www.epa.gov/system/files/documents/2023-01/NEJAC%20Air%20Quality%20and%20Community%20Monitoring%20%28AQCM%29%20Workgroup%20Letter%20of%20Recommendations.pdf.

²³ National Environmental Justice Advisory Council. *NEPA Training Letter of Recommendations*. U.S. Environmental Protection Agency, 29 Aug. 2023. www.epa.gov/system/files/documents/2023-10/nejac-nepa-training-letter-of-recommendations_august-2023.pdf.

²⁴ National Environmental Justice Advisory Council. *NEJAC's Water Infrastructure Workgroup Recommendations to the United States Environmental Protection Agency on Water Technical Assistance*. U.S. Environmental Protection Agency, Aug. 2023. www.epa.gov/system/files/documents/2023-10/nejac-water-infrastructure-ta-letter-of-recommendations_august-2023.pdf.

²⁵ National Environmental Justice Advisory Council. *Draft Letter to EPA on the Environmental Strategic Enforcement Assessment Tool*. U.S. Environmental Protection Agency, 14 Aug. 2019. www.epa.gov/sites/default/files/2019-10/documents/nejac_letter_data_limitations.pdf.

activities that respond to the priorities of communities with EJ concerns within existing agency practices and frameworks.

Section 1. Science, Data, and Research Priorities to Advance Environmental Justice

Research supporting the advancement of EJ has a rich history that began in earnest in the late 1970s. It was sparked by the analysis²⁶ and documentation²⁷ of a pattern showing that environmental harms disproportionately affected some populations or communities, such as low-income and communities of color in the United States. The advancement of EJ was also built on a foundation of community-led movements such as the Memphis Sanitation Strike,²⁸ Delano Grape Strike,²⁹ Warren County protests,³⁰ and the formation of the Indigenous Environmental Network.³¹ One of the seminal moments in the field of environmental justice occurred when residents of a Black middle-class neighborhood in Houston, Texas, learned of a plan to site a solid-waste facility in their community. This led to the first systematic study revealing that the majority of the city's waste sites were located in Black neighborhoods.³²

Since these early studies and the heightened federal focus on environmental justice, research on EJ has continued to grow. It has included a variety of issues, such as the distributions of environmental hazards; access to natural resources; links between environmental harm and cultural, subsistence, health, and other impacts on Tribal Nations and Indigenous ways of life; and the impacts of climate change on historically marginalized communities overburdened with social, economic, and health inequities.^{33,34,35} We have also witnessed an increase in and visibility of Native American EJ scholarship that expands beyond distributional injustice and explores the unique cultural, social, political, and historic challenges of Indigenous Peoples facing environmental injustice in the United States and

²⁶ U.S. General Accounting Office. *Siting of Hazardous Waste Landfills and Their Correlation With Racial and Economic Status of Surrounding Communities*. B-211461, 1 June 1983. <http://archive.gao.gov/d48t13/121648.pdf>.

²⁷ United Church of Christ, Commission for Racial Justice. *Toxic Wastes and Race in the United States*. United Church of Christ, 1987, <https://new.uccfiles.com/pdf/ToxicWastes&Race.pdf>.

²⁸ National Archives. *Martin Luther King, Jr., and Memphis Sanitation Workers*. www.archives.gov/education/lessons/memphis-v-mlk. Accessed 18 July 2024.

²⁹ Pulido, Laura, and Devon Peña. "Environmentalism and Positionality: The Early Pesticide Campaign of the United Farm Workers' Organizing Committee, 1965-71." *Race, Gender & Class*, vol. 6, no. 1, 1998, pp. 33-50. *JSTOR*, <http://www.jstor.org/stable/41658847>. Accessed 18 July 2024.

³⁰ McGurty, Eileen. *Transforming environmentalism: Warren County, PCBs, and the origins of environmental justice*. Rutgers University Press, 2007.

³¹ Indigenous Environmental Network. *About | Indigenous Environmental Network*. www.ienearth.org/about. Accessed 18 July 2024.

³² Bullard, Robert D. "Solid Waste Sites and the Black Houston Community." *Sociological Inquiry*, vol. 53, no. 2-3, Apr. 1983. pp. 273-88. <https://doi.org/10.1111/j.1475-682x.1983.tb00037.x>.

³³ Chakraborty, Jayajit, et al. "Environmental Justice Research: Contemporary Issues and Emerging Topics." *International Journal of Environmental Research and Public Health*, vol. 13, no. 11, Nov. 2016, p. 1072. <https://doi.org/10.3390/ijerph13111072>.

³⁴ Vickery, Jamie, and Lori M. Hunter. "Native Americans: Where in Environmental Justice Research?" *Society & Natural Resources*, vol. 29, no. 1, July 2015, pp. 36-52. <https://doi.org/10.1080/08941920.2015.1045644>. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4835033/>.

³⁵ Ranco, Darren J., et al. "Environmental Justice, American Indians and the Cultural Dilemma: Developing Environmental Management for Tribal Health and Well-being." *Environmental Justice*, vol. 4, no. 4, Dec. 2011, pp. 221-30. <https://doi.org/10.1089/env.2010.0036>. Available at: https://swinomish-nsn.gov/media/53995/swin_pr_2011_02.pdf.

beyond.^{36,37,38} The field has also grown to encompass global perspectives,³⁹ recognizing that environmental injustices are not confined to any single region or group.

The evolution of EJ research has led to a broader spectrum of issues being addressed, including the manifold and complex connections between environmental exposures⁴⁰ and health disparities.^{41,42,43} This expansion has given rise to the field of environmental health justice, which seeks to document and mitigate the adverse health impacts associated with environmental hazards.⁴⁴ The field continues to explore the role of sociodemographic factors in environmental exposures, including areas where multiple population characteristics or demographic categories overlap, aiming to ensure that all communities have equal protection from environmental and health hazards. The field also aims to support equitable access to and participation in decision making processes, increased representation in the workforce, and recognition of diverse perspectives in policies and practices for a wide range of affected groups. Additionally, the field seeks to illuminate pathways for the equal distribution of resources and benefits—with consideration of existing disparities. As noted in the guidance⁴⁵ released by the Office of Information and Regulatory Affairs to federal agencies on how agencies can better engage members of the public when developing regulations, effective and meaningful access improves the information available to federal agencies when making evidence-based decisions. The challenge remains to translate this growing body of salient research and guidance into actionable policies that promote a whole-of-government approach to health equity and environmental sustainability.

³⁶ Vickery, Jamie, and Lori M. Hunter. “Native Americans: Where in Environmental Justice Research?” *Society & Natural Resources*, vol. 29, no. 1, July 2015, pp. 36–52. <https://doi.org/10.1080/08941920.2015.1045644>. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4835033/>.

³⁷ Parsons, Meg, et al. “Environmental Justice and Indigenous Environmental Justice.” *Springer eBooks*, 2021, pp. 39–73. https://doi.org/10.1007/978-3-030-61071-5_2.

³⁸ Ranco, Darren J., et al. “Environmental Justice, American Indians and the Cultural Dilemma: Developing Environmental Management for Tribal Health and Well-being.” *Environmental Justice*, vol. 4, no. 4, Dec. 2011, pp. 221–30. <https://doi.org/10.1089/env.2010.0036>. Available at: https://swinomish-nsn.gov/media/53995/swin_pr_2011_02.pdf.

³⁹ Petrescu-Mag, Ruxandra Mălina, et al. “Environmental Equity Through Negotiation: A Case Study on Urban Landfills and the Roma Community.” *International Journal of Environmental Research and Public Health*, vol. 13, no. 6, June 2016, p. 591. <https://doi.org/10.3390/ijerph13060591>.

⁴⁰ Tulse, Nicolle S., et al. “Redefining Exposure Science to Advance Research Supporting Cumulative Impacts, Environmental Justice, and Decision-making.” *Journal of Exposure Science & Environmental Epidemiology*, vol. 33, no. 6, Nov. 2023, pp. 843–45. <https://doi.org/10.1038/s41370-023-00610-5>.

⁴¹ Wilson, Sacoby, et al. “Being Overburdened and Medically Underserved: Assessment of This Double Disparity for Populations in the State of Maryland.” *Environmental Health*, vol. 13, no. 1, Apr. 2014. <https://doi.org/10.1186/1476-069x-13-26>.

⁴² Hricko, Andrea, et al. “Global Trade, Local Impacts: Lessons From California on Health Impacts and Environmental Justice Concerns for Residents Living Near Freight Rail Yards.” *International Journal of Environmental Research and Public Health*, vol. 11, no. 2, Feb. 2014, pp. 1914–41. <https://doi.org/10.3390/ijerph110201914>.

⁴³ Castillo, Maria Daniela, et al. “Estimating Intra-Urban Inequities in PM_{2.5}-Attributable Health Impacts: A Case Study for Washington, DC.” *Geohealth*, vol. 5, no. 11, Nov. 2021. <https://doi.org/10.1029/2021gh000431>. Available at: <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GH000431>.

⁴⁴ Grineski, Sara E., et al. “Local Variability in the Impacts of Residential Particulate Matter and Pest Exposure on Children’s Wheezing Severity: A Geographically Weighted Regression Analysis of Environmental Health Justice.” *Population and Environment*, vol. 37, no. 1, Jan. 2015, pp. 22–43. <https://doi.org/10.1007/s11111-015-0230-y>. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4627709>.

⁴⁵ Office of Management and Budget. *Broadening Public Participation and Community Engagement in the Regulatory Process*. Executive Office of the President, 19 July 2023. www.whitehouse.gov/wp-content/uploads/2023/07/Broadening-Public-Participation-and-Community-Engagement-in-the-Regulatory-Process.pdf.

There has been an increase in federal science, data, and research activities relevant to environmental justice since 1994,⁴⁶ when EO 12898 was issued directing agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions.⁴⁷ We recognize that we have more work to do to continue to expand science, data, and research, and to help make EJ a reality for our nation. In its review of science, data, and research activities with relevance to EJ across the federal government, the EJ Subcommittee identified several opportunities for gaps and inadequacies to be filled. These opportunities existed in both the *processes* (i.e., the practices used to achieve objectives) and *products* (i.e., outputs of science, data, and research activities) of science, data, and research activities.

Opportunities for science, data, and research processes to identify and address gaps relevant to EJ.

To fill data gaps and inadequacies relevant to EJ via science, data, and research activities, it is important that members of communities, particularly those that are disproportionately affected by environmental and health issues, have opportunities to co-develop science, data, and research processes. This involves setting science, data, and research agendas that promote the just treatment of these communities, interpreting results in ways that identify and address systemic inequalities and biases, and ensuring that the findings are accessible and actionable. By integrating EJ principles into science, data, and research processes, agencies can not only advance knowledge but also support a fairer and more just society.

In its review of current science, data, and research processes relevant to EJ across federal agencies, the EJ Subcommittee identified several opportunities for heightened agency focus including:

Building cultures and practices that help ground the benefits of EJ-relevant scientific discovery, research efficacy, and innovation in community needs

- Assessing how patterns of historical or ongoing structural racism or bias may manifest in and shape science, data, and research activities.
- Providing training on respectful and effective engagement on science, data, and research activities with members of communities with EJ concerns and with members of Tribal Nations.
- Hiring staff with diverse science, data, and research expertise relevant to EJ, acquired from academic, professional, or experiential settings.
- Acknowledging and valuing experiential knowledge⁴⁸ equally to academically or professionally acquired knowledge, including attribution for knowledge and access to incentives (e.g., compensation).

⁴⁶ Morrison, Dianne See. "Rallying Point: Charles Lee's Longstanding Career in Public Health." *American Journal of Public Health*, vol. 99, no. S3, Nov. 2009, pp. S508–10. <https://doi.org/10.2105/ajph.2009.178590>. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2774201/>.

⁴⁷ EO 12898. *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, Sections 1-101, 3-3, and 4-4. Federal Register, vol. 59, no. 32, 16 Feb 1994, 60 FR 7795. <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>.

⁴⁸ Experiential knowledge is gained from lived experiences associated with direct exposure and personal impact.

Enhancing mechanisms for community involvement and coordination in the acceleration of data, research, and techniques

- Creating pathways for members of communities with EJ concerns to provide input into associated federal research goals, questions, data and approaches.
- Creating or expanding pathways for agencies to support community and participatory science, community-owned and managed research, community-based participatory research, and open research, to the extent feasible.⁴⁹
- Clearly articulating, engaging with, and training members of communities with EJ concerns on agency data collection, data quality, data management needs, and requirements.
- Increasing the emphasis on translational research, i.e., research focused on converting basic research into practical applications to enhance human health and well-being.
- Planning, with communities, for the sunseting of community-focused science, data, and research activities and infrastructure, including ways for sustaining and applying knowledge and insights from these activities.

Providing equitable access to actionable science, data, and research products

- Making research publicly available, understandable, and actionable for communities with EJ concerns—including in different languages and forms of communication, while upholding privacy protections and respecting data rights and ownership.
- Providing real-time information to the public, including by maps or mobile apps that indicate levels of pollution, types of pollutants, compliance and enforcement histories, and avenues to document and submit concerns.
- Creating resource centers and communities of practice that support communities with environmental justice concerns in the improvement of their local conditions.

Opportunities for science, data, and research products to identify and address gaps relevant to EJ.

The products of science, data, and research activities can be diverse and multi-faceted. They include tangible outputs such as new technologies, datasets, patents, and publications, as well as intangible assets like theories, models, methods, and enhanced understanding of natural phenomena. These outputs can serve as the building blocks for future innovation, driving progress across sectors and contributing to the collective knowledge base. They can also lead to practical applications that can improve the quality of life, inform policy decisions, and foster economic growth. Science, data, and research products can also help fill gaps in understanding.

In its review of current science, data, and research activities relevant to EJ across federal agencies, the EJ Subcommittee identified opportunities across several areas that would benefit from heightened agency focus, as consistent with agency mission and applicable law, including:

⁴⁹ O’Fallon, Liam R., and Allen Dearry. “Community-based Participatory Research as a Tool to Advance Environmental Health Sciences.” *Environmental Health Perspectives*, vol. 110, no. suppl 2, Apr. 2002, pp. 155–59. <https://doi.org/10.1289/ehp.02110s2155>.

Identifying and documenting populations that are missing from datasets and/or analysis

- Increasing the spatial and temporal resolution of information used to identify people who experience multiple, overlapping sociodemographic and health characteristics associated with EJ concerns, using methods that ensure privacy protection and confidentiality.
- Integrating populations with migrant, mobile, undocumented, incarcerated, and unhoused statuses into analysis, while being cognizant of the risks faced by these groups, and building in procedural and legal protections.
- Collecting and integrating data, ensuring the preservation of privacy, about people living in insular areas⁵⁰ into nationally representative datasets, particularly those that are used to distribute benefits.
- Increasing awareness of the differences in risk that populations face with privacy loss.

Assessing accurate exposure levels to chemicals in the environment for populations across time and location

- Collecting high-resolution temporal and spatial pollution levels across all media (e.g., air, soil, and water), including via the use of techniques such as continuous fenceline monitoring, airborne instruments, satellite data, water and soils sensors, and sampling in locations with high known or potential pollution and refining modeling approaches.
- Measuring and modeling indoor pollution across time and locations (including homes, schools, public buildings, workplaces, etc.) disaggregated by demographic and other indicators such as public housing.

Understanding and accounting for factors that can create or enhance vulnerability and susceptibility to environmental harms

- Disaggregating health status, health risks, and health outcomes by demographic indicators (including intersectional identities⁵¹) at geographic scales that support the local and national advancement of EJ to the extent that individual privacy can be protected.
- Assessing the health, social, and economic harms caused by past and ongoing pollution, to more accurately reflect the cumulative effects on members of communities disproportionately impacted by pollution and to inform decisions for development and environmental protection advances.
- Improving modeling of unique exposure pathways and interactions between pre-existing conditions and exposure and their implications for health effects.

⁵⁰ As defined by the U.S. Department of the Interior, an insular area is “A jurisdiction that is neither a part of one of the several States nor a federal district. This is the current generic term to refer to any commonwealth, freely associated state, possession or territory or Territory and from July 18, 1947, until October 1, 1994, the Trust Territory of the Pacific Islands. Unmodified, it may refer not only to a jurisdiction which is under United States sovereignty but also to one which is not, i.e., a freely associated state or, 1947-94, the Trust Territory of the Pacific Islands or one of the districts of the Trust Territory of the Pacific Islands.” Citation: U.S. Department of The Interior. *Definitions of Insular Area Political Organizations* | U.S. Department of the Interior. www.doi.gov/oia/islands/politicatypes. Accessed 18 July 2024.

⁵¹ As stated in HHS’s *Advancing Equity by Incorporating Intersectionality in Research and Analysis*, intersectionality is when people belong to more than one group and, consequently, may experience overlapping health and social inequities and have overlapping strengths and assets related to their group identities or membership. Citation: Office of the Assistant Secretary for Planning and Evaluation. *Advancing Equity by Incorporating Intersectionality in Research and Analysis*. U.S. Department of Health and Human Services, Sept. 2022. <https://aspe.hhs.gov/sites/default/files/documents/afa8245bfa85dbce89bb3c6f3a35f789/Intresectionality-Resrch-Anlysis.pdf>.

- Incorporating representative health statuses, rather than the assumption of no underlying health conditions, in analysis to better reflect physiologic processes that can modify the effects of chemical, environmental, social, and other stressors on populations.
- Developing methods to predict, measure, and account for non-chemical stressors in communities with EJ concerns.
- Accounting for variability and uncertainty (e.g., creating and using adjustment, modification, and/or uncertainty factors) in all stages of risk and environmental assessments to be more protective of populations facing disproportionate burdens.

Developing methods that more accurately reflect the risks, harms, and benefits of complex environments

- Integrating multi-stressor indicators into risk and environmental assessments (e.g., multiple chemicals, multiple social stressors, susceptibility/vulnerability, and socio-exposomic⁵² approaches).
- Developing methods and approaches for the assessment of cumulative impacts in communities with EJ concerns.
- Incorporating the social determinants of health into hazard, risk, and environmental assessments.
- Forecasting the impacts of new, emerging, or re-imagined technologies on the health, economic, and other measures of well-being on communities overburdened by environmental pollution and degradation and on underserved populations.
- Understanding and projecting the health, economic, and other impacts of climate change on communities overburdened by environmental pollution and degradation.
- Increasing the fit-for-purpose use of science, data, and research methods and data that reflect community exposures and experiences (including social experiences) into hazard, exposure, risk, and environmental assessments.
- Increasing the use of and creating best practices for integrating narrative analysis, ethnography, and other qualitative methods into analyses, as appropriate.
- Incorporating root causes/structural drivers of injustice, including racism, discrimination, and oppression, into assessments.
- Developing and incorporating methods for assessing the value and distribution of health and environmental benefits associated with progress on health and environmental outcomes relevant to communities with EJ concerns.
- Analyzing the extent and types of EJ analysis conducted for rulemakings and the impact of these analyses on decisions relative to community concerns to support the creation of recommendations on the development and use of science, data, and research to support EJ policy.

⁵² In this document, the exposome refers to the totality of exposures a person or population faces throughout their lives including social, physical, psychological, economic, chemical, and physical exposures. Exposomics is the study of the exposome. Citation: Centers for Disease Control and Prevention. *Exposome and Exposomics* | NIOSH | CDC. https://archive.cdc.gov/www_cdc.gov/niosh/topics/exposome/default.html. Accessed 18 July 2024.

Incorporation of priorities into the Research Plan

To support federal agencies in identifying and addressing longstanding gaps, barriers, and missing data relevant to EJ—including those listed above—the EJ Subcommittee developed a series of recommendations to serve as high-level guideposts. The recommendations were designed to provide flexibility and discretion to agencies in implementing them in ways that align with their missions and objectives. They were also designed with the anticipation that future iterations of the Research Plan will evaluate progress, identify potential ways to overcome obstacles, and identify new science, data, and research activities that can support agencies in identifying and addressing data gaps to advance EJ. The recommendations are organized into four themes that were informed by the “Planning Guide for Fulfilling EO 14096 Charges” appendix to the CEQ [Strategic Planning to Advance Environmental Justice](#) template.⁵³ These thematic areas are meaningful involvement and engagement; just treatment, equitable access, and protection from environmental injustice; work and partnership with non-federal entities; and institutionalizing EJ. Finally, the recommendations were designed to be implemented as expeditiously as possible, because as EO 14096 recognizes, our nation needs an ambitious approach to environmental justice that is informed by scientific research and high-quality data.

⁵³ Council on Environmental Quality. *Strategic Planning to Advance Environmental Justice Under Executive Order 14096, Revitalizing Our Nation’s Commitment to Environmental Justice for All*. Executive Office of the President, Oct. 2023. www.whitehouse.gov/wp-content/uploads/2023/11/Strategic-Planning-to-Advance-Environmental-Justice_final-Oct.-2023.pdf.

Section 2. Meaningful Involvement and Engagement to Inform Federal Science, Data, and Research Activities.

Executive Order 14096 directs agencies to develop opportunities for meaningful public participation and community engagement to advance EJ. Section 5 of the EO specifically directs agencies to provide opportunities for meaningful engagement for communities with EJ concerns on the development and design of data collection and research strategies relevant to those communities.⁵⁴ In a government of the people, by the people, and for the people—inclusive, effective, and meaningful participation and engagement is one of the foundational principles of government decision-making. A wide range of federal statutes provide for participation and engagement across routine federal agency functions—from rulemaking to strategic planning and evaluation.^{55,56,57,58,59} Consistent with these laws, a range of executive actions and policy directives also encourage and, in many cases, require agencies to develop better mechanisms to receive direct feedback from and engage with the people, organizations, and communities served by the federal government.^{60,61,62,63}

Identifying or enhancing concrete pathways for members of the public to provide input and feedback on science, data, and research activities—taking into account barriers to participation—while simultaneously demonstrating a commitment to serving as trustworthy partners, are important components for agencies to consider when enhancing public participation and community engagement. Recognizing the size of the federal government and the potential demand on communities that increased engagement may create, agencies should actively coordinate on engagement with communities with EJ concerns around science, data, and research activities. This may include, for example, sharing of best practices, sharing input received from communities with EJ concerns, and collaboration on research with communities as appropriate.

To support agencies in the development of public participation and community engagement with science, data, and research activities, the EJ Subcommittee makes the following recommendations:

⁵⁴ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, 5(a)(iii)(F)(8). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁵⁵ United States Congress. *Administrative Procedure Act*, 5 U.S.C. §§ 551–559, 1946. <https://www.justice.gov/sites/default/files/jmd/legacy/2014/05/01/act-pl79-404.pdf>.

⁵⁶ United States Congress. *Paperwork Reduction Act*, 44 U.S.C. §§ 3501–3521, 1995. <https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/paperwork-reduction-act.pdf>

⁵⁷ United States Congress. *Government Performance and Results Act Modernization Act*, 31 U.S.C. § 1101 note, 2011. <https://www.govinfo.gov/content/pkg/PLAW-111publ352/pdf/PLAW-111publ352.pdf>.

⁵⁸ United States Congress. *Foundations for Evidence-based Policymaking Act*, 5 U.S.C. § 306, 44 U.S.C. § 3501, et seq., 2019. <https://www.govinfo.gov/content/pkg/PLAW-115publ435/pdf/PLAW-115publ435.pdf>.

⁵⁹ United States Congress. *The National Environmental Policy Act of 1969, as amended*, 42 U.S.C. § 4321 et seq., 1970. https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-NEPA.pdf.

⁶⁰ EO 13707. *Using Behavioral Science Insights to Better Serve the American People*. Federal Register, vol. 80, no. 181, 15 Sept. 2015, 80 FR 56365. <https://www.govinfo.gov/content/pkg/FR-2015-09-18/pdf/2015-23630.pdf>.

⁶¹ EO 14058. *Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government*. Federal Register, vol. 86, no. 239, 13 Dec. 2021, 86 FR 7135. <https://www.govinfo.gov/content/pkg/FR-2021-12-16/pdf/2021-27380.pdf>.

⁶² EO 14091. *Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*. Federal Register, vol. 88, no. 35, 16 Feb. 2023, 88 FR 10825. <https://www.govinfo.gov/content/pkg/FR-2023-02-22/pdf/2023-03779.pdf>.

⁶³ Office of Management and Budget. *Modernizing Regulatory Review*. Executive Office of the President, 2022. www.whitehouse.gov/omb/information-regulatory-affairs/modernizing-regulatory-review. Accessed 18 July 2024.

Recommendation 1: Federal agencies should examine how current and future strategic planning efforts can advance the goals of this Research Plan. In doing so, federal agencies should consider how they can develop meaningful opportunities for communities to co-create, shape, determine the priorities of, and/or interpret and validate the findings of science, data, and research activities.

As part of their ongoing and future strategic planning processes required under EO 14096—particularly those relevant to science, data, and research activities—agencies should consider both processes (i.e., the practices used to achieve objectives) and products (i.e., outputs of science, data, and research activities) associated with meaningful participation and engagement of members of communities with EJ concerns.

For example, to address limitations to participation and engagement in science, data, and research activities for members of communities with EJ concerns, agencies should consider mechanisms for providing training, capacity-building,⁶⁴ and incentives (potentially including provisions for child care, food, and financial compensation) for these groups. To address barriers to full participation in and use of science, data, and research activities, agencies should consider (or continue to consider) including members of communities with EJ concerns in activities such as:

- providing advice directly to agencies via advisory boards and councils⁶⁵ (see, for example, the Health and Human Services (HHS) Office of the Administration for Children & Families Office of Planning, Research, and Evaluation [CAMPE](#) project);⁶⁶
- sharing resources (such as those from the HHS [Office of Climate Change and Health Equity](#));⁶⁷
- acting as peer reviewers for research proposals, contributing as producers and stewards of data (such as those used in the Housing and Urban Development [Accessible & Participator Methods for Involving People with Mental Disabilities in Housing Discrimination testing](#) project⁶⁸ and the [NIH/HEAL Initiative’s Native Collective Research Effort to Enhance Wellness \(N CREW\) Program](#));⁶⁹
- participating as partners in analysis (e.g., in EPA’s [ASPIRE study](#), EPA met regularly with local partners to discuss analyses and preliminary results. Partners helped EPA explore potential rationale for unexpected findings);⁷⁰
- serving as interpreters and validators of research findings (i.e., verifying the accuracy and credibility of research findings relative to lived experiences and expertise); and

⁶⁴ U.S. Environmental Protection Agency. *The Environmental Justice Thriving Communities Technical Assistance Centers Program* | US EPA. www.epa.gov/environmentaljustice/environmental-justice-thriving-communities-technical-assistance-centers. Accessed 18 July 2024.

⁶⁵ In accordance with all applicable laws including the Federal Advisory Committee Act (FACA; 5 U.S.C. Chapter 10)

⁶⁶ Office of Planning Research and Evaluation. *Advancing Contextual Analysis and Methods of Participant Engagement (CAMPE)*. www.acf.hhs.gov/opre/project/advancing-contextual-analysis-and-methods-participant-engagement. Accessed 18 July 2024.

⁶⁷ Office of the Assistant Secretary for Health (OASH). “Resources.” *HHS.gov*, www.hhs.gov/climate-change-health-equity-environmental-justice/climate-change-health-equity/resource/index.html. Accessed 18 July 2024.

⁶⁸ Office of Policy Development and Research. *Accessible and Participatory Methods for Involving People With Mental Disabilities in Housing Discrimination Testing*. U.S. Department of Housing and Urban Development, Aug. 2017. www.huduser.gov/portal/sites/default/files/pdf/MentalDisabilities-ShortPaper4.pdf.

⁶⁹ National Institutes of Health. *NIH HEAL Initiative*, <https://heal.nih.gov/research/research-to-practice/native-collective-research-effort-enhance-wellness-overdose-substance-mental-health-pain>. Accessed 18 July 2024.

⁷⁰ U.S. Environmental Protection Agency. *Wildfire Study to Advance Science Partnerships for Indoor Reductions of Smoke Exposures* | US EPA. www.epa.gov/air-research/wf-aspire. Accessed 18 July 2024.

- participating across the entirety of the research-to-action pathway (e.g., see Box 2 describing the Department of Energy (DOE) Argonne National Lab [Community Research on Climate and Urban Science \(CROCUS\)](#)).⁷¹

Enhancing the participation and engagement of members of communities with EJ concerns can also include the use of action-oriented community engagement workshops that include listening sessions, dialogue, and other activities in partnership with community members and organizations to address and solve challenges. Additionally, providing resources and technical support, and other collaborative activities to better understand community needs and priorities can also enhance community participation (see, for example, the Bureau of Ocean Energy Management (BOEM) [Underserved Community Dialogue Series on Offshore Wind](#)).⁷²

Consistent with the [Framework for Federal Scientific Integrity and Practice](#),⁷³ agencies should ensure that different modes of science, such as community science, community-engaged research, participatory science, and crowdsourcing, have the recognition, support, and resources to meet the same standards of scientific integrity that traditional modes are expected to uphold. This may require expanded scientific integrity practices and expectations, such as granting communities more autonomy over research questions and research design, recognition of data and knowledge sovereignty, and inclusion of multiple forms of evidence, such as Indigenous Knowledge.⁷⁴ For example, agencies could develop guidance and training on data collection, data quality, and data management strategies.⁷⁵ A cross-agency group should also identify best practices, opportunities, and limitations for doing community-engaged research in the context of the Paperwork Reduction Act and other relevant laws.

⁷¹ U.S. Department of Energy. *Community Research on Climate and Urban Science*. <https://crocus-urban.org/>. Accessed 18 July 2024.

⁷² Department of the Interior Bureau of Ocean Energy Management. *New York and New Jersey Offshore Wind Environmental Justice Forums*. www.boem.gov/renewable-energy/state-activities/new-york-new-jersey-offshore-wind-environmental-justice-forums. Accessed 18 July 2024.

⁷³ Office of Science and Technology Policy, National Science and Technology Council, Scientific Integrity Framework Interagency Work Group. *A Framework for Federal Scientific Integrity Policy and Practice*. Executive Office of the President, Jan. 2023. www.whitehouse.gov/wp-content/uploads/2023/01/2023-Framework-for-Federal-Scientific-Integrity-Policy-and-Practice.pdf.

⁷⁴ Ibid.

⁷⁵ U.S. Environmental Protection Agency. *Policy Guidelines and Checklist for Participatory Science Projects* | US EPA. www.epa.gov/participatory-science/policy-guidelines-checklist-participatory-science-projects. Accessed 18 July 2024.

Box 2. Direct engagement with communities to inform science, data, and research questions and local EJ strategies.

The [Community Research on Climate and Urban Science \(CROCUS\)](https://crocus-urban.org/)^a program is a collaborative initiative led by the U.S. Department of Energy (DOE)'s Argonne National Laboratory, alongside various academic, community, civic, and industry partners. With funding from DOE's Office of Science, Biological, and Environmental Research program, CROCUS focuses on studying urban climate change and its effects on EJ within the Chicago region. Through innovative partnerships with civic organizations and local invested parties, the program gathers first-hand knowledge from local community members to guide its scientific inquiry. This collaborative process allows for tailored research methods that address specific environmental justice issues identified and experienced by members of Chicago area communities. These efforts are directed toward creating actionable knowledge and tools that cater to the needs of diverse communities that can be used in urban areas nationwide to enact a climate-ready future.

^a U.S. Department of Energy. *Community Research on Climate and Urban Science*. <https://crocus-urban.org/>. Accessed 18 July 2024.

Recommendation 2: Federal agencies should encourage all federally funded research projects that involve members of communities with EJ concerns to develop transition, evaluation, and continuity plans in coordination with community representatives.

Successful community engaged research⁷⁶ relies on building trusting relationships between researchers and community partners. Additionally, community engaged research often examines questions that are enmeshed in a complex, interconnected network of issues. These and other factors can make it challenging to develop guidelines for when a project should end. However, the need for research to support EJ efforts across the United States is incredibly high.

To support communities with EJ concerns in planning for their current and future science, data, and research needs, researchers both internal (intramural) and external (extramural) to the federal government should co-develop transition, evaluation, and continuity plans with community representatives.⁷⁷ These discussions should include how communications and follow up will occur after the research project has concluded and how the outcomes of the research will be evaluated. These processes can be integrated into grant and contract mechanisms and should include plain language explanations of the funding, scope, and duration of the planned science, data, and research activities. The processes can also be outlined in community engagement plans⁷⁸ that encourage researchers to:

⁷⁶ In this research plan, community engaged research references a continuum of research practices that includes members for groups with shared affiliation (e.g., same geographic location, shared identity, health status, etc.) in collaborative roles and partnerships across the entirety of the life cycle of the research project.

⁷⁷ See, for example, processes utilized in the National Institute of Minority Health and Health Disparities [Research Centers in Minority Institutions \(RCMI\) program](https://www.nimhd.nih.gov/programs/extramural/research-centers/rcmi). Citation: National Institute of Minority Health and Health Disparities. *Research Centers in Minority Institutions Program*. www.nimhd.nih.gov/programs/extramural/research-centers/rcmi. Accessed 18 July 2024.

⁷⁸ See, for example, an EPA STAR grant funding opportunity. Citation: U.S. Environmental Protection Agency. *Community-Based Research for Effective Programs, Policies, and Decisions to Mitigate Cumulative Health Impacts and Environmental Health Disparities in Underserved Communities Request for Applications (RFA) | US EPA*. www.epa.gov/research-grants/community-based-research-effective-programs-policies-and-decisions-mitigate. Accessed 18 July 2024.

- partner with and involve affected communities, including communities with EJ concerns, in the formulation of research objectives and in clarifying their real-world exposures and/or health effects;
- describe how they will work in partnership to effectively design and implement the proposed project;
- coordinate with and/or complement other projects or activities (e.g., translational research) that can increase the positive impact of the research; and
- demonstrate how the proposed project will address the needs and concerns of overburdened communities, including how community-based organizations and/or other appropriate parties will be engaged to enhance the project's effectiveness and/or efficiency.

Recommendation 3: Federal agencies should develop and/or promote simplified and accessible public-facing portals/virtual resource centers that consolidate, summarize, and clearly communicate science, data, and research relevant to communities with EJ concerns.

Executive Order 14096 Section 3⁷⁹ emphasizes that agencies should ensure that members of the public, including from communities with EJ concerns, have adequate access to information on federal activities, including planning, regulatory actions, implementation, permitting, compliance, and enforcement related to human health or the environment, when required under the Freedom of Information Act, 5 U.S.C. 552; the Government in the Sunshine Act, 5 U.S.C. 552b; the Clean Air Act, 42 U.S.C. 7401 et seq.; the Clean Water Act, 33 U.S.C. 1251 et seq.; the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), 42 U.S.C. 11001 et seq.; or other statutes with public information provisions.⁸⁰ Developing publicly available resources that are accessible for communities with and without access to online materials are important to achieving this goal.

Each agency should curate or contribute to publicly available resources about how their activities intersect with EJ and could directly impact communities. Toward the goal of transparency, these resources should summarize federal activities and their results—including the products of science, data, and research activities relevant to the needs of communities with EJ concerns. Example portals and resources that begin to address this goal include HHS's [Head Start Environmental Exposure Mapping Tool and Resource Dashboard](#),⁸¹ EPA's [EJScreen](#)⁸² and [EJ Clearinghouse](#),⁸³ the [Climate and Economic Justice Screening Tool \(CEJST\)](#)⁸⁴ and [EJ Scorecard](#),⁸⁵ and the CDC/ATSDR [Environmental](#)

⁷⁹ EO 14096. *Revitalizing Our Nation's Commitment to Environmental Justice for All*, Section 3(a)(xi). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁸⁰ Ibid.

⁸¹ U.S. Department of Health & Human Services Administration for Children & Families. *Head Start Environmental Exposure Mapping Tool* | ECLKC. <https://eclkc.ohs.acf.hhs.gov/safety-practices/article/head-start-environmental-exposure-mapping-tool>. Accessed 18 July 2024.

⁸² U.S. Environmental Protection Agency. *EJScreen: Environmental Justice Screening and Mapping Tool* | US EPA. www.epa.gov/ejscreen. Accessed 18 July 2024.

⁸³ U.S. Environmental Protection Agency. *EJ Clearinghouse* | US EPA. www.epa.gov/environmentaljustice/forms/ej-clearinghouse. Accessed 18 July 2024.

⁸⁴ Council on Environmental Quality. *Explore the Map*. <https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5>. Accessed 11 June 2024.

⁸⁵ Council on Environmental Quality. *Environmental Justice Scorecard*. <https://ejscorecard.geoplatform.gov/scorecard/>. Accessed 11 June 2024.

[Justice Index](#).⁸⁶ When developing both online and print materials, agencies should follow all ethical guidelines in developing publicly available resources.

Federal agencies should also explore opportunities to enhance their ability to communicate with the public—especially communities from under-resourced or overburdened areas. As highlighted in the 2023 [letter](#)⁸⁷ from the President’s Council of Advisors on Science and Technology (PCAST), federal agencies should make science and technology communication and public engagement a core component of their mission and strategy. In its letter, the PCAST emphasized the importance of effective two-way science communication with diverse cross-sections of the public that enables the public to communicate their values, concerns, priorities, and interests to adjudicate and legitimize policy choices and priorities.

In making information on science, data, and research activities relevant to the needs of communities with EJ concerns, agencies should seek to use a diversity of scientific communication formats like graphic abstracts, plain language summaries, and well-designed infographics to make information more comprehensible and usable by the public.⁸⁸ Information should also be translated into languages most relevant to the communities of concern and into formats accessible to people with disabilities. These activities help support a research enterprise in which scientists collaborate with the public, from the identification of initial questions, to the review and analysis of new findings, to their dissemination and translation into policies.⁸⁹

⁸⁶Centers for Disease Control and Prevention. “Environmental Justice Index (EJI).” *Centers for Disease Control and Prevention*, www.atsdr.cdc.gov/placeandhealth/eji/index.html. Accessed 18 July 2024.

⁸⁷President’s Council of Advisors on Science and Technology. *Letter to the President Advancing Public Engagement With the Sciences*. report, Executive Office of the President, 2023. www.whitehouse.gov/wp-content/uploads/2023/08/PCAST_Science-Engagement-Letter_August2023.pdf.

⁸⁸Hyland-Wood, Bernadette, et al. “Toward Effective Government Communication Strategies in the Era of COVID-19.” *Humanities & Social Sciences Communications*, vol. 8, no. 1, Jan. 2021. <https://doi.org/10.1057/s41599-020-00701-w>.

⁸⁹President’s Council of Advisors on Science and Technology. *Letter to the President Advancing Public Engagement With the Sciences*. report, Executive Office of the President, 2023. www.whitehouse.gov/wp-content/uploads/2023/08/PCAST_Science-Engagement-Letter_August2023.pdf.

Section 3. Just Treatment, Equitable Access, and Protection from Environmental Injustice in Federal Science, Data, and Research Activities.

Executive Order 14096 directs agencies to identify, analyze, and address gaps, inadequacies, and opportunities in data collection and scientific research that may affect their ability to advance EJ. Data collection challenges related to patterns of historical or ongoing racial discrimination and bias, inadequate accounting for cumulative impacts (including risks), and other factors can inhibit the ability of members of communities with EJ concerns to achieve or maintain healthy and sustainable environments, and to receive equitable access to health, social, economic, environmental, and other benefits.

As the underlying basis of many vital federal programs and policies, it is also vital that all communities—especially those with EJ concerns—have adequate access to science, data, and research information generated by or through federal activities. Efforts to increase the availability of federal data can foster trust by providing the public with information on governmental activities and their results.⁹⁰ Enhanced access to science, data, and research information can also help agencies with accountability and support agency and public determination of whether federal activities are performing as intended.

To support the achievement of these just treatment, access, and protection goals, the EJ Subcommittee makes the following recommendations:

Recommendation 4: Federal agencies should add and explain existing practices for privacy and confidentiality protections and ethical standards associated with science, data, and research activities to their websites or other publicly accessible venues. They should also develop or enhance strategies for protecting the privacy rights of all people.

As defined by the National Institute of Standards and Technology (NIST), privacy risk is the likelihood that individuals will experience problems resulting from data processing, and the impact should they occur.⁹¹ Privacy risk can vary across different demographic indicators, such as culture, level of vulnerability, socioeconomic status, and disability status. Investing time to sufficiently engage with each community can help to honor and respect the freedoms valued by different communities.

By making existing privacy and confidentiality protections and ethical standards easily accessible to the public (e.g., see the National Institutes of Health (NIH) [Principles and Best Practices for Protecting Participant Privacy](#)⁹² and [Considerations for Researchers Working with AI/AN Communities](#)),⁹³ agencies help to create opportunities for a uniform, baseline understanding of current privacy and confidentiality protections and improve transparency on the types of protections offered to individuals and members of specific communities. Making these standards public also represents an important early step in identifying potential gaps (e.g., the identification and analysis of populations that have been historically and/or presently underserved by privacy standards) and best practices in these

⁹⁰ Office of Science and Technology Policy. *OSTP Issues Guidance to Make Federally Funded Research Freely Available Without Delay*. www.whitehouse.gov/ostp/news-updates/2022/08/25/ostp-issues-guidance-to-make-federally-funded-research-freely-available-without-delay. Accessed 18 July 2024.

⁹¹ National Institute of Standards and Technology. *Privacy Framework*. www.nist.gov/privacy-framework/privacy-framework. Accessed 18 July 2024.

⁹² National Institutes of Health. *Principles and Best Practices for Protecting Participant Privacy*. <https://sharing.nih.gov/data-management-and-sharing-policy/protecting-participant-privacy-when-sharing-scientific-data/principles-and-best-practices-for-protecting-participant-privacy>. Accessed 11 June 2024.

⁹³ National Institutes of Health. *Considerations for Researchers Working With AI/AN Communities*. <https://sharing.nih.gov/data-management-and-sharing-policy/protecting-participant-privacy-when-sharing-scientific-data/considerations-for-researchers-working-with-aian-communities>. Accessed 11 June 2024.

protections and standards. By assessing gaps, agencies can develop privacy and confidentiality protections that ensure that all people, including those most vulnerable to harms due to privacy loss, are adequately protected in federal science, data, and research activities.

Recommendation 5: Federal agencies should prioritize identifying and addressing EJ-relevant science, data, and research gaps and integrate comprehensive data into tools and databases that inform decision-making and analysis.

When working in areas that are relevant to EJ, agencies should prioritize science, data, and research activities that can, as outlined in Section 5⁹⁴ of EO 14096, support EJ policy and other relevant decision contexts (e.g., permitting, civil rights investigations) where mission appropriate. Agencies should, whenever possible, prioritize the precautionary use (i.e., minimization of Type II error (false negative) while permitting Type I error (false positive))⁹⁵ of existing data to create science, data, and research products relevant to EJ.

While all efforts should be taken to use existing data to support the EJ policy and agency responsibilities outlined in Sections 3 and 5⁹⁶ of EO 14096, there are situations in which data gaps may serve to conceal harms from public view. When data gaps obscure potential harm, they themselves can become persistent and pernicious drivers of environmental injustice. For example, gaps that exist on the magnitude and impacts of toxic chemical exposures (e.g., air toxics,⁹⁷ drinking water contaminants)⁹⁸ including the effects of cumulative impacts, can minimize the true, real-world conditions that members of communities with EJ concerns experience and are impacted by.

Gaps and inadequacies can also prevent the accurate and adequate representation of specific *populations* (e.g., Indigenous populations, people living in territories and possessions of the United States, people with disabilities, unhoused populations, people who are incarcerated); *geographies* (e.g., rural areas, community-levels); *health outcomes and conditions* (e.g., maternal and child health, pre-existing conditions); *economic statuses* (e.g., socioeconomic factors); and *occupations* (e.g., farm workers) in analyses. Missing data in areas such as those described above represent high-priority science, data, and research areas relevant to communities with EJ concerns in need of immediate attention and action.

Agencies should take affirmative steps to identify and address EJ-relevant science, data, and research gaps—using interagency forums (e.g., the EJ Subcommittee) to discuss needs with other agencies and share the needs with the broader scientific community. When identifying and addressing science, data, and research gaps, agencies should be mindful of and follow all relevant laws, directives, guidance, and

⁹⁴ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 5(a)(iii)(C). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁹⁵ U.S. Environmental Protection Agency. *Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC) Final Report | US EPA*. www.epa.gov/endocrine-disruption/endocrine-disruptor-screening-and-testing-advisory-committee-edstac-final. Accessed 18 July 2024.

⁹⁶ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 5(a)(iii)(C). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

⁹⁷ Robinson, Ellis S., et al. “Ethylene Oxide in Southeastern Louisiana’s Petrochemical Corridor: High Spatial Resolution Mobile Monitoring During HAP-MAP.” *Environmental Science & Technology*, vol. 58, no. 25, June 2024, pp. 11084–95. <https://doi.org/10.1021/acs.est.3c10579>.

⁹⁸ Josset, Laureline, et al. “The U.S. Water Data Gap—A Survey of State-Level Water Data Platforms to Inform the Development of a National Water Portal.” *Earth’s Future*, vol. 7, no. 4, Apr. 2019, pp. 433–49. <https://doi.org/10.1029/2018ef001063>.

recommendations, including the recently updated [Statistical Policy Directive No. 15](#)⁹⁹ on *Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity*.

In addition to filling gaps via data collection efforts, agencies should also explore filling gaps via increased monitoring and measurement; modeling; the use of adjustment, modification, and/or uncertainty factors; and other methodological tools for making use of information that is grounded in and reflective of the experiences of members of communities with EJ concerns, including participatory and community science. Community-derived data, including data collected by and in collaboration with communities with EJ concerns, has increasingly been shown to produce data with accuracy equal to or surpassing that of professional scientists. These data should also be considered in filling gaps—particularly in areas in need of rapid and/or high-priority assessment (e.g., air pollution, drinking water, or environmental impact assessments).¹⁰⁰

Where possible, datasets, methodologies, and other materials that help fill data gaps should be made available via tools like the [EJ Clearinghouse](#)¹⁰¹ and data.gov, ensuring that information relevant to EJ is easily accessible to all, including communities with EJ concerns.

Recommendation 6: Federal agencies should collaborate across agencies/departments to advance science, data, and research about cumulative impacts that can inform policy and decision-making that advances EJ.

Throughout EO 14096, the importance of ameliorating and preventing the cumulative impacts of environmental degradation and societal marginalization are highlighted. Communities with EJ concerns face entrenched disparities that are often the legacy of racial discrimination and segregation, redlining, exclusionary zoning, and other discriminatory land use decisions or patterns. The decisions that stem from these often government-supported practices led and lead to the placement of polluting sources (e.g., industries, hazardous waste sites, and landfills) in locations in communities already overburdened by social stress (e.g., intergenerational trauma associated with histories of slavery and genocide) and other stress from the built environment (e.g., buildings and roads) and natural environment (e.g., effects of climate change). People in these communities suffer from poorer health outcomes and have lower life expectancies than those in other communities in our nation.^{102,103,104}

⁹⁹ Office of Management and Budget. *Revisions to OMB’s Statistical Policy Directive No. 15: Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity*. Federal Register, vol. 89, no. 62, 29 Mar. 2024, 89 FR 22182. <https://www.federalregister.gov/documents/2024/03/29/2024-06469/revisions-to-ombs-statistical-policy-directive-no-15-standards-for-maintaining-collecting-and-presenting-federal-data-on-race-and-ethnicity>.

¹⁰⁰ Kosmala, Margaret, et al. “Assessing Data Quality in Citizen Science.” *Frontiers in Ecology and the Environment*, vol. 14, no. 10, Dec. 2016, pp. 551–60. <https://doi.org/10.1002/fee.1436>. Available at: <https://esajournals.onlinelibrary.wiley.com/doi/am-pdf/10.1002/fee.1436>.

¹⁰¹ U.S. Environmental Protection Agency. *EJ Clearinghouse | US EPA*. www.epa.gov/environmentaljustice/forms/ej-clearinghouse. Accessed 18 July 2024.

¹⁰² Arias, Elizabeth, et al. *U.S. Small-area Life Expectancy Estimates Project: Methodology And Results Summary*. 1 Sept. 2018. <https://stacks.cdc.gov/view/cdc/58853>.

¹⁰³ Hunt, Bijou R., et al. “Life Expectancy Varies in Local Communities in Chicago: Racial and Spatial Disparities and Correlates.” *Journal of Racial and Ethnic Health Disparities*, vol. 2, no. 4, Mar. 2015, pp. 425–33. <https://doi.org/10.1007/s40615-015-0089-8>.

¹⁰⁴ Boing, Antonio Fernando, et al. “Quantifying and Explaining Variation in Life Expectancy at Census Tract, County, and State Levels in the United States.” *Proceedings of the National Academy of Sciences of the United States of America*, vol. 117, no. 30, July 2020, pp. 17688–94. <https://doi.org/10.1073/pnas.2003719117>.

Sections 2 and 3 of EO 14096¹⁰⁵ direct agencies to identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of federal activities, including those related to climate change and cumulative impacts of environmental and social burdens on communities with EJ concerns. To advance this work, Section 5 of EO 14096¹⁰⁶ specifically calls for the analysis of cumulative impacts from multiple sources, pollutants or chemicals, and exposure pathways, and accounting for non-chemical stressors and current and anticipated climate change. In order for agencies to meet these goals, they should begin by understanding the specific areas in which cumulative impacts intersect with their work; how their work can be joined with that of other agencies; and how the federal government can support state, Tribal, territorial and local governments to fully assess and address cumulative impacts and community priority concerns. Identifying policy areas or other decision areas (e.g., funding decisions) that may intersect with cumulative impacts can help agencies develop fit-for-purpose approaches^{107,108,109,110,111,112} to reducing said impacts. At the same time, agencies should coordinate their cumulative impacts science, data, and research activities so that they can leverage their collective expertise and learning (see Box 3 for EPA approaches to cumulative impacts), minimize the science, data, and research-related burden in communities they are working in, and ensure that they are maximizing benefits to communities with EJ concerns.

¹⁰⁵ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 2(b) and Section 3(a)(i). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁰⁶ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, 5(a)(iii)(F)(6). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁰⁷ Morello-Frosch, Rachel, et al. “Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy.” *Health Affairs*, vol. 30, no. 5, May 2011, pp. 879–87. <https://doi.org/10.1377/hlthaff.2011.0153>.

¹⁰⁸ National Environmental Justice Advisory Council. *Ensuring Risk Reduction in Communities With Multiple Stressors: Environmental Justice and Cumulative Risks/Impacts*. U.S. Environmental Protection Agency, 2004. www.epa.gov/sites/default/files/2015-02/documents/nejac-cum-risk-rpt-122104.pdf.

¹⁰⁹ New Jersey Department of Environmental Protection. *A Preliminary Screening Method to Estimate Cumulative Environmental Impacts*. 22 Dec. 2009. https://dep.nj.gov/wp-content/uploads/ej/docs/ejc_screeningmethods20091222.pdf.

¹¹⁰ Ellickson, Kristie M., et al. “Cumulative Risk Assessment and Environmental Equity in Air Permitting: Interpretation, Methods, Community Participation and Implementation of a Unique Statute.” *International Journal of Environmental Research and Public Health*, vol. 8, no. 11, Nov. 2011, pp. 4140–59. <https://doi.org/10.3390/ijerph8114140>.

¹¹¹ California Office of Environmental Health Hazard Assessment. *CalEnviroScreen 4.0*. <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40>. Accessed 18 July 2024.

¹¹² Payne-Sturges, Devon C., et al. “Framing Environmental Health Decision-Making: The Struggle Over Cumulative Impacts Policy.” *International Journal of Environmental Research and Public Health*, vol. 18, no. 8, Apr. 2021, p. 3947. <https://doi.org/10.3390/ijerph18083947>.

Box 3. Developing frameworks to inform agency action on cumulative impacts.

EPA’s Office of Research and Development (ORD) published the report, [Cumulative Impacts Research: Recommendations for EPA’s Office of Research and Development](#)^b to inform development of its fiscal year 2023-2026 strategic research action plans. This research framework prioritizes research needs that will help advance the science of cumulative impacts and cumulative impact assessment to inform decision-making at all levels. EPA defines cumulative impacts as the totality of exposures to combinations of chemical and non-chemical stressors and their effects on health, well-being, and quality of life outcomes.

^bU.S. Environmental Protection Agency. *Cumulative Impacts Research*. <https://www.epa.gov/healthresearch/cumulative-impacts-research>. Accessed 18 July 2024.

Recommendation 7: Federal agencies should identify, highlight, and support pathways to integrate qualitative research and mixed methods into federal decision-making related to EJ.

To capture the full experience of humans in their environments—especially the experiences of communities with EJ concerns—agencies should employ methodologically diverse toolsets in their evidence-building science, data, and research activities. As noted in Circular A-11,¹¹³ evidence can be quantitative or qualitative and can be viewed broadly as the available body of information indicating whether a belief or proposition is valid or true. Evidence includes Indigenous Knowledge as a form of knowledge that can and should inform federal government decision-making where appropriate.¹¹⁴

Evidence generation can involve the development of methods and approaches to appropriately integrate qualitative data and information (e.g., perspectives of people with lived experience, including Indigenous Knowledge) into analyses and products relevant to decision-making at the federal, state, and local levels.¹¹⁵ In addition, pathways to integrate qualitative research methods should also create space for community perspectives and documentation where possible. Methodologically diverse toolsets should also include data obtained on lived experiences and other information that are captured in artistic¹¹⁶ and narrative forms,¹¹⁷ including oral histories,¹¹⁸ cultural expressions, or family

¹¹³ Office of Management and Budget. *OMB Circular A-11*. Executive Office of the President, 11 Aug. 2023. www.whitehouse.gov/wp-content/uploads/2018/06/a11_web_toc.pdf.

¹¹⁴ Office of Science and Technology Policy and Council on Environmental Quality. *Guidance on Federal Agency Implementation of Indigenous Knowledge Consideration and Application*. Executive Office of the President, 15 Nov. 2021. www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IC-Guidance.pdf.

¹¹⁵ Kakade, Seema. “Environmental Evidence.” *Colorado Law Scholarly Commons*, vol. 94, no.3, 2023. <https://scholar.law.colorado.edu/lawreview/vol94/iss3/5>.

¹¹⁶ Avril, Ellen, et al. “Art And Environmental Struggle Curating an Exhibition About Place-Rooted Ecological Knowledge.” *Geohealth*, vol. 6, no. 12, Dec. 2022. <https://doi.org/10.1029/2022gh000625>.

¹¹⁷ Toliver, S. R. *Recovering Black Storytelling in Qualitative Research*. 2021. <https://doi.org/10.4324/9781003159285>.

¹¹⁸ In 2023, with support from NEH, Secretary Haaland established the Oral History Project for the federal Government to—for the first time—document experiences of federal Indian boarding school survivors as part of the public record and for public memorialization. NEH’s support will go towards digitization efforts and making these stories publicly accessible as well as federal and Tribal partnerships for future research efforts. The Department and Smithsonian National Museum of American History are in ongoing discussions about how to support this work. Citation: Domestic Policy Council. *The White House 2023 Progress Report for Tribal Nations*. Executive Office of the President, 2023. www.whitehouse.gov/wp-content/uploads/2023/12/2023.12.04-TNS-Progress-Report.pdf.

archives. Science, data, and research staff should also find ways, as feasible and desired by community members, to capture and preserve experiences that have not yet been captured.

Once new and existing pathways are identified to integrate qualitative research methods and other information sources and forms into EJ research design and interpretation, agencies should develop specific guidance and best practices on their processes that can help support continued advancement in this area. For example, the [Lived Experiences Project](#)¹¹⁹ of HHS's Office of the Assistant Secretary for Planning and Evaluation has been leading work and creating resources on how federal agencies can meaningfully and effectively engage people with lived experiences. Having guidance available at the agency level will increase awareness of value and utility of qualitative methods in EJ and provide communities and federal agencies with a more comprehensive understanding of outcomes of EJ research. The activities can also aid in the development of uniform best practices of qualitative research across the government.

Recommendation 8: Federal agencies should assess the role of, and find opportunities to integrate, the social determinants of health into their science, data, and research activities.

Healthy People 2030 defines [social determinants of health](#)¹²⁰ (SDOH) as “the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.”¹²¹ In November 2023, the White House released The [U.S. Playbook to Address Social Determinants of Health](#), with the vision “to enable every American to lead a full and healthy life within their community.”¹²² This playbook also recognized that disproportionate exposure to pollutants or hazardous waste and other environmental injustices is linked to adverse health problems such as lead poisoning, asthma, anxiety, and cancer.¹²³ Adopting a whole-of-government framework for SDOH can result in scientific assessments, including cumulative impact assessments, socio-exposomic¹²⁴ analysis, and other data/research-related products, that are more robust and reflective of reality and policies that impact communities with EJ concerns. This could support the reduction of harms and produce measurable benefits across the full range of health determinants.

To move toward a unified, intragovernmental framework on the SDOH, agencies should first identify the areas of their work and mission relevant to EJ that can be supported by the inclusion of tools, methods, and thinking associated with the SDOH. Agencies can build on existing work by [OSTP and the](#)

¹¹⁹ Office of the Assistant Secretary for Planning and Evaluation. *Engaging People with Lived Experience to Improve Federal Research, Policy, and Practice*. <https://aspe.hhs.gov/lived-experience>. Accessed 11 June 2024.

¹²⁰ Office of Disease Prevention and Health Promotion. *Social Determinants of Health - Healthy People 2030* | Health.Gov. <https://health.gov/healthypeople/priority-areas/social-determinants-health>. Accessed 11 June 2024.

¹²¹ Ibid.

¹²² Domestic Policy Council and Office of Science and Technology Policy. *The U.S. Playbook to Address Social Determinants of Health*. Executive Office of the President, Nov. 2023. www.whitehouse.gov/wp-content/uploads/2023/11/SDOH-Playbook-3.pdf.

¹²³ Ibid. at 3.

¹²⁴ Senier, Laura, et al. “The Socio-exposome: Advancing Exposure Science and Environmental Justice in a Postgenomic Era.” *Environmental Sociology*, vol. 3, no. 2, Nov. 2016, pp. 107–21. <https://doi.org/10.1080/23251042.2016.1220848>. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5604315/>.

[Domestic Policy Council](#),¹²⁵ HHS Offices of [Health Policy](#)¹²⁶ and [Disease Prevention and Health Promotion](#),¹²⁷ [Centers for Disease Control and Prevention](#),¹²⁸ and the [National Institute on Minority Health and Health Disparities](#)¹²⁹ to identify high priority areas within their workstreams that intersect with the SDOH.

Concurrent with the development of agency-specific frameworks, agencies should identify ways that key indicators for the SDOH can be combined with efforts on addressing cumulative impacts. These agency efforts can also feed into whole-of-government approaches that seek to create unified and streamlined approaches for the integration of SDOH indicators into datasets and other interagency work.

Recommendation 9: Federal agencies should analyze the alignment of their current data governance, standards, management, and sharing practices with the recommendations of the Data Sharing Work Group of the federal Chief Data Officer (CDO) Council and NSTC Subcommittee on Equitable Data—focusing on potential gaps that could disproportionately impact members of communities with EJ concerns.

Clear data policies, processes, and mechanisms to access data, and channels to communicate about data, are essential for engaging with and informing communities with EJ concerns, as well as for engendering overall public trust. Building on existing OMB data guidance^{130,131} and the recommendations of the [Data Sharing Work Group of the CDO](#)¹³² and [NSTC Subcommittee of Equitable Data](#),¹³³ the assessment of existing data practices should include mechanisms for members of communities with EJ concerns to provide feedback. Additionally, agencies should distribute examples of co-development of data governance agreements with communities.

Data governance agreements assist parties involved in the production of science, data, and research information, such as the researchers, community members, and study participants, in understanding the roles and responsibilities of each party in ethical data management and stewardship. The purpose of formulating these agreements is to minimize the misuse or misunderstanding of data. Federal agencies create these types of agreements with partners through documentation such as Memoranda

¹²⁵ Domestic Policy Council, and Office of Science and Technology Policy. *The U.S. Playbook to Address Social Determinants of Health*. Executive Office of the President, Nov. 2023. <https://www.whitehouse.gov/wp-content/uploads/2023/11/SDOH-Playbook-4.pdf>.

¹²⁶ Office of the Assistant Secretary for Planning and Evaluation. *Addressing Social Determinants of Health in Federal Programs*. <https://aspe.hhs.gov/topics/health-health-care/social-drivers-health/addressing-social-determinants-health-federal-programs>. Accessed 18 July 2024.

¹²⁷ Office of Disease Prevention and Health Promotion. *Social Determinants of Health - Healthy People 2030* | [health.gov](https://health.gov/healthypeople/priority-areas/social-determinants-health). <https://health.gov/healthypeople/priority-areas/social-determinants-health>. Accessed 18 July 2024.

¹²⁸ Center for Disease Control and Prevention. *Social Determinants of Health (SDOH) at CDC*. www.cdc.gov/about/priorities/social-determinants-of-health-at-cdc.html. Accessed 18 July 2024.

¹²⁹ National Institute on Minority Health and Health Disparities. *PhenX SDOH Toolkit*. <https://www.nimhd.nih.gov/resources/phenx/>. Accessed 18 July 2024.

¹³⁰ Office of Management and Budget. *Open Data Policy-Managing Information as an Asset*. M-13-13, Executive Office of the President, 9 May 2013. https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2013/m-13-13.pdf

¹³¹ Office of Management and Budget. *Guidance for Providing and Using Administrative Data for Statistical Purposes*. M-14-06, Executive Office of the President, 14 Feb. 2014. https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2014/m-14-06.pdf

¹³² Chief Data Officers Council. *Data Sharing*. <https://www.cdo.gov/data-sharing/>. Accessed 11 June 2024.

¹³³ USAGov. *Expand the Production, Dissemination, and Use of Equitable Data*. <https://open.usa.gov/national-action-plan/5/US0113/>. Accessed 11 June 2024.

of understanding (MOUs) or statements of work (SOWs) (e.g., DOT's [model](#)¹³⁴ for data governance). Developing a set of examples of co-produced data governance agreements in the federal science, data, and research ecosystem is an important, demonstrable step toward better coordination and communication between agencies and among those affected by environmental injustice throughout the lifecycle of federal science, data, and research activities. As part of these activities, agencies should consider developing training for staff on the creation and use of MOUs and SOWs and should identify possible pathways for streamlining the approval of these documents in order to expedite their use.

Recommendation 10: (for EPA only) By the release of the next Toxics Release Inventory (TRI) Annual Report after the publication of this Research Plan, EPA should update its TRI analysis and process to be more inclusive of the needs of communities with EJ concerns.

Section 6 of Executive Order 14096 provides several directions to agencies aimed at ensuring that the public, including members of communities with EJ concerns, receive timely information about releases of toxic chemicals that may affect them and health and safety measures available to address such releases. Subsection (d) of Section 6 directs the Administrator of the EPA to provide the EJ Subcommittee with an annual report on trends in data in the Toxic Release Inventory established by Section 313 of EPCRA to inform the development of the Research Plan.

Released in March 2024, the 2022 TRI National Analysis,¹³⁵ reveals that overall chemical releases have decreased since 2013, with long-term declines in air emissions—especially from the electric utilities sector—driving decreases. The analysis also found that the chemicals not released were largely due to them being recycled rather than emitted. Though these trends are positive in the aggregate, the EJ Subcommittee review of the analysis identified several areas that should be improved in future analyses, including:

- EPA should investigate opportunities to include additional analysis of disproportionate releases and impacts of toxic chemicals in the TRI National Analysis, particularly those faced by communities with EJ concerns, using available demographic variables and other indicators (e.g., income, education, race/ethnicity, disability status). This analysis may include individual chemicals and industry sectors of interest to communities as well as aggregated TRI data.
- EPA should investigate opportunities to address data gaps in TRI's coverage (e.g., industry sectors to regulate, chemicals to list, and means to further speciate reporting elements to improve the use of TRI data), and explore methods to characterize data limitations including potential error and/or range of uncertainty in order to communicate these to the public.
- EPA should support community-initiated activities by assisting such communities in understanding and using TRI data and by exploring strategies for EPA to solicit public feedback about perceived gaps in TRI coverage as well as suspected compliance concerns.
- EPA should help increase the use of TRI data across community researcher hubs affiliated with federal sector funders to enhance community understanding of EJ concerns.

¹³⁴ National Highway Traffic Safety Administration National 911 Program. *Model Data Governance Agreements and Governance Structure*. United States Department of Transportation, May 2023. https://www.911.gov/assets/Model-Governance-Report_08MAY2023_Final.pdf.

¹³⁵ U.S. Environmental Protection Agency. *2022 TRI National Analysis*. Mar. 2024. https://www.epa.gov/system/files/documents/2024-03/complete_2022_tri_national_analysis.pdf.

Section 4. Work and Partner with Non-Federal Entities to Inform EJ- Relevant Federal Science, Data, and Research Activities.

Executive Order 14096 Section 3¹³⁶ emphasizes engagement with members of the public and other invested parties as important to the achievement of EJ. These provisions include directions for agencies to:

- improve collaboration and communication with state, Tribal, territorial, and local governments on programs and activities to advance EJ;¹³⁷
- encourage and, to the extent permitted by law, ensure that government-owned, contractor-operated facilities take appropriate steps to implement the directives of this order;¹³⁸ and
- consider ways to encourage and, as appropriate, ensure that recipients of federal funds¹³⁹ advance EJ.¹⁴⁰

The federal government plays an important role in setting expectations and developing guidance for how federal science, data, and research activities should be conducted. The federal government also has the ability to create communication channels and convene non-federal entities, including state, Tribal, territorial, and local governments; non-governmental organizations; private companies; and contract laboratories to discuss and gather input on how federal science, data, and research activities can be improved. The ways and extent to which federal government agencies can truly create and improve communication channels, convene non-federal entities, and institutionalize the ways in which recipients of federal funds can advance EJ will be paramount in the coming years.

Engagement and Consultation with Tribal Nations.

The United States has a unique legal relationship with Tribal Nations as set forth in the Constitution of the United States, treaties, statutes, executive orders, and court decisions, and has enacted a number of statutes and promulgated numerous regulations that establish and define a trust relationship with Tribal Nations.¹⁴¹ This trust responsibility applies to all federal activities, including science, data, and research activities across the entirety of their life cycles.

¹³⁶ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Sections 3(a)(xi) through 3(a)(xiv). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹³⁷ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 3(a)(xii). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹³⁸ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 3(a)(xiii). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹³⁹ Including recipients of block grant funding – and entities subject to contractual, licensing, or other arrangements with federal agencies.

¹⁴⁰ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 3(a)(xiv). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁴¹ EO 13175. *Consultation and Coordination with Indian Tribal Governments*, Section 2(a). Federal Register, vol. 65, no. 218, 9 Nov 2000, 65 FR 67249. <https://www.govinfo.gov/content/pkg/FR-2000-11-09/pdf/00-29003.pdf>.

When agencies pursue policies that have implications for Tribal Nations,¹⁴² they must engage in regular, meaningful, and robust consultation with Tribal Nations consistent with the agency's Tribal consultation action plan, the Presidential Memorandum on Uniform Standards for Tribal Consultation,¹⁴³ the Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships,¹⁴⁴ and Executive Order 13175 on Consultation and Coordination with Indian Tribal Governments.¹⁴⁵ Consultation is a cornerstone of building and maintaining trust with Tribal Nations.

To support consultation and engagement with Tribal Nations on federal science, data, and research activities relevant to EJ concerns, the EJ Subcommittee makes the following recommendations:

Recommendation 11: Federal agencies should recognize the sovereign interests of Tribal Nations with regard to the data, knowledge, and other information they hold and candidly acknowledge any limitations on agencies' ability to keep information confidential, to ensure that Tribal Nations make informed decisions about whether and how to share their Indigenous Knowledge.

Federal access to Indigenous Knowledge and data from Tribal Nations is a privilege. Federal employees engaging in science, data, and research-related activities should recognize that members of Tribal Nations may possess knowledge that is sensitive, sacred, or belongs to certain families or clans. Members of Tribal Nations may have concerns about privacy, confidentiality, or potential threats to natural or cultural resources, or they may fear loss of access to or desecration of lands and waters if certain information is shared with others.

As an extension of their legal sovereignty, Tribal Nations control the knowledge and data they hold. When working with Tribal Nations on science, data, and research activities relevant to EJ, agencies should have extensive consultation about the needs and desires of Tribes about how data they share with federal agencies is handled. The collection of new data and the use of existing data on or about their Nations should also follow established principles and standards of consultation. When desired by representatives of Tribal Nations, agencies should follow principles of FAIR (Findable, Accessible, Interoperable, and Reusable) and CARE (Collective benefit, Authority, Responsibility, and Ethics).^{146,147} As developed by the Global Indigenous Data Alliance¹⁴⁸ and highlighted in the [White House Ocean](#)

¹⁴² EO 13175 defines "Policies that have tribal implications" as "regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes." Citation: EO 13175 *Consultation and Coordination with Indian Tribal Governments*, Section 1(a). Federal Register, vol. 65, no. 218, 9 Nov 2000, 65 FR 67249. <https://www.govinfo.gov/content/pkg/FR-2000-11-09/pdf/00-29003.pdf>.

¹⁴³ Executive Office of the President. "Memorandum on Uniform Standards for Tribal Consultation." 30 Nov. 2022. <https://www.whitehouse.gov/briefing-room/presidential-actions/2022/11/30/memorandum-on-uniform-standards-for-tribal-consultation/>.

¹⁴⁴ Executive Office of the President. "Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships." 26 Jan. 2021. <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-tribal-consultation-and-strengthening-nation-to-nation-relationships/>.

¹⁴⁵ EO 13175. *Consultation and Coordination with Indian Tribal Governments*. Federal Register, vol. 65, no. 218, 9 Nov. 2000, 65 FR 67249. <https://www.govinfo.gov/content/pkg/FR-2000-11-09/pdf/00-29003.pdf>.

¹⁴⁶ Carroll, Stephanie Russo, et al. "Operationalizing the CARE and FAIR Principles for Indigenous data futures." *Scientific Data*, vol. 8, no. 108, 16 April 2021. <https://doi.org/10.1038/s41597-021-00892-0>.

¹⁴⁷ Office of Science and Technology Policy, National Science and Technology Council, Subcommittee on Open Science. *Desirable Characteristics of Data Repositories for Federally Funded Research*. Executive Office of the President, May 2022. <https://doi.org/10.5479/10088/113528>.

¹⁴⁸ Global Indigenous Data Alliance (GIDA). *CARE Principles for Indigenous Data Governance*. <https://www.gida-global.org/care>. Accessed 18 July 2024.

[Justice Strategy](#),¹⁴⁹ the CARE principles were designed to ensure the inclusion of Indigenous Peoples in the collection, handling, access, use, and benefits of data. Agencies should also strive to support Tribal Nations in developing their capacity to fully exercise their sovereign interests with regard to the data, knowledge, and other information they hold. Agencies should also follow the principles set forth in the [Guidance for Federal Departments and Agencies on Indigenous Knowledge](#)¹⁵⁰ when engaging with Tribal Nations and their representatives. Additionally, the Federal Privacy Council, the Chief Data Officers Council, and the Interagency Council on Statistical Policy (the three councils that collectively govern privacy and confidentiality over data collected by the federal government) should engage with members of Tribal Nations to develop more EJ-informed governance plans over protected data.

Enhancing working relationships and partnership across all non-federal invested parties.

Federal science, data, and research activities, and any resulting policies that they help inform, can have EJ implications for a wide range of non-federal partners and invested parties—including state, Territorial, and local governments; academic institutions; communities; the private sector; and the nonprofit sector. Decisions such as who is funded to do the science, data, and research activity; how the scope of science, data, and research activities are decided; who will participate in the science, data, and research activities; who will benefit from and see the results of science, data, and research activities; and how resulting policies that are supported by science, data, and research activities will impact certain populations are important questions that exist along the entirety of the science, data, and research life cycles. Examining these aspects might include discussions on methodological standards, equitable data collection, research outcome dissemination, and the representation of specific community characteristics. To address this, the EJ Subcommittee makes the following recommendations:

Recommendation 12: Federal agencies should establish or strengthen practices for the collection of data and inclusion of populations from insular areas of the United States, including collaborative work with territorial governments, in EJ-relevant science, data, and research tools and activities.

As defined¹⁵¹ by the U.S. Department of the Interior, an insular area is

“A jurisdiction that is neither a part of one of the several States nor a federal district. This is the current generic term to refer to any commonwealth, freely associated state, possession or territory or Territory and from July 18, 1947, until October 1, 1994, the Trust Territory of the Pacific Islands. Unmodified, it may refer not only to a jurisdiction which is under United States sovereignty but also to one which is not, i.e., a freely associated state or, 1947-94, the Trust Territory of the Pacific Islands or one of the districts of the Trust Territory of the Pacific Islands.”

¹⁴⁹ Ocean Policy Committee. *Ocean Justice Strategy*. Executive Office of the President, Dec. 2023.

<https://www.whitehouse.gov/wp-content/uploads/2023/12/Ocean-Justice-Strategy.pdf?cb=1701982354>.

¹⁵⁰ Office of Science and Technology Policy and Council on Environmental Quality. *Guidance for Federal Departments and Agencies on Indigenous Knowledge*. Executive Office of the President, 30 Nov. 2022. <https://www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf>.

¹⁵¹ Department of the Interior. *Definitions of Insular Area Political Organizations*. <https://www.doi.gov/oia/islands/politicatypes>. Accessed 18 July 2024.

Insular areas include a range of political distinctions, with a wide variety of cultures, priorities, people, and needs. Executive Order 14096 explicitly includes insular areas as places that may have communities with EJ concerns¹⁵² and as communities with data collection needs.¹⁵³

As of 2024, insular areas are often not included in broad data collection efforts of the federal government (e.g., the [American Community Survey](#),¹⁵⁴ [Bureau of Labor Statistics \(BLS\) employment and wage statistics](#),¹⁵⁵ [BLS Consumer Price Index](#),¹⁵⁶ [National Health Examination and Nutrition Survey](#),¹⁵⁷ [Current Population Survey](#),¹⁵⁸ [National Survey on Drug Use and Health](#),¹⁵⁹ and [National Health Interview Survey](#)),¹⁶⁰ which can deprive the people living in these areas of benefits they need. As a first step to mitigating the harms associated with past and present omission and suppression of cultural rights and priorities of insular areas, the formation of an interagency space that can assess the needs of these areas and provide recommendations for whole of government approaches is warranted. Agencies should commit to working with the Federal Statistical System to establish such a space.

Recommendation 13: Federal agencies should establish, strengthen, and/or streamline collaboration and consultation activities with state and local governments and academic, private, and nonprofit institutions that are also engaged in science, data, and research activities.

In addition to engagement with Tribal and territorial governments, Section 5¹⁶¹ of EO 14096 highlights agency coordination with the research efforts of state and local governments; academic institutions; communities; the private sector; the nonprofit sector; and other relevant actors to accelerate the development of data, research, and techniques as an important area of focus. Additionally, Section 3¹⁶² directs agencies to improve collaboration and communication with state and local governments on programs and activities to advance environmental justice. To enhance relationships with these non-federal invested parties, effective communication, collaborative research development, and enhanced data sharing are areas of importance.

Communication between federal and state and local agencies is a cornerstone of effective science, data, and research activities, including those relevant to EJ. Science, data, and research collaboration requires a network of communication that not only connects different state, local, and federal agencies but also facilitates the interoperable exchange of science, data, and research findings across organizations and platforms (technologies). This can be achieved through the establishment of local,

¹⁵² EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Preamble. Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁵³ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 5(a)(iii)(F)(2). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁵⁴ U.S. Census. *American Community Survey (ACS)*. <https://www.census.gov/programs-surveys/acs/>. Accessed 18 July 2024.

¹⁵⁵ U.S. Bureau of Labor Statistics. *Overview of BLS Wage Data by Area and Occupation*. <https://www.bls.gov/bls/blswage.htm>. Accessed 18 July 2024.

¹⁵⁶ U.S. Bureau of Labor Statistics. *Consumer Price Index*. <https://www.bls.gov/cpi/>. Accessed 18 July 2024.

¹⁵⁷ Center for Disease Control, National Center for Health Statistics. *National Health and Nutrition Examination Survey*. <https://www.cdc.gov/nchs/nhanes/index.htm>. Accessed 18 July 2024.

¹⁵⁸ U.S. Census. *Current Population Survey (CPS)*. <https://www.census.gov/programs-surveys/cps.html>. Accessed 18 July 2024.

¹⁵⁹ Substance Abuse and Mental Health Services Administration. *National Survey on Drug Use and Health (NSDUH)*. <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>. Accessed 18 July 2024.

¹⁶⁰ Center for Disease Control and Prevention. *About the National Health Interview Survey*. https://www.cdc.gov/nchs/nhis/about_nhis.htm. Accessed 18 July 2024.

¹⁶¹ EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 5(a)(iii)(B). Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

¹⁶² EO 14096. *Revitalizing Our Nation’s Commitment to Environmental Justice for All*, Section 3(a)(xii) Federal Register, vol. 88, no. 80, 21 Apr. 2023, 88 FR 25251. <https://www.govinfo.gov/content/pkg/FR-2023-04-26/pdf/2023-08955.pdf>.

state, and federal interagency scientific committees and working groups that focus on EJ science, data, and research priorities. These groups can use digital platforms for data sharing and virtual meetings to discuss research methodologies, findings, and implications for policy and practice.

Federal agencies can also work with science, data, and research invested parties in state and local governments and academic, corporate, and nonprofit institutions to conduct joint research projects, share scientific literature, and set evidence-based targets for the analysis of EJ outcomes. The alignment of process could also include the development of research agendas that address the multifaceted aspects of EJ.

Finally, federal agencies should seek to enhance the data sharing mechanisms that exist with non-federal invested parties. For example, increasing the use of third-party freely available open-access databases, data repositories, and collaborative platforms that adhere to ethical, privacy, and scientific standards can help facilitate increased use of and collaboration on federal EJ-relevant science, data, and research activities.¹⁶³ Similarly, agencies developing software applications with relevance to EJ should consider ways to make the code publicly available so that people may contribute to and make use of the code, such as through open source repositories.¹⁶⁴ Creating or increasing opportunities for data sharing, both from and with the federal government, can help create data sets that are more actionable, robust, uniform, and useful in answering EJ-relevant science, data, and research questions.

¹⁶³ Office of Science and Technology Policy, National Science and Technology Council, Subcommittee on Open Science. *Desirable Characteristics of Data Repositories for Federally Funded Research*. Executive Office of the President, May 2022. <https://doi.org/10.5479/10088/113528>.

¹⁶⁴ See Office of Management and Budget. *Federal Source Code Policy: Achieving Efficiency, Transparency, and Innovation through Reusable and Open Source Software*. M-16-21, Executive Office of the President, 8 Aug. 2016. https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2016/m_16_21.pdf; see also Code.gov Program. *Sharing America's Code*. <https://code.gov/>. Accessed 18 July 2024.

Section 5. Institutionalize EJ in Federal Science, Data, and Research Activities.

To support the advancement of EJ through science, data, and research activities, it is imperative that federal agencies incorporate the principles of EJ into all aspects of the science, data, and research ecosystem. Embedding the principles of EJ into agency processes that generate science, data, and research products can lead to a host of wide-ranging benefits, including more equitable distribution of the benefits arising from these activities, as well as fostering innovative environments that address the needs of all people—beginning with those that are most in harm’s way. Key activities to further the institutionalizing of EJ into federal science, data, and research activities include capacity building, cultivating a deeper understanding of the role science, data, and research activities of the federal government have contributed to environmental injustice, and creating opportunities for addressing important questions through research strategic planning.

To achieve these goals, the EJ Subcommittee makes the following recommendations:

Recommendation 14: Federal agencies should develop concrete, strategic pathways to hire and retain a diverse, multidisciplinary science, data, and research workforce that can evaluate and address complex questions that support the advancement of EJ.

To support the advancement of EJ, agencies should develop a science, data, and research workforce equipped to conduct and communicate technical evaluations of data and analysis to identify EJ concerns and research to support the advancement of EJ. In the 2021 [Strengthening and Sustaining the Federal Science and Technology Workforce](#) report,¹⁶⁵ the U.S. Government Accountability Office found that critical skill gaps across the government undermined the ability of agencies to carry out their missions. Additionally, the Subcommittee on Equitable Data found that capacity building was an area of heightened importance in the [Vision for Equitable Data](#) report.¹⁶⁶

As agencies develop workforce strategies to support the hiring of new staff, they should also prioritize the hiring of staff with relevant science, data, and research training and skills that will enable the agency to advance EJ. In addition to the equity and data science skillsets recommended by OMB,¹⁶⁷ OPM,¹⁶⁸ and others, agencies should hire and retain multidisciplinary and interdisciplinary staff across the range of fields relevant to addressing the needs of communities with EJ concerns. Increasing the prevalence of staff with expertise in areas such as population health, the social determinants of health, health equity, community science, community engagement, science/risk communication, community resilience, and other related fields can support the development of research questions, methods, and process across all scales of human experiences (from the molecular to the societal). The hiring of social scientists with expertise in implementing qualitative research should also be considered high priority to advance the goals of this Research Plan.

¹⁶⁵ U.S. Government Accountability Office. *Science and Technology: Strengthening and Sustaining the Federal Science and Technology Workforce*. GAO-21-461T, 17 March 2021, <https://www.gao.gov/assets/gao-21-461t.pdf>.

¹⁶⁶ Office of Science and Technology Policy, National Science and Technology Council, Subcommittee on Equitable Data. *A Vision for Equitable Data Recommendations From the Equitable Data Working Group*. Executive Office of the President. www.whitehouse.gov/wp-content/uploads/2022/04/eo13985-vision-for-equitable-data.pdf.

¹⁶⁷ Office of Management and Budget. *Study to Identify Methods to Assess Equity: Report to the President*. Executive Office of the President, 20 July 2021, https://www.whitehouse.gov/wp-content/uploads/2021/08/OMB-Report-on-E013985-Implementation_508-Compliant-Secure-v1.1.pdf.

¹⁶⁸ U.S. Office of Personnel Management. *Agency Equity Action Plan - Strategies to Advance Equity in FY 2024*. <https://www.opm.gov/about-us/agency-equity-action-plan/strategies-to-advance-equity-in-fy-2024/>. Accessed 18 July 2024.

Agencies should also seek to cultivate a strong, fair, and inclusive workforce that draws from the full diversity of expertise and experience of the nation (see Box 4).¹⁶⁹ This diversity should include and prioritize expertise gained from lived experiences in communities with EJ concerns or other communities facing unfair access to health and well-being in the hiring of staff to perform science, data, and research activities.

Recommendation 15: Federal agencies should take steps to identify and address science, research, or data collection challenges related to patterns of historical or ongoing structural racism or bias, and develop pathways (including training for staff and other strategies) to prevent and as appropriate address potential impacts of such patterns.

As agencies work to advance environmental justice—and to address the health, social, and economic inequities that have impaired opportunities for all to achieve thriving and resilient communities—it is helpful to assess, identify and analyze barriers linked with data collection challenges and other areas of science, data, and research, including the drivers of injustices and inequities.^{170,171} Drivers such as racism,¹⁷² discrimination, ableism, and other structural inequities—including those linked with the social determinants of health—can both influence and be influenced by macro-level social systems, including those within science, data, and research processes.

Historically, there have been egregious examples of science, data, and research being used to foster discriminatory systems and practices (e.g., eugenics,¹⁷³ nonconsensual and unethical participation in research¹⁷⁴ and attainment and use of biological material,¹⁷⁵ and the distortion of science to justify the taking of Tribal and Indigenous lands for uses by the federal government).¹⁷⁶ At the same time, the effects of historical or ongoing systemic discrimination and bias may not always be visible. Implicit bias, which involves all of the subconscious feelings, perceptions, attitudes, and stereotypes that have developed as a result of prior influences and imprints, can lead to gaps and inadequacies in science, data, and research products, processes, and activities that result in exclusion or harm to specific

¹⁶⁹ EO 14035. *Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce*. Federal Register, vol. 86, no. 123, 30 June 2021, 86 FR 34593. <https://www.federalregister.gov/documents/2021/06/30/2021-14127/diversity-equity-inclusion-and-accessibility-in-the-federal-workforce>.

¹⁷⁰ Richter, Lauren. “Constructing Insignificance: Critical Race Perspectives on Institutional Failure in Environmental Justice Communities.” *Environmental Sociology*, vol. 4, no. 1, Dec. 2017, pp. 107–21. <https://doi.org/10.1080/23251042.2017.1410988>.

¹⁷¹ Hardy, Dean. “Flood Risk as Legacy Vulnerability: Reading the Past Into the Present for Environmental Justice.” *Geoforum*, vol. 142, June 2023, p. 103757. <https://doi.org/10.1016/j.geoforum.2023.103757>. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S0016718523000830>

¹⁷² Centers for Disease Control and Prevention. *Racism and Health*. www.cdc.gov/minority-health/racism-health/index.html. Accessed 18 July 2024.

¹⁷³ National Institutes of Health, National Human Genome Research Institute. *Eugenics and Scientific Racism*. www.genome.gov/about-genomics/fact-sheets/Eugenics-and-Scientific-Racism. Accessed 18 July 2024.

¹⁷⁴ Centers for Disease Control and Prevention. *Public Health Service Study of Untreated Syphilis at Tuskegee and Macon County, AL - CDC - OS*. www.cdc.gov/tuskegee/index.html. Accessed 18 July 2024.

¹⁷⁵ Skloot, Rebecca. *The Immortal Life of Henrietta Lacks*. Picador, 2018.

¹⁷⁶ Rudd, Lauren F., et al. “Overcoming Racism in the Twin Spheres of Conservation Science and Practice.” *Proceedings - Royal Society. Biological Sciences/Proceedings - Royal Society. Biological Sciences*, vol. 288, no. 1962, Nov. 2021. <https://doi.org/10.1098/rspb.2021.1871>.

populations.^{177,178} Implicit bias does not require animus; it only requires knowledge of a stereotype to produce discriminatory action.¹⁷⁹

Gaps related to structural and/or implicit bias in science, data, and research can have significant downstream effects.¹⁸⁰ For example, underinvestment in topics that are more commonly proposed by Black primary investigators—including in EJ-relevant areas^{181,182}—can obscure the health, economic, and environmental realities facing communities across the country. Implicit bias could also lead to devaluation of relevant scientific factors in areas such as chemical risk and health impacts assessment, leading to diminished understanding of the potential need for protections for populations with higher susceptibility, exposure, and/or vulnerability.¹⁸³

To mitigate these types of effects, implicit biases can be reduced through the very processes of acknowledging them and recognizing them for what they are.¹⁸⁴ Agencies should begin by recognizing and identifying the ways that patterns of historical or ongoing structural racism, including implicit bias and other manifestations of structural inequities, could impact their science, data collection, and research activities relevant to EJ. Agencies can then begin to develop pathways by which to dismantle and address the impacts these biases have had on their work and the broader research, scientific, and regulatory communities, including training and other potential methods that can prevent and fill gaps resulting from these impacts going forward (See Box 4).

¹⁷⁷ Sugimoto, Cassidy R., et al. “Factors Affecting Sex-related Reporting in Medical Research: A Cross-disciplinary Bibliometric Analysis.” *Lancet*, vol. 393, no. 10171, Feb. 2019, pp. 550–59. [https://doi.org/10.1016/s0140-6736\(18\)32995-7](https://doi.org/10.1016/s0140-6736(18)32995-7).

¹⁷⁸ Rucker, Julian M., and Jennifer A. Richeson. “Toward an Understanding of Structural Racism: Implications for Criminal Justice.” *Science*, vol. 374, no. 6565, Oct. 2021, pp. 286–90. <https://doi.org/10.1126/science.abj7779>.

¹⁷⁹ Community Relations Service. *Understanding Bias: A Resource Guide*. Department of Justice. <https://www.justice.gov/crs/file/1188566/dl?inline=>.

¹⁸⁰ Chen, Christine Yifeng, et al. “Systemic Racial Disparities in Funding Rates at the National Science Foundation.” *eLife*, vol. 11, Nov. 2022. <https://doi.org/10.7554/elife.83071>.

¹⁸¹ Lauer, Michael S., et al. “Associations of Topic-specific Peer Review Outcomes and Institute and Center Award Rates With Funding Disparities at the National Institutes of Health.” *eLife*, vol. 10, Apr. 2021. <https://doi.org/10.7554/elife.67173>.

¹⁸² Hoppe, Travis A., et al. “Topic Choice Contributes to the Lower Rate of NIH Awards to African-American/Black Scientists.” *Science Advances*, vol. 5, no. 10, Oct. 2019. <https://doi.org/10.1126/sciadv.aaw7238>.

¹⁸³ Varshavsky, Julia R., et al. “Current Practice and Recommendations for Advancing How Human Variability and Susceptibility Are Considered in Chemical Risk Assessment.” *Environmental Health*, vol. 21, no. S1, Jan. 2023. <https://doi.org/10.1186/s12940-022-00940-1>.

¹⁸⁴ *Ibid.*

Box 4. Acknowledging and confronting structural racism and unconscious bias in science, research, and data.

The [UNITE Initiative](#)^c at the National Institutes of Health (NIH) and the [CORE Commitment to Health Equity](#)^d of the Centers for Disease Control and Prevention (CDC) are important programs that seek to address structural racism and implicit bias within public health and biomedical research. The UNITE initiative's mission includes dismantling systemic barriers in biomedical research by fostering an inclusive environment and promoting diversity. It uses strategies such as prioritizing health disparities and minority health research, and enhancing equity both within and external to the NIH workforce. The initiative also emphasizes transparency, accountability, and communication across NIH, alongside funding opportunities designed to encourage inclusive research practices.

The CDC's CORE Commitment to Health Equity confronts structural racism by embedding health equity into all CDC functions. This commitment is operationalized through mandatory unconscious bias training for supervisors and the development of the Foundations of Health Equity Training Plan. These educational efforts are designed to build foundational knowledge and skills related to health equity, health disparities, and the social determinants of health, with a focus on disrupting implicit biases and systemic discrimination. These efforts are part of the CDC's strategy to integrate health equity considerations into its science, programs, and partnerships.

Both the UNITE initiative and CORE commitment aim to enhance awareness and understanding of implicit bias, contributing to the broader goal of health equity—an important outcome for EJ. They employ educational and strategic measures to address the influence of implicit bias on health care and research, demonstrating an ongoing process of reflection and action in pursuit of a more equitable future for all people in the United States.

^c National Institutes of Health. *UNITE*. <https://www.nih.gov/ending-structural-racism/unite>. Accessed 18 July 2024.

^d Centers for Disease Control and Prevention. *CDC's CORE Commitment to Health Equity | Health Equity | CDC*. <https://www.cdc.gov/healthequity/core/index.html>. Accessed 18 July 2024.

Recommendation 16: Federal agencies should develop training opportunities for building (or expanding) effective and efficient engagement on science, data, and research activities with members of communities with EJ concerns.

Public trust in government (i.e., the belief held by the general population that the government is acting in their best interests) is an essential element of a well-functioning democracy. When public trust is broken, it can have negative consequences across a range of areas.^{185,186} Discriminatory and exclusionary actions, including within science, data, and research activities, has eroded the trust that

¹⁸⁵ Jiang, Lixin, et al. "In Whom Do We Trust? A Multifoci Person-Centered Perspective on Institutional Trust During COVID-19." *International Journal of Environmental Research and Public Health*, vol. 19, no. 3, Feb. 2022, p. 1815. <https://doi.org/10.3390/ijerph19031815>.

¹⁸⁶ EO 14074. *Advancing Effective, Accountable Policing and Criminal Justice Practices to Enhance Public Trust and Public Safety*, Section 1. Federal Register, vol. 87, no. 104, 25 May 2022, 87 FR 32945. <https://www.govinfo.gov/content/pkg/FR-2022-05-31/pdf/2022-11810.pdf>.

some people have in the government’s interest in providing true partnership and support.^{187,188} To move beyond this barrier and to open the door to more meaningful engagement and co-creation of science, data, and research products, the federal government should provide information and training to assist agency staff in advancing strong partnership opportunities.

Federal agencies could consider creating principles for how their science, data, and research workforce of federal agencies should engage with communities overburdened with environmental inequities. Utilizing these guidelines can help sustain, and where needed, build trust. As a starting place, agencies can build on and/or adapt existing principles like the Agency for Toxic Substances and Disease Registry’s [Principles of Community Engagement](#)¹⁸⁹ to develop guidelines specific to their EJ science, data, and research needs and objectives.

Relevant to their own science, data, and research activities and mission, agencies should develop and require training (e.g., [NIH Partnerships for Environmental Public Health Resources](#)¹⁹⁰—including the [Building Equitable Partnerships for EJ Curriculum](#))¹⁹¹ on meaningful engagement and science, data, and research co-production with affected communities. The trainings can help researchers learn engagement tools and strategies that can bolster innovation in, and application of methods for, scientific evaluation and technical analysis to identify and address EJ concerns. Trainings can be hosted via workshops or through Learning Management Systems (LMS) (e.g., see the [LMS](#)¹⁹² developed by the Department of Health and Human Services).

For each of these activities, it is essential that there is an honoring and acknowledgement of the value that members of communities with EJ concerns and their expertise bring to improving the ability of the federal science, data, and research enterprise to develop products that support decision-making to advance EJ. It is also important for agencies to consider community members compensation for the costs of participation (e.g., childcare, transportation, time off from work), as feasible and allowable.

Recommendation 17: Federal agencies should integrate EJ into high-level science, data, and research planning, ensuring that translational science and concepts of intersectionality are incorporated.

Incorporating EJ into high-level planning for science, data, and research is vital for prioritizing and institutionalizing the importance of this work within agencies. Imbedding EJ in high-level science, data,

¹⁸⁷ Beard, Sharon, et al. “Racism as a Public Health Issue in Environmental Health Disparities and Environmental Justice: Working Toward Solutions.” *Environmental Health*, vol. 23, no. 1, Jan. 2024. <https://doi.org/10.1186/s12940-024-01052-8>.

¹⁸⁸ Burger, Joanna. “Trust and Consequences: Role of Community Science, Perceptions, Values, and Environmental Justice in Risk Communication.” *Risk Analysis*, vol. 42, no. 11, Sept. 2022, pp. 2362–75. <https://doi.org/10.1111/risa.14020>.

¹⁸⁹ Clinical and Translational Science Awards Consortium and Community Engagement Key Function Committee Task Force on the Principles of Community Engagement. *Principles of Community Engagement*. Second, NIH Publication No. 11-7782, Department of Health and Human Services, June 2011. www.atsdr.cdc.gov/communityengagement/pdf/PCE_Report_508_FINAL.pdf.

¹⁹⁰ National Institute of Environmental Health Sciences. *Healthy Communities, Partnership for Environmental Public Health (PEPH)*. <https://www.niehs.nih.gov/research/supported/translational/peph/resources/communities>. Accessed 18 July 2024.

¹⁹¹ University of California, Davis and University of Michigan, Ann Arbor. *Building Equitable Partnerships for Environmental Justice Curriculum*. July 2018. www.niehs.nih.gov/sites/default/files/research/supported/translational/peph/resources/assets/docs/building_equitable_partnerships_for_environmental_justice_curriculum_508.pdf.

¹⁹² Human Capital, Department of Health and Human Services. *The HHS Learning Portal*. <https://humancapital.learning.hhs.gov/lmsorientation/orientation-manager03.asp>. Accessed 18 July 2024.

and research planning also helps ensure that all communities, especially historical marginalized and overburdened communities, have the ability to inform research planning activities and have equal access to the benefits of science and technology. Often referred to as roadmaps, blueprints, strategic plans, and/or frameworks, these documents^{193,194,195,196,197} are essential for guiding agencies in setting their science priorities based on broader strategic plans. They help align science, data, and research activities with national goals and addressing societal needs, ensuring that these activities are impactful and relevant.

As part of the integration of EJ into high-level science, data, and research planning, agencies should also include opportunities for increasing the development of translational science. Translational science can play a pivotal role in EJ by bridging the gap between scientific research and real-world applications. It involves translating scientific discoveries into practical tools, policies, and interventions that can be implemented within communities to address EJ concerns. This field is crucial for ensuring that the benefits of advancements in science, data, and research reach all segments of society, particularly those that are disproportionately burdened by environmental risks.

Additionally, agencies should also seek to appropriately incorporate intersectionality of social identities, such as race, ethnicity, gender, sexual orientation, religion, age, disability, and class, into high-level science, data, and research planning activities. Intersectionality is a critical framework that examines how various forms of social stratification create unique modes of discrimination and privilege. It is particularly important to incorporate this framework into science, data, and research focused planning activities because it creates opportunities for more inclusive and equitable analysis that recognizes and addresses the complex realities of diverse populations. The concept of intersectionality not only enriches the scientific inquiry, but also promotes social justice by actively working to dismantle systemic barriers within the scientific community and broader society.

¹⁹³ U.S. Department of Transportation. *U.S. DOT RD&T Strategic Plan (FY 2022-2026)–Building a Better Transportation Future for All*. www.transportation.gov/rdtstrategicplan. Accessed 18 July 2024.

¹⁹⁴ U.S. Environmental Protection Agency. *Office of Research and Development Strategic Plan*. <https://www.epa.gov/research/office-research-and-development-strategic-plan> and Environmental Protection Agency. *Strategic Research Action Plans Fiscal Years 2023-2026*. <https://www.epa.gov/research/strategic-research-action-plans-fiscal-years-2023-2026>. Accessed 18 July 2024.

¹⁹⁵ National Aeronautics and Space Administration. *Science Strategy*. <https://science.nasa.gov/about-us/science-strategy/>

¹⁹⁶ United States Department of Agriculture. *USDA Science and Research Strategy*. <https://www.usda.gov/usda-science>. Accessed 18 July 2024.

¹⁹⁷ Assistant Secretary for Planning and Evaluation. *HHS Roadmap for Behavioral Health Integration*. Department of Health and Human Services, Sept. 2022, <https://aspe.hhs.gov/sites/default/files/documents/4e2fff45d3f5706d35326b320ed842b3/roadmap-behavioral-health-integration.pdf>.

To implement this recommendation, agencies can begin by reviewing current science, data, and research strategic plans to identify opportunities for the integration of EJ into current priority areas of work. They can also convene conversations with internal and external subject matter experts to pinpoint areas where EJ considerations can elevate the agency’s work and impact. Through partnerships with non-federal entities, including state, Tribal, territorial and local governments and non-governmental organizations, academic, and private sector institutions, agencies can work to leverage expertise and resources from these non-federal entities to identify potential pathways to integrate EJ into science, data, and research work. Agencies should also consider creating funding opportunities, both internal and external to the federal government, that can support EJ research initiatives and translational science efforts that can lead to practical solutions (see Box 5). Finally, agencies should seek to engage with communities affected to gather insights and perspectives that can help inform the creation and integration of their priorities into science, data, and research strategies.

Box 5. Catalyzing multidisciplinary innovation for societal impact through translational science.

The National Science Foundation's [Convergence Accelerator](#)^e program addresses national-scale societal challenges through translational research. This program's “Track K” funds awards that build upon foundational knowledge and advancements in environmental sciences, geosciences, engineering, computing, social and behavioral sciences, as well as other areas to develop viable solutions for water quality, quantity, and equity issues. Project teams funded by these awards represent diverse, multi-sector partnerships with local/state governing bodies, academic institutions, and private investors that center on user interfaces, engagement, and co-design processes to inform equitable water outcomes. For example, awarded projects integrate cutting-edge technologies and co-design implementation frameworks to enhance water equities and capacities for communities disproportionately exposed to inadequate water sources. Other awarded projects have created test beds of training and planning tools for optimizing tree canopies in order to improve water resource availability for desert cities.

^eU.S. National Science Foundation. *Convergence Accelerator* | NSF - National Science Foundation. <https://new.nsf.gov/funding/initiatives/convergence-accelerator>. Accessed 5 July 2024.

Section 6. Looking Ahead

This Research Plan focuses primarily on science, data, and research activities *within* agencies as charged by Executive Order 14096. The EJ Subcommittee also recognizes in the need for forward movement of these activities *between* agencies and with external partners. The EJ Subcommittee and other existing interagency groups (e.g., those listed on page 9) can continue to grow this momentum. For example, in the months and years ahead, the EJ Subcommittee will serve as a convening and coordinating body for science, data, and research activities relevant to EJ. Priority areas of the Subcommittee may include:

- Facilitating the harmonization and coordination of approaches for analyzing and addressing EJ concerns within the federal science, data, and research infrastructure, processes, and products.
- Supporting the identification of new and existing pathways to assess agency progress on the advancement of science, data, and research activities via outcome- and process-associated metrics.
- Guiding the generation of recommendations to agencies on science, data, and research. This may include identifying data sources that can help develop and update tools that assess environmental and health impacts (e.g., the Climate and Economic Justice Screening Tool (CEJST) established by the Council on Environmental Quality pursuant to [EO 14008](#)).¹⁹⁸ This may also include developing collaborative approaches to advance the science supporting cumulative impacts, social determinants of health, and community-based participatory research.
- Facilitating cross-agency opportunities for optimizing engagement with members of communities with EJ concerns, recognizing the challenges communities with EJ concerns face in engaging with multiple parts of the federal government, to inform agency-specific work as well as the work of the Subcommittee.
- Coordinating interagency efforts to:
 - identify high-priority and cross-cutting research areas that will advance practices and policies to achieve EJ (e.g., cumulative impacts);
 - outline the types of scientific information that can drive the creation of policies that address the cascade of causes, including root causes, of environmental health inequities in communities;
 - highlight opportunities to integrate and leverage the social determinants of health and socio-exposomics in EJ-related science, data, and research activities;
 - explore opportunities to develop metrics to help to inform decisions, lead to solutions, and measure and characterize whether and how communities are experiencing EJ; and
 - explore pathways for agencies to support community engaged and open research.

As recognized by the Biden-Harris Administration in the investments it has made in and emphasis it has placed on environmental justice, the development of this Research Plan comes at a pivotal moment for our nation. Science, data, and research activities provide unique opportunities to understand the scope and impact of past injustices and can help forge the just landscapes of the future. The

¹⁹⁸ EO 14008. *Tackling the Climate Crisis at Home and Abroad*. Federal Register, vol. 86, no. 19, 2 Feb. 2021, 86 FR 7619. <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>.

recommendations developed in this plan are designed with a spirit of deep humility and a steadfast resolve to propel meaningful action, for both the betterment of science, data, and research activities and society.