



Reimagining Environmental and Natural Resources Law: A Synthesis Report Exploring the Next 50 Years of Environmental Law

*Environmental Law Institute & George
Washington University School of Law*



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The Environmental Law Institute makes law work for people, places, and the planet. Since 1969, ELI has played a pivotal role in shaping the fields of environmental law, policy, and management, domestically and abroad. Today, in its sixth decade, ELI is an internationally recognized, non-partisan publishing, research, and education center working through thoughtful research and knowledge transfer to strengthen environmental protection by improving governance and advancing environmental rule of law worldwide.

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Table of Contents

Foreword.....	2
Executive Summary.....	3
Findings and Proposals	3
Introduction	8
Chapter 1: Climate Change Law and Policy.....	9
The Problem	9
Current Practice.....	11
Solutions Re-Imagined.....	13
Chapter 2: Water Pollution From Uncontrolled Sources	17
The Problem	17
Current Practice.....	17
Solutions Re-Imagined.....	19
Chapter 3: Materials Use and Conservation/Circular Economy	24
The Problem	24
Current Practice.....	25
Solutions Re-Imagined.....	29
Chapter 4: Ecosystem Degradation.....	32
The Problem	32
Current Practice.....	33
Solutions Re-Imagined.....	34
Chapter 5: Environmental Justice	37
The Problem	37
Current Practice.....	38
Solutions Re-Imagined.....	40
Conclusion.....	43
Endnotes	45

Foreword

In ELI's 50th anniversary year, we undertook a project in partnership with the Environmental and Energy Law Program at George Washington University School of Law to review the state of environmental law and "reimagine" what law might need to look like in the years ahead if we are to achieve a more sustainable future. Key to this endeavor were several meetings that we convened of natural resources legal scholars and leaders from the community of practitioners to discuss the critical issues that will define the next 50 years of environmental and natural resources law, starting with convenings at the Wingspread Conference Center in Racine, Wisconsin, in March 2019, and at Airlie House Conference Center in Warrenton, Virginia, in November 2019. A similar gathering at Airlie House 50 years ago was where the idea of the Environmental Law Institute was born. We continued to consider the notions generated through these dialogues at policy convenings and in the research department of the Institute, leading to production of this report.

Our findings? While critical environmental protection progress has been made since the enactment of the National Environmental Policy Act (NEPA) in 1970 and all of the environmental legislation that followed, significant gaps remain. These gaps must be addressed if the country is to make further progress. This report provides suggestions for how the field of environmental law might need to evolve to meet current and expected future challenges. As the country embarks on the second half-century of the modern environmental law era, it is important to credit the successes of the past. Indeed, the labors of many have produced remarkable progress in overcoming the costs of our country's rapid industrialization and growth. And new tools and players have emerged to assist in the environmental enterprise, including various environmentally beneficial technologies and private-sector environmental governance. But plainly, despite the advances, there are areas in which needed progress has been slow or elusive. The Reimagining initiative was designed to focus on some of these areas to help ensure that policymakers seriously address remaining problems and inequities. Our coverage is no doubt incomplete; the interface of human beings and natural world is endlessly complex, and there are important questions, such as the proliferation of chemicals and chemical products and byproducts like PFAS and plastics, that our examination did not address. This said, the issues discussed in this report rose to the top in our discussions and are no doubt at the core of our unfinished business.

We hope that when our successors look back on environmental law after the next 50 years, they will be able to identify significant progress in the areas discussed in this report. The future of our work—and our world—depends on it.

No resting on laurels; much important work remains to be done.

—Scott Fulton, President 2015-2021

Executive Summary

Our discussions centered on several key areas of challenge in the human/environment interface, including: climate change and decarbonization, nonpoint sources of water pollution, materials conservation and reuse, and ecosystem degradation and biodiversity loss. In addition, environmental justice was seen as an area of needed focus alone as well as a point of attention that cuts across all of the other challenges. Progress in these areas will require law and policy changes at all levels of government, as well as accompanying economic, political, and social changes.

Findings and Proposals

Climate Change Law and Policy.

Climate change presents many cross-cutting environmental challenges that require transformational changes across government and society if a problem of this scope and scale is to be addressed. Essential to the transformation needed is an economywide price on carbon to provide the economic incentives to make the shifts necessary to reach zero emissions, including most significantly an overhaul of our energy system to optimize renewable energy sources. To this end, federal, state, local, and tribal governments need to remove subsidies for fossil fuels and carbon-intensive industries and reduce or remove regulatory barriers to decarbonization of the economy while promoting social equity at every stage and level. Government policies are also needed to provide incentives for innovation and investment toward a carbon-neutral future. If mitigation efforts do not advance at a sufficient pace, innovating the means to remove and sequester carbon from the atmosphere may be necessary.

We also need comprehensive and just policies for adapting to the risks—and impacts—of climate change and for helping communities become resilient. This includes making buildings safer, healthier, and more energy-efficient, and electrifying and investing in grid updates. It also requires an appropriate model for assessing risk. Decisions must be based on the possibility of the uncertain but potentially massive catastrophic outcomes in the form of natural disasters, sea-level rise, drought, and biodiversity loss. Government agencies need to plan for how they will deliver essential services amidst climate disruptions, and how they will coordinate with partners at other levels of government.

In addition to significant adaptation actions, the law and policy framework must account for the liabilities associated with unintended consequences of adaptation measures. An effective climate governance regime will further require the engagement of the private sector in a multi-tiered system with distributed roles and accountability mechanisms. Throughout, an equity lens will be critical in designing these policies to ensure that affected and especially vulnerable communities are meaningfully involved in designing and implementing these measures. If the future promises to reorder where industrial and waste management activities occur and where people live, then efforts

must be made to ensure that the future corrects past inequities rather than perpetuating or recreating them.

Water Pollution From Uncontrolled Sources.

Freshwater resources are under enormous pressure from human consumption and climate change. Many sources of water quality impairment are from nonpoint sources—runoff and discharges from areas of land and operations that are not subject to direct federal regulation under the 1972 Clean Water Act (CWA). Recharacterizing these sources as “uncontrolled pollution” may be helpful in amplifying the nature of the problem and the contribution of diffuse sources to the remaining water pollution problems. Messaging also needs to be reframed so that that goal in this area is seen as achieving better environmental and public health outcomes—as opposed to simply controlling sources. This necessarily means taking a watershed-health-focused system approach that looks to land quality and water quality results instead of perpetuating the current permit-by-permit, source-by-source approach.

State regulators should create a new structural framework for dealing with uncontrolled pollution that captures sectors that have previously escaped requirements to reduce uncontrolled pollution and that focuses on watersheds with major, recurrent pollution threatening public health and welfare.

At the federal level, policymakers should inventory effective regulatory and non-regulatory approaches, construct a database of effective tools, and transfer these to sectors, watersheds, and problems where they hold particular promise. In addition, all agencies need to require that federally funded land and water and development projects, and all authorized activities on federal lands, result in net water quality improvements—or at least no net loss of water quality where there is no opportunity to achieve a net improvement.

Policymakers should link federal and state procurement to effective management of uncontrolled pollution in the supply chain. Supply chain managers in the private sector should proceed likewise. The reimagined approach would expressly provide for disclosures and certifications and perhaps pollution controls as conditions related to market access or receiving funds. Legislators can also consider funding and relying on big data to define and track progress toward watershed outcomes. Sharing of data on public platforms and integration of ecological information with water quality, discharge data, geo-siting of best management practices, remote sensing, and biological sampling should be encouraged and supported.

Materials Use and Conservation/Circular Economy.

Materials consumption is particularly challenging in the United States, and despite the increasingly clear adverse impacts of unsustainable materials use, the issue has received relatively little attention in U.S. environmental law.

Extended producer responsibility, or EPR, at the national level would help create a level playing field across the country; a national EPR for electronics waste would, for example, help drive reuse behaviors and reduce environmental impacts associated with these products. A national greenhouse gas (GHG) policy that establishes a price on carbon could encourage business innovation and incentivize examination of the relative energy demands of virgin resource extraction and processing versus reuse of materials already entrained in commerce.

Regarding infrastructure, the new administration can have a major impact on responsible production and consumption by taking materials conservation and circular economy principles into account in procurement, perhaps through Executive Orders that build on available authority. Federal procurement rules could be redesigned so that criteria favor products and services that are consistent with a circular economy. Resource Conservation and Recovery Act (RCRA) regulations could be revised to reflect the circular economy hierarchy and prioritize reuse of resources in a primary objective, encouraging repairing and refurbishing, and supporting remanufacturing and repurposing. Model legislation could be developed for states to adopt this new circular economy waste hierarchy.

Materials conservation could further be added as a factor to be considered in National Environmental Policy Act (NEPA) analyses. The White House Council on Environmental Quality could contribute to responsible production and consumption by providing guidance to agencies on how to consider materials use and conservation in environmental impact review.

Ecosystem Degradation.

Driven primarily by anthropogenic activities, destroyed and degraded ecosystems threaten critical resources in significant and varied ways. In the United States, no federal statute focuses exclusively or directly on mitigating ecosystem degradation. In the short term, the “Incorporating Ecosystem Services Into Federal Decision Making” memorandum, issued jointly by the Office of Management and Budget, Council on Environmental Quality, and the White House Office of Science and Technology Policy in 2015, that called on “agencies to develop and institutionalize policies to promote consideration of ecosystem services . . . in planning, investments, and regulatory contexts” could be revived.

In the longer term, policies at the federal, state, and local levels that emphasize no net loss of ecosystem services are needed to ensure these functions are preserved. Communities must be involved in the development of these policies so that the damages and benefits are spread justly across and within communities. This is especially true when addressing the legacy of discrimination faced by environmental justice communities and determining where damage is experienced yet permissible under a no-net-loss framework.

Policymakers should also revise their environment and natural resources management frameworks with a goal of adopting a more holistic approach that prioritizes local ecosystem-level decisionmaking. Legislation should also include provisions for grant funding for research and data

collection, and for the development of multi-stakeholder, consensus-based ecosystem management. Federal changes should be bolstered by efforts at the state level, including through revising or adopting state-level NEPA laws to include requiring an analysis of how a project will affect ecosystems and ecosystem services in the long term.

Governance structures must likewise be reformed to complement ecological boundaries and more effectively integrate natural systems and environmental media to better ensure impacts are accounted for and degradation is mitigated. That reorganization will require inter- and intra-governmental cooperation at all levels—federal, state, local, and tribal. Throughout, these techniques should involve communities and incorporate local perspectives and traditional ecological knowledge. New and existing regional governance bodies could be provided with “pre-authorization compacts” akin to water compacts and regional electricity grid agreements to address different parts of the same environmental event or phenomenon. While arguably less comprehensive than ecosystem-level management, compacts may be more feasible and can still help facilitate responsive coordination to environmental impacts.

Environmental Justice.

At the federal level, the framework for environmental justice has been almost entirely based on Executive Orders and agency memoranda, rather than on enforceable laws and regulations. A number of states have enacted environmental justice (EJ) legislation or adopted regulations or policy instruments to give EJ a greater role in decisionmaking. EJ, to be achieved, must be thoroughly integrated into all decisionmaking affecting the environment. It cannot simply be an add-on or check-off at the end of a decision process.

A minority of states have constitutional rights related to the environment, but only a few of these are self-executing and enforceable by members of the public and communities. EJ may be advanced by promoting adoption of state constitutional amendments that overcome these limitations. This approach would require careful drafting of amendments to ensure that they are self-executing and hence enforceable without the need for additional state legislation. Their impact may be more powerful if the amendments create or recognize a public trust in the natural resources of the state, including clean air, pure water, biological resources, and publicly owned lands and resources, and all the more so if they enshrine a human right to a clean and healthy environment.

Federal and state legislation that embodies important EJ procedural and outcome elements should be adopted. Such legislation can include codification of Executive Order No. 12898 elements and could require use of tools such as EJScreen. There could be other requirements for new development in communities overburdened by pollution to offset any projected increases in pollution loadings, with reductions in the existing pollution inventory on a 1:1 or net-reduction basis. Statutes could mandate disclosures of information by applicants or operators and could remove legal barriers to public participation in decisions affecting EJ communities. Finally, the laws could create a private right of action for enforcement of civil rights.

For the private sector, policymakers could promote and encourage private governance and corporate commitments and accountability mechanisms for EJ. Companies and groups of companies and organizations can develop best practices and codes of conduct that firms integrate into their decision processes, management systems, supply chain requirements, and internal and external accountability mechanisms.

Introduction

We are now into our second half-century of environmental and natural resources law. President Richard Nixon signed the National Environmental Policy Act (NEPA) on New Year's Day 1970, making it a convenient marker for the birth of modern environmental protection. NEPA has been called the Magna Carta of environmental law, and it heralded a new era of federal legislation, including the Clean Air Act (CAA) later that year and a whole roster of laws to follow. The federal acts, along with complementary state environmental statutes, have substantially reduced pollution, resulting in cleaner air, water, and soils. And species like the brown pelican and bald eagle have been brought back from the brink.

While critical progress has been made, significant gaps in environmental laws remain if the country is to achieve a more sustainable economy. Understanding that, we convened a diverse group of leading environmental law experts to consider how the field might need to evolve to meet current challenges and those expected over the next decades. We characterize this effort as “Reimagining Environmental Law.” In many ways, it means as well reimagining the future.

Toward that end, ELI and George Washington University Law School convened two dialogues, first at the Wingspread Conference Center in Racine, Wisconsin, in March 2019, and second at Airlie House Conference Center in Warrenton, Virginia, in November 2019. Both centers have been settings for environmental conferences for decades. This report reflects the discussions at Wingspread and Airlie House, subsequent discussions with participants, and research conducted by ELI and GW Law.

In consultation with our experts, we concluded that among the key challenges remaining for environmental law are climate change and decarbonization, nonpoint sources of pollution, materials conservation and reuse, and ecosystem degradation and biodiversity loss. In addition, environmental justice presents both an area of needed focus alone as well as attention in cutting across all the other challenges. These areas will require legal changes at all levels of government, as well as accompanying economic, political, and social changes.

Chapter 1: Climate Change Law and Policy

The Problem

Climate change encompasses a broad array of impacts and associated problems. These are global issues that require robust and comprehensive legal and policy responses in order to avoid catastrophic consequences in the near term.

Since the Industrial Revolution, global emissions of greenhouse gases (GHGs), such as carbon dioxide (CO₂) and methane, have steadily increased. Trapped in earth's atmosphere, these GHGs have altered the dynamics of our atmospheric system, warmed the planet, and caused widespread changes to the climate. The last five years have been the five hottest in recorded history.¹ CO₂ concentrations in the atmosphere have climbed from 315 parts per million (ppm) in 1958 to over 409 ppm today, a concentration that now equals levels not seen in 3 million years.² On the current trajectory, we stand to reach double pre-industrial levels of CO₂ in the atmosphere by 2060.³

For decades, scientists have been sounding the alarm.⁴ In recent years, the United Nations Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Climate Assessment have published extensive findings on multiple aspects of climate change.⁵ These climate experts have determined that current rates of GHG emissions are likely to cause temperature increases of 2.6°C-4.8°C (4.68°F-8.64°F) by 2060.⁶ Impacts are expected to be extremely damaging even in a best-case scenario where emissions are rapidly reduced. Any warming beyond 2°C will bring disruptive sea-level rise, intolerable heat waves and drought, permanent ecosystem damage, and all the attendant social and economic impacts.⁷

Compounding the challenge of responding to climate impacts is the interconnected and cumulative nature of climate change. Feedback loops can exacerbate the impacts—a warming planet melts reflective sea ice, which in turn increases the earth's warming potential. Moreover, the effects of GHG emissions do not fully manifest themselves for decades, and, once manifested, many of the changes will persist for hundreds or even thousands of years.⁸ Climate change is therefore both a long- and near-term issue.

Many changes currently threaten a host of natural and social systems. Potentially catastrophic impacts to ecosystems, biodiversity, public health, the economy, and communities are already being felt across the globe. In some cases, irreversible planetary tipping points are approaching or being crossed. With extinction rates 1,000 times greater than historical background levels, the situation is perilous for many species.⁹ Humans are suffering too. Since 2005, the U.S. has experienced more than 150 “billion-dollar” weather-related events with more than \$1.1 trillion in economic losses, more than 7,500 deaths, and federal disaster assistance costs exceeding \$400 billion.¹⁰

To stand a chance at avoiding the worst of these impacts,¹¹ scientists have identified a need to halt the current emissions trajectory and possibly to also remove CO₂ from the atmosphere. Radical

decarbonization is required, with a goal of an 80% reduction from 1990 levels by 2050. The biggest obstacle to deep decarbonization is that extraction, production, trade, sale, and use of GHGs and their precursors is integrally tied into almost every facet of modern society. Identifying and implementing the most effective approaches for decarbonizing the economy is critical. While the pathways for making this transition are known, reaching the goal of 80% by 2050 will require deep decarbonization, and, the economic, political, social, and administrative challenges to doing so have prevented substantial progress so far. The longer we wait to act, the greater the risk and the more expensive it will be to make the changes.

This effort needs to be global, as sources and impacts are global, but the United States has a special responsibility because of its historic position in the world, its role in the development of the fossil fuel economy, and the fact that it has emitted the most per capita since the beginning of the Industrial Revolution.¹² One factor that complicates the response is the uncertainty surrounding the costs associated with impacts relative to the costs of reducing emissions now. However, as climate science has continued to develop and findings become more certain, we need to give priority to measures that will keep us away from worst-case scenarios, given the high costs of the most catastrophic outcomes.

In addition to individual adjustments such as diet and lifestyle, systemic legal and policy changes at governmental levels are also needed. To be truly effective, the changes must be international in scope. The Paris Agreement, which entered into force in 2016, strives to keep warming below 2°C by requiring countries to set out nationally determined contributions of emissions reductions and report on those emissions and their implementation efforts. Subsequent meetings have failed to deliver significant progress in carbon mitigation, carbon markets, and the relationship between developed and developing countries.¹³ Many countries also failed to submit or update their emissions targets by the 2020 deadline.¹⁴ In the absence of immediate and collective global action, nations have been forced to deal with climate change primarily through domestic and sub-national legislation and judicial action.

Major efforts by the United States to address climate change have mostly come up short. The cap-and-trade bill of 2009-2010 died in the U.S. Senate. U.S. Environmental Protection Agency (EPA) efforts to reduce GHG emissions from electric generating facilities were defeated by political opposition to “big government” solutions. Although *Massachusetts v. EPA* marked a significant turning point for GHG regulation, more recent lawsuits that would usher in sweeping reforms have been met with resistance from federal courts.¹⁵ Other countries’ judiciaries have been more intrepid and proactive.¹⁶ Our current tendency to address the global problem of climate change in a limited and fragmented way must change and be recalibrated to an approach that is comprehensive and cohesive. Critically, the situation requires rapidly identifying the preferred, or at the very least acceptable, tools and techniques.¹⁷

Current Practice

While we know now that the climate affects nearly every environmental resource, climate change was not on the agenda when our modern environmental regulatory system was being established. Our current environmental regulatory regime combined with our broader administrative structure has also entrenched a system where environmental impacts are disproportionately felt by people of color. Environmental policies have reduced but not eliminated environmental impacts and risks and have failed to effectively include measures to ensure justice in allocation of those impacts and risks. The scale and scope of the climate change problem, and the need for immediate and significant action, call for a well-coordinated, comprehensive national program to reduce GHG emissions. Even if all possible measures to control GHG emissions were instituted immediately, substantial impacts will still result from all of the GHGs the atmosphere has already absorbed. As a result, efforts to plan for and adapt to those impacts will also be necessary. With little federal encouragement or coordination, this is currently taking place in a patchwork approach with some states and municipalities incorporating changes driven by climate change into land use and other planning tools.

At the federal level, the Clean Air Act (CAA), passed in 1970 and amended in 1990, regulates air pollution, with the objective of protecting ambient air quality. While the 2007 *Massachusetts v. U.S. Supreme Court* decision confirmed that GHGs are pollutants that can be regulated by the CAA, the CAA has proven to be ill-adapted to control GHGs. Following the Court's order to conduct analysis on the relationship between GHGs and climate change, EPA made an endangerment finding pursuant to Section 202(a) of the CAA, which concluded GHG emissions endanger public health and welfare.¹⁸ The endangerment finding, along with EPA's conclusion that motor vehicles "cause or contribute" to climate change, meant those sources must be regulated. While EPA during the Barack Obama Administration proposed the Clean Power Plan to address electricity generation, and issued a number of CAA regulations that sought to reduce domestic GHG emissions from motor vehicles, transportation fuels, new and existing power plants, the oil and gas sector, and municipal landfills, many of those were rolled back or replaced under the Donald Trump Administration.

In addition to a comprehensive legal framework designed to regulate GHG emissions, we also need to adjust the way decisions are made in our regulatory system to make them more climate-sensitive. The current regulatory regime relies heavily on cost-benefit analysis, but traditional economic models are ill-suited for carbon because the highest costs of continuing on the current GHG emissions trajectory are (or are perceived to be) far in the future, and risks about which we do not have complete information are considered in calculating costs, but not in calculating benefits.¹⁹ This tension is captured in the controversy around how to calculate the value of carbon reductions, known as the social cost of carbon,²⁰ and whether it should take into account only U.S. impacts or have a global scope.²¹

New regulations determined to be "significant" must include a cost-benefit analysis.²² But while the costs of compliance with new environmental protections can be estimated with relative ease, our

system does not currently account appropriately for the costs associated with the impacts of carbon emissions or the full benefits of reduction of those emissions. Further, long-term environmental benefits are typically heavily discounted, resulting in an under-calculation of regulatory benefits. As a result, any cost-benefit analysis cannot account accurately for the costs and benefits of climate-related policies and inevitably disproportionately considers costs of regulation.²³ Similarly, the Securities and Exchange Commission does not require disclosure of climate risks because they are not considered to be “material,” in spite of the enormous financial risk they pose to many corporations. There is a need to learn how to meaningfully quantify climate risk in order to take it into account in decisionmaking—in both government and private sectors.

In the vacuum left by the federal government, states and cities have adopted climate and renewable energy laws.²⁴ Nonfederal actors are taking actions to drive down U.S. emissions at scale.²⁵ To date, 13 states, and counties or localities in at least 20 other states, have enacted 100% clean energy policies. Meanwhile, more than 50 action plans to address climate change have been produced by tribal authorities.²⁶ Predictions about the results of full achievement of these policies from state and local actors in the context of rapidly shifting economics in the power sector suggest that they could reduce emissions 19% below 2005 levels by 2025 and 25% below 2005 levels by 2030.²⁷ But such a patchwork of efforts will not achieve the scale needed to avert significant and widespread climate impacts.

In recent years, initiatives by private actors (including business, higher-education institutions, and cultural institutions, among others) to cut carbon emissions and increase renewable energy are motivating meaningful climate action independent of government mandates.²⁸ For example, RE100 is a global initiative of the Climate Group dedicated to working with businesses that are committed to 100% renewable electricity.²⁹ If managed effectively, this emerging system of private environmental governance has the potential to make a critical contribution to the systems change needed to achieve climate goals.

Climate change is a global challenge, but global approaches have yet to show meaningful results. In 2016, 175 countries signed the Paris Agreement, committing to developing and implementing national plans to meet a global emissions reduction target. While there are some indications of building momentum, the global community is not on track to meet the target.³⁰ One study identified ambition or implementation gaps in the seven countries and regions jointly responsible for the majority of GHG emissions.³¹ While the United States formally withdrew from the Agreement during the Trump Administration, the Joseph Biden Administration rejoined the Paris Agreement in January 2021.³² The recent Conference of the Parties in Glasgow, Scotland, increased ambition levels and prioritized movement away from fossil fuels, but left significant worries, including concern that the new ambition levels remain insufficient and that law and governance systems may, in any case, not be up to the task.

Solutions Re-Imagined to Justly Reach 80% by 2050³³

Economywide price on carbon.

Essential to the needed transformation is an economywide price on carbon to provide the economic incentives to make the shifts necessary to reach zero-emissions. A price on carbon has the potential to stimulate the comprehensive shift across the economy necessary to achieve our goals. This means imposing a direct cost on each ton of GHG emitted.³⁴ This must be at the national level to achieve the necessary economywide shifts. Pricing carbon could take the form of a tax or a trading system like the Regional Greenhouse Gas Initiative, which caps emissions from electricity generators in nine northeastern states, or the AB32 cap-and-trade program in California, though a national cap-and-trade system risks running afoul of General Agreement on Tariffs and Trade (GATT) rules. Carbon pricing strategies should also consider a Clean Energy Standard (CES) for electricity generation.³⁵ Any such pricing or trading system will also need to mitigate the disproportionate affect it will have on the poor due to the higher costs of fossil fuels coupled with the higher proportion of their income that the poor spend on energy.

In practice, policies to price carbon directly have proven elusive in the United States and elsewhere. Beyond the political opposition to anything conceived of as a new tax, the technical challenges in getting the price right are immense. While we consider a price on carbon essential, we must not wait for this systemic solution, but instead need to continue to advance with more surgical approaches to decarbonizing our economy.

Utilization of existing tools to reduce GHG emissions.

Given the anticipated time horizons of establishing a price on carbon and the urgency of taking action, we must immediately use the tools we have to reduce GHG emissions, in particular from energy production. We will need to address this issue across our economy through a comprehensive approach like that taken through the Legal Pathways for Deep Decarbonization project that lists more than 1,000 recommendations for legal instruments, including cross-cutting approaches, energy in buildings and industry as well as in transportation, decarbonizing electricity production, decarbonizing fuel, carbon capture and negative emissions, and non-CO₂ pollutants.³⁶

Establishing new and just policies.

We will need to harness all legal tools available to establish policies necessary to reach these goals. We will also need a comprehensive and just policy to get past debating how to handle the risks—and impacts—of climate change and grow resilient communities. In designing these new legal tools and approaches, we must put in place the appropriate fiduciary model for assessing risk. Decisions must be based on the possibility of the uncertain but potentially massive, catastrophic outcomes related to natural disasters, sea-level rise, drought, and biodiversity loss.

The already advanced shift away from burning coal must be expedited through government and corporate action. Additional attention needs to be brought to supporting livelihood transition for communities historically dependent on coal production and use. Renewable energy production, now competitive with coal in the marketplace, must continue to receive support as part of the continuing transition away from fossil fuels. Regulating methane is already a popular policy, including among the regulated community, and while an immediate phaseout of natural gas as an electricity-generating fuel may not be feasible, it must be increasingly replaced by renewable energy, and on as short a time line as possible. We must also establish programs to remediate abandoned oil and gas wells as a way to reduce fugitive methane emissions and rehabilitate the extractive landscape. Many of these processes will require legal tools, like the model laws being produced by volunteer attorneys through the Legal Pathways³⁷ project, but others will require public investment, including public transit projects and in making buildings safer, healthier, and more energy-efficient. Since transportation and buildings are major contributors to GHGs,³⁸ reducing emissions from these sectors can produce meaningful change. Electrifying and investing in electricity grid updates will also be essential in this effort, creating a more robust, resilient, and efficient network. This operation can be advanced by enhanced renewable portfolio standards at the state level. A host of other legal mechanisms, including tradeable permits or allowances, market-leveraging instruments, property rights, land use, and insurance regulation will also be necessary to reach our goal.

We will need to harness these legal tools to remove incentives for fossil fuel use and carbon-intensive industries.³⁹ We must go further and reduce or remove regulatory barriers related to the decarbonization of facilities and operations, infrastructure development, and research and development, while promoting social equity at every stage. These tools will need to be employed at all levels of government, including federal, state, local, and tribal authorities. In many cases, approaches will have to be tailored to a particular landscape or region.

We also need government policies that incentivize innovation and investment toward a carbon-free future. This component will enable the private sector to develop the necessary technologies. Technologies and equipment to remove or sequester carbon from the atmosphere—a technique that results in negative emissions—may be necessary if mitigation efforts do not advance at a sufficient pace.⁴⁰ Policies to promote these efforts can include financial incentives, tax breaks to encourage development of key technologies, grants from agencies such as the U.S. Department of Energy, etc.⁴¹

National adaptation actions framework law.

Eventually, when there is a price on carbon emissions, the regulatory system will have to be adjusted based on the shifted economic landscape.

As stated above, even if all GHG emissions were to instantaneously cease, we would still feel increasing climate change impacts over coming decades and centuries. As such, we must proceed on parallel tracks to prepare to adapt to these impacts and build resilience while also moving as fast as possible to mitigate climate emissions. Adaptation efforts must be informed by the best available

science about the impacts of climate change and account for climate justice considerations. But because of the economic (not to mention human suffering) implications, these adaptation efforts must be built in systematically to all relevant regulatory, investment, and other policy and legal decisions. They must consider both the potential for disasters and the double disasters that threaten some communities, as well as the incremental impacts, including the migration of large vulnerable populations. Government agencies need to plan for how they will deliver essential services amidst climate disruptions, and how they will coordinate with partners at other levels of government.

This could be accomplished through a national framework law, administered to complement and support state and local efforts.⁴² In addition to significant adaptation actions, the law must account for the liabilities associated with unintended consequences of adaptation actions.

Private environmental governance.

An effective climate governance regime will require a multi-tiered system with distributed roles and accountability mechanisms.⁴³ The regime must capitalize on and encourage private-sector initiatives to meet 2050 goals (corporations, universities both directly and through their supply chains). While ambient or broad environmental quality objectives like biodiversity will likely be “X” more effectively addressed through public environmental governance, administrative law, and top-down regulations, private environmental governance (PEG) may work best in areas more readily reduced to compliance obligations and best practices. This can include PEG approaches such as certification, auditing, labeling, and reporting programs that are enforced through contracts and related vehicles.⁴⁴ When possible, PEG goals should be aligned with climate-related Sustainable Development Goals.

PEG will not operate in a legal vacuum, however, and corporate and securities law will be critical to ensuring appropriate corporate behavior. A discussion of private environmental law in this context should also reflect the need for accountability measures, such as disclosure requirements to enable the public to hold the private sector accountable through litigation or other mechanisms. Corporate climate disclosures of both GHG emissions and climate risks to and within supply chains (including as a consideration in awarding federal contracts) will contribute to the financial response needed to confront climate risk.⁴⁵

Involve vulnerable communities in the creation and implementation of policies.

Finally, there are a host of critical cross-cutting considerations that must underpin all these mitigation and adaptation efforts. It will be critical to use an equity lens in designing all of these policies and to ensure that affected and especially vulnerable communities are meaningfully involved in designing and implementing them. If policies are designed to protect against the greatest potential risk, in many cases, this will result in just outcomes. An updated and enhanced conception of the duty of care in both government and the private sector will help to facilitate this.

We must also ensure adequate consideration of the cumulative and distributional impacts of policies on environmental justice (EJ) communities.⁴⁶ The historic NEPA approach is a valuable starting

point in this regard, but these protections must extend beyond the scope of major federal projects and become a foundational aspect of all governmental decisions, particularly those that are climate-related.⁴⁷ In addition, to further promote healthy and resilient communities, spending on clean energy and infrastructure projects should be prioritized for the most vulnerable populations.⁴⁸

Because of the need for specific scientific information to support so many of these decisions, we must continue to fund and advance climate science research and facilitate policy development underpinned by this information. Adaptive management techniques that prioritize an iterative method of management will also be critical to address uncertainty surrounding climate risks. Enhanced investments in data collection and monitoring, coupled with increased focus on sharing data, will better enable effective evaluation of implemented measures.

This role could be played by a new federal institution for assessing and coordinating climate risk, or through interagency cooperation. And such a structure must include institutions at all levels of government because of the specialized and critical roles that local governments, states, and tribes play in climate change response. The structure must also account for the highly localized nature of some climate impacts—a one-size-fits-all approach will not suffice. Finally, even with a coordinated monitoring approach, data transparency (and interoperability) will be critical, both from government and the private sector.

Chapter 2: Water Pollution From Uncontrolled Sources

The Problem

Freshwater is the source of much of the life on our planet, and it is a resource under tremendous pressure from the combined influences of human consumption and climate change. The nation has made major strides in controlling water pollution from point sources (factories, sewage treatment plants, piped discharges from other sources). But much of the impairment to water quality is from nonpoint sources—runoff and discharges from areas of land and operations that are not subject to regulation under the 1972 Clean Water Act (CWA), as amended.⁴⁹ Even though these uncontrolled sources of pollution were recognized in the CWA, which includes some provisions to determine their scope and to encourage planning for their control by states and local governments, they were not regulated because of concerns with federal intrusion on state and local land use prerogatives and solicitude for such industries as agriculture, forestry, and land development.

In the ensuing decades, some sources of nonpoint water pollution have been brought by statutory amendment and regulation within the point source universe (e.g., regulation of municipal stormwater, industrial stormwater discharges, concentrated animal feeding operations). Nevertheless, many of the major sources of water quality impairment remain unregulated at the federal level and only sporadically regulated by states. The leading strategies for nonpoint sources embodied in law are heavily reliant on technical assistance, voluntary best management practices, agricultural and other cost-share programs, and development of plans for impaired waters. Among the plans with some nexus to CWA requirements are the development by states of total maximum daily loads (TMDLs) for impaired waters,⁵⁰ with pollutant load allocations to be defined for nonpoint source contributors to the impairments. But implementation and enforcement are essentially a state function, often heavily dependent on the availability of funding assistance.

The problems presented by uncontrolled water pollutants include hypoxic zones; toxic algal blooms; beach closures; fishery closures; pollution of drinking water sources with pesticides and fertilizers; boil-water advisories; loss of aquatic habitat and destruction of submerged vegetation, macroinvertebrates, and fish; and impacts on communities that rely on wells and small water systems. These effects are not new, but as other sources have been brought under control, the need to address these has become even more evident and important—especially with a rising population, vertical integration of many traditional nonpoint-pollution-generating industries, and awareness that water quality goals cannot be met with existing techniques.

Current Practice

Under current U.S. law, uncontrolled water pollution sources escape regulation under the permitting-monitoring-reporting system applicable to point source discharges from discrete conveyances into U.S. waters.⁵¹ Instead, these are chiefly addressed through provision of federal or state financial and technical assistance—for example the U.S. Department of Agriculture, EPA's

Section 319 program, and state funding efforts⁵²—to willing applicants. A few states have enacted state regulatory provisions focused on particular pollutants (e.g., nutrient applications to farmland), or applicable to specific watersheds or industries (e.g., Maryland’s nutrient management regulations), but most apply no regulatory measures.

The 2019 Wingspread Conference participants created a matrix to assist in identifying paths forward. They began by characterizing the “status quo” of legal approaches; then they projected desired future outcomes. The status quo does not (for the most part) regulate nonpoint source discharges. Its reliance on the TMDL program,⁵³ has proven insufficient to induce timely and steady progress. Actual legal approaches belie the policy, expressed in 33 U.S.C. §1251(a)(7), that programs for control of nonpoint sources of pollution be developed and implemented in an “expeditious manner” to enable the water quality goals of the CWA “to be met through the control of both point and nonpoint sources of pollution.” And control of these pollution sources relies on highly complex but informal relationships among many units and layers of government and governmental agencies. In contrast, a preferred outcome would create a more watershed-health-focused system. At the same time, the status quo approach focuses permit-by-permit on individual sources and on effluent limits on pollutant discharges; but an alternative future could be far more focused on land quality and water quality results, and on achieving multiple benefits.

The current approach to nonpoint sources treats the problem as of limited interest to a limited number of parties—but the future could include greater involvement of political actors, consumers and purchasers, users of water, and ecological resources.

Finally, current approaches are generally high-cost—especially as they are aimed at point sources where most cost-effective controls have been fully tapped—but there are many ways to reduce overall costs for water quality improvement. And the regulatory focus is short-term (tied to permit for point sources, and TMDL time lines (however long)). But longer-term protection is possible if we take into account desired outcomes for water and ecosystem services and land health.

The most robust current approaches deliver federal money on an applicant-by-applicant basis to participants in federal agricultural programs, while EPA’s much smaller §319 program focuses on matching grants within watersheds identified by states. Coordination of financial and technical assistance resources occurs most often in impaired watersheds with specific impairments identified by states under Section 303(d),⁵⁴ but even this often does not make it possible to achieve rapid progress. And regulatory approaches are mostly nonexistent apart from specific state experiments, some innovations with point-nonpoint trading systems in specific watersheds, and occasional enforcement actions related to major spills, fish kills, and beach closures. There are many actors in the status quo, but there is no substantial accountable system to control these uncontrolled sources to achieve a desired outcome.

Solutions Re-Imagined

There is a need for a fresh look at the current system, focusing on at least the following five elements:

1. Identify effective motivators to support action to control pollution from these sources. This means discarding jargon like “nonpoint source” pollution and referring instead to “uncontrolled pollution.” The public and institutional motivation necessary to support advancement in law needs to be defined as: achieving better environmental and public health outcomes—not *controlling* nonpoint sources. This reframing in turn makes possible and accessible the identification of appropriate strategies, communication, monitoring, and accountability.
2. Create a structural framework that can accelerate the pace of change. We have been haphazardly incremental, slow, and sporadic in dealing with these sources over the last four decades.
3. Define the cumulative impacts of pollution to drive management and results.
4. Focus on watersheds with major, recurrent pollution threatening public health (e.g, algal blooms, water closures, boil-water advisories).
5. Make use of the opportunity to leverage public and consumer preferences as well as the ability of vertically integrated sectors to rapidly implement change. Recognize the importance of risks (regulatory, financial, reputational, operational) to these sectors and the enterprises they manage. Supply and value chain managers with modern sustainability ideals are well-positioned to help drive the behavior of suppliers in the direction of best practices in this area because market access is the lever they hold. Likewise, investors looking to stem investment risk can be influential in changing behaviors that have proved immune to regulation.

This fresh look highlights the deficiencies in existing tools and provides a basis to create a re-imagined system.

As a predicate to analyzing pathways from the status quo to the desired future conditions, there is a need to characterize data needs, private governance opportunities, environmental justice, law and policy innovations, and climate effects. There are some key assets available to support this new approach: new technology and “big data” that can enable us to link practices to outcomes and to support public understanding, funding, and accountability; better use of existing management and public policy tools to target best practices to the appropriate places; supply chain management tools, labeling, and private governance influence by key actors; and the power of the purse—linking federal and state expenditures and purchases for all kinds of purposes to vendors’ accountability for control of pollution. They offer several solutions.

Implement underutilized existing laws with a focus on environmental and public health outcomes, including full integration of cumulative impacts on communities and watersheds, for a data-driven approach to uncontrolled pollution.

Funding and relying on big data will not only make it publicly accessible, but will also make it possible to define and track progress toward watershed outcomes. It will be critical to encourage the sharing of data on public platforms and integration of ecological information with water quality, discharge information, geo-siting of best management practices, remote sensing, and biological sampling.

Nonpoint source dischargers have frequently insisted on privacy, exemptions from nondisclosure, and aggregation of information to prevent attribution of pollution to particular owners. This prevents the kinds of accountability we insist on for almost every other significant pollution source. Especially given intensive consolidation and vertical integration in the agricultural sector, there is a compelling reason to ensure that water quality and ecological outcomes can be linked to those entities affecting them most strongly. The U.S. legal system and funding should support data collection and presentation (in ways only hinted at by platforms such as “surf your watershed”) so that multiple decisionmakers can use it to make funding and regulatory decisions, to target enforcement, and to prioritize among actions needed to support community and watershed health.

This framework would make it possible to go beyond the compliance-based and best management practice (BMP) models that currently produce scattered results, and that are frequently not well-tracked for effects on watersheds beyond a specific cost-share period or the pollutant-specific monitoring tied to a TMDL implementation plan. Attention to cumulative impacts of numerous activities and conditions, if integrated into the legal and funding framework by law or regulation, is also likely to produce far better outcomes than a mere increase in cost shares or traditional TMDL implementation.

The availability of data and cumulative impact information will make it possible to create a feedback loop of information and action to improve the nation’s waters and their supporting landscapes.

The sequence to get to the desired condition would rely on funding of data and data management, including accessibility; regulatory and management changes to link priority-setting with funding of pollution control activities to the watershed and the environmental outcomes desired; changes in data management and funding programs to remove obstacles to identifying the sources and scope of impairments in a particular watershed; adoption of an express feedback-loop management approach; and conforming amendments to the CWA and relevant EPA and Council on Environmental Quality (CEQ) regulations.

Provide key actors with the power to create change by matching the best tool to the source of impairment.

There is a need to inventory effective regulatory and nonregulatory approaches and to target these to sectors, watersheds, and problems where they have proven to be effective. Many useful techniques are often limited by constraints on funding or the absence of a plan. EPA or others should be directed to construct a database of tools used by the states, federal programs, private sector, and others, and determine how these can be applied to different forms of uncontrolled pollution in different types of watersheds and settings. This resource could further be backed by supporting and funding “integrated water management” planning and making funding available for implementation using listed tools. Alternatively, legislation could be adopted requiring states to evaluate and apply these tools where problems exist.

Additionally, further funding for the CWA Section 319 program could both support planning and implementation in targeted watersheds. Similarly, Farm Bill programs that have not produced sufficient improvements in watershed health and water quality could trigger the application of one or more of these tools as a backstop by states or EPA.

Steps in the sequence would include support for the detailed inventory, development of regulatory systems, and subsequently development of legislation to ensure that tools are evaluated and applied where they need to be.

Capture escapees from regulation, focusing on priority sectors with the ability to produce visible, measurable results.

A unified approach is needed that increases the risk calculation for those responsible for uncontrolled pollution. This can be advanced through a multi-federal agency working group.

Additional innovations could include disclosure requirements tied to watershed conditions or to other regulatory systems or receipt of federal or state funding of any kind. The disclosure of information could create a potential for liability under the common law, duties to warn, and responsibility for remediation of nuisances. A regulatory requirement could be fashioned requiring disclosures to downstream and watershed users/residents. This might be analogous to the annual Safe Drinking Water Act (SDWA) water provider system disclosures to customers, but instead related to public media, governments, and residents of relevant watersheds. All of these can be set up for enforcement, where enforcement is available under existing or modified law and regulation.

Conceivably, the CWA point-nonpoint framework could be amended in order to treat large-scale nonpoint source discharges similar to point sources for permitting, enforcement, and reporting purposes (e.g., requiring permits for dischargers of certain size/characteristics/watershed even if their pollutants are not discharged via a discrete conveyance). There is some analogy to current law addressing unregulated stormwater discharges. The Act authorizes EPA or a state to regulate a stormwater discharge (other than an urban MS4, an industrial stormwater discharge, or a

concentrated animal feeding operation) if it “contributes to a violation of water quality standards or is a significant contributor of pollutants” to waters of the United States.⁵⁵ Of course, these provisions that allow expansion of stormwater regulation to additional sources still do not extend to authority over “nonpoint sources,” but the law could be amended.⁵⁶

Other legislative innovations might include laws providing for expanded disclosure, reporting, and warning, with supporting enforcement mechanisms. As appropriate, such tools could be aimed primarily at industry sectors that are highly concentrated and integrated, with integration including the most common forms of integration (e.g., in commodity and animal agribusiness) where the relationships are primarily governed by contract rather than ownership of the producer. The focus on large integrated producers would have the effect of treating these businesses much like their historic manufacturing and municipal counterparts. This could be supported by public disclosures that can reinforce responsibility for uncontrolled or poorly controlled pollutants in the eyes of the purchasing public, and provide additional leverage for corporate private governance and supply chain management that emphasizes, monitors, and rewards excellence and reductions in externalities.

Use the power of the purse and link federal and state procurement to effective management of uncontrolled pollution in the supply chain.

This approach recognizes that government funding is substantial in the acquisition of food and fiber, materials, energy, and development. The re-imagined approach would expressly provide for disclosures and certifications and perhaps pollution controls as conditions related to expenditures of government funds. This, like governmental specifications for energy efficiency, human rights, and other requirements, could drive the rapid development of integrated private governance (or external certification schemes measuring private governance) that can change behavior and produce results.

A related, but different, strategy would be to include requirements that federally funded land and water and development projects, and all authorized activities on federal lands, result in net water quality improvements—or at least restoration to no net loss of water quality in connection with the completion of the activity where there is no opportunity to achieve a net improvement. Again, this would take advantage of the government’s power of the purse (and its role as landowner in stewardship for the public of public resources), in order to achieve improvements and not mere exploitation.

Each of these strategies would benefit from statutory support but may also be supportable as management and regulatory requirements founded on existing procurement laws, public land laws, and the requirements of NEPA Sections 102(1) and 105, making such improvements and protection of resources for future generations a core supplemental function of every federal agency.⁵⁷

Relatedly, there is major opportunity for large private-sector supply chain managers to lead in this space by putting pressure on sources of uncontrolled pollution to do that which has proved elusive through lawmaking and government regulation. Retailers for agricultural products, for example,

have the ability to set expectations for their suppliers that advance the managers' sustainability objectives, including those pertaining to water quality. There is nothing to prevent these supply chain managers from declining to bring to market those goods that have uncontrolled pollution as a byproduct. Ideally, large retailers could coalesce around a common set of principles and best practices that could be driven through their supply chains. Government support may be needed to help convene such cooperation or to help ensure avoidance of anti-trust limitations.

Chapter 3: Materials Use and Conservation/Circular Economy

The Problem

The European Union (EU) in its Circular Economy Plan noted “[t]here is only one planet Earth, yet by 2050, the world will be consuming as if there were three.”⁵⁸ According to the United Nations (UN),

in 2017, worldwide material consumption reached 92.1 billion tons, up from 87 billion in 2015 and a 254 per cent increase from 27 billion in 1970, with the rate of extraction accelerating every year since 2000. This reflects the increased demand for natural resources that has defined the past decades, resulting in undue burden on environmental resources.⁵⁹

Further, the per capita materials consumption rate has dramatically increased. The UN reports that “in 1990 some 8.1 tons of natural resources were used to satisfy a person’s need, while in 2015, almost 12 tons of resources were extracted per person.”⁶⁰ The EU Circular Economy Plan also points out that “half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing.”⁶¹

The scale of change needed is recognized in the UN’s Sustainable Development Goal 12 that deals with Sustainable Production and Consumption. SDG 12 notes that achieving the goal of responsible consumption and production requires urgent reduction of the world’s “ecological footprint by changing the way we produce and consume goods and resources.”⁶² SDG 12 points out that “efficient management of our shared natural resources, and the way we dispose of toxic waste and pollutants, are important targets to achieve this goal. Encouraging industries, businesses and consumers to recycle and reduce waste is equally as important. . . .”⁶³

Materials consumption is particularly challenging in the United States. In 2017, U.S. per capita materials consumption including fuels was 18.6 metric tons, which is 42% higher than Europe and is a 74% increase since 1970.⁶⁴ In 2012, the United States, with less than 5% of the world’s population, used one-third of the world’s paper, one-quarter of the world’s oil, 27% of the aluminum, and 19% of the copper, among other resources.⁶⁵ Total generation of municipal solid waste in 2018 was 292 million tons, up almost 24 million tons from 2017.⁶⁶ About 140 million tons of these wastes still are disposed of in landfills.⁶⁷ At an average cost of about \$54 per ton, landfilling alone cost approximately \$7.5 billion dollars.⁶⁸

A 2020 U.S. Environmental Protection Agency Report noted:

- In the past 50 years, humans have consumed more resources than in all previous history.
- The U.S. consumed 57% more materials in the year 2000 than in 1975; the global increase was even higher.

- In 1900, 41% of the materials used in the U.S. were renewable (e.g., agricultural, fishery, and forestry products); by 1995, only 6% of materials consumed were renewable. The majority of materials now consumed in the U.S. are nonrenewable, including metals, minerals, and fossil-fuel derived products.
- Our reliance on minerals as fundamental ingredients in the manufactured products used in the U.S.—including cell phones, flat-screen monitors, paint, and toothpaste—requires the extraction of more than 25,000 pounds of new nonfuel minerals *per capita* each year.
- This rapid rise in material use has led to serious environmental effects such as habitat destruction, biodiversity loss, overly stressed fisheries, and desertification.⁶⁹

The UN Environment Programme has observed that decoupling economic growth from natural resource use is fundamental to sustainable development.⁷⁰ However, the global figures cited above point to worsening trends. The UN reports that “[f]or all types of materials, developed countries have at least double the per capita footprint of developing countries. In particular, the material footprint for fossil fuels is more than four times higher for developed than developing countries.”⁷¹ At the same time, developing countries often disproportionately suffer the environmental consequences of materials extraction and production, creating a serious equity issue.

Current Practice

Despite the increasingly clear adverse impacts of unsustainable materials use, the issue has received relatively little attention in U.S. environmental law. Waste management is addressed in the Resource Conservation and Recovery Act (RCRA), but the Act principally focuses on properly containing, labeling, storing, treating, disposing, and transporting hazardous waste and on state management of solid waste. While the 1984 amendments to RCRA established a national policy that “the generation of hazardous waste should be reduced or eliminated as expeditiously as possible,” and the 1990 Pollution Prevention Act expanded this policy to minimizing or eliminating toxic waste releases to all media, these policies have not resulted in substantial reductions in releases.⁷² Moreover, these laws focus on waste rather than on materials use throughout the economy.

EPA has for many years had voluntary programs, such as Design for the Environment,⁷³ that address product design and materials usage, and pollution prevention programs, but these are limited initiatives that have not had a transformational impact on materials use. States and localities have the lead for solid waste management, and many have adopted waste management hierarchies that support reuse and recycling of materials rather than incineration or landfilling whenever possible. For example, about half of the states have enacted electronics waste extended producer responsibility laws, most of which require manufacturers of certain types of electronics products to arrange for those products to be returned for recycling.⁷⁴ A few states have banned the use of some heavy metals in certain types of products such as inks and dyes, and some others charge fees or deposits to incentivize return and recycling of some products such as batteries and tires. All these initiatives play a useful role in materials use and conservation, but they fall far short of a sustainable materials usage policy for the United States. To remedy this situation, the federal government, states, companies,

and consumers must reimagine approaches to materials conservation that incorporate the concepts of extended producer responsibility and the circular economy.

In the early 1990s, Friedrich Schmidt-Bleek from the Wuppertal for Climate, the Environment, and Energy proposed that production must be dematerialized by a “Factor of 10” to achieve sustainable and equitable use of natural resources.⁷⁵ In an editorial, Schmidt-Bleek asserted that “the fundamental physical flaw of human activities is the enormous consumption of natural resources per unit output of value or service. . . . The key for sustainability is to radically increase the resource productivity of all economic activities, including energy generation.”⁷⁶

Materials conservation can be driven by a variety of policies, including extended producer responsibility, which encourages companies to reduce use of harmful materials and design products for reuse; adoption of circular economy concepts that shift from a make, use, and dispose linear economy to approaches that support reduction of inputs, remanufacturing, product repair and reuse, and waste exchanges; and Design for the Environment programs that provide resources or incentives to assist companies to redesign their products to achieve environmental goals. This shift from a linear economy to a circular economy, where producers take more responsibility for the fate of their products and consumers are more aware of how to conserve materials, will require government action including new laws and regulations. However, reaching the full potential of materials conservation and achieving the goals of SDG 12 will also require a shift in societal norms, analogous to the change in norms related to smoking, and economic cues that provide financial incentives to adopt circular economy approaches. These incentives can come from changing consumer preferences associated with a shift in norms, financial incentives for better design, extended producer responsibility obligations, lower costs that result from lower demand on product inputs, or a variety of other economic factors.

The roadmap for the needed fundamental change is becoming clearer. The EU, for example, has been more receptive to extended producer responsibility than the United States. The EU adopted a Directive aimed at reducing packaging waste and encouraging recycling,⁷⁷ the End of Life Vehicle Directive that focuses on recycling of vehicles and reduction in the use of heavy metals,⁷⁸ and the Waste Electrical and Electronic Equipment Directive (WEEE) that deals with waste from a broad range of equipment, requiring collection and reuse or recycling where possible and separation and containment of hazardous wastes. The EU also restricts the use of certain hazardous substances in electrical and electronic products (RoHS).⁷⁹ EU regulations also set out product design standards under the Ecodesign Directives and require these products to be labeled with the “CE” symbol.⁸⁰ More recently, the EU has adopted a Circular Economy Plan.⁸¹

EPA in its 2020 report on materials usage observed:

Our key message is simple, [o]ur use of materials is very large and increasing with population and economic growth. Energy and water use accompany materials use. Our use of materials now challenges the capacity of the Earth—air, water and land—to withstand the many resulting environmental problems. This situation fundamentally

affects many other aspects of our future, such as the economy, energy and climate. We need to fulfill our human needs and prosper while using less material, reducing toxics and recovering more. Business as usual cannot continue. The public and private sectors have many of the tools that we need to manage materials much more carefully than we typically do today. However, these tools are seldom used to address the full life cycle of materials. This report describes specific measures that EPA and state environmental agencies can take to: (1) promote efforts to manage materials and products on a life-cycle basis, using present authorities, (2) build our capacity to manage materials in the future, and (3) accelerate the public dialogue necessary to start a generation-long shift in how we manage materials and create a green, resilient and competitive economy. We should begin aggressively.⁸²

The Agency concluded that

[i]t is becoming increasingly clear that how we use materials is a large factor in energy use, climate change and the economy, and an important issue in its own right. Therefore, if we want to address the issues behind the headlines, and if we want the U.S. to be competitive in the world economy, sustainable use of materials must be our goal.⁸³

It also affirmed that “[i]t’s important that both the federal and state governments make more systematic efforts to enable, encourage, and collaborate with all parts of society to see that materials are used more effectively and efficiently with less overall environmental toll.”⁸⁴

The Wingspread and Airlie House participants built on work by the leading advocates of circular economy, the World Resources Institute (WRI) and the Ellen MacArthur Foundation. According to WRI, a circular economy is “based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.”⁸⁵ Key to achieving a circular economy are: shifting from a waste hierarchy to a circularity hierarchy, updating national climate plans to incorporate the circular economy, reforming recycling regulations to promote closed-loop manufacturing and incentivizing Design for Circularity.⁸⁶

The idea of a circular economy has gained significant momentum in both the government and the business sector. Unfortunately, in January 2018, the first Circularity Gap Report published during the World Annual Forum in Davos established that our world is only 9.1% circular, leaving a massive circularity gap.⁸⁷

A number of businesses have recognized the need to conserve materials by focusing on ideas consistent with a circular economy. A joint report by the UN Global Compact and the World Business Council for Sustainable Development noted, “[i]t is in the interest of business to find new solutions that enable sustainable consumption and production patterns.”⁸⁸ Among the innovations identified in the report are product portfolio analysis tools to understand the environmental and social footprint of products, developing innovative business models such as moving from selling

products to selling services, reducing manufacturing impacts by substituting virgin raw materials in products with post-consumer materials through recycling and upcycling, and using modular design, so products' constituent parts will be easily separated and either re-used without further processing, or easily recycled near the point of disposal.⁸⁹

A related approach is set out in a UNEP report titled "Redefining Value."⁹⁰ The report describes a "value-retention process" (VRP) that includes approaches such as remanufacturing, refurbishment, repair, reuse, and recycling that, "if pursued strategically, can enable faster achievement of circular economy. . . . VRPs enable the retention of the inherent value of the product, whereas recycling retains just the value of the material or resource that is recycled."⁹¹ For example, remanufacturing and comprehensive refurbishment can contribute to GHG emissions reduction by between 79% and 99% in appropriate sectors and can reduce new material requirements by between 80% and 98%.⁹²

The idea of redefining value finds strong support in Vision 2050 developed by the World Business Council for Sustainable Development, which is made up of some of the World's leading business enterprises. Vision 2050 suggests that by mid-century, Circular, closed-looped and networked designs that help people to live well and within one planet drive successful industry and reduce the need for primary resource extraction. Closed-loop systems make the concept of waste obsolete. They use waste as an input and resource, eliminating waste accumulation on land, in air or in water. Used products and materials can be reengineered to function again for multiple and distinct purposes or reduced to raw materials for manufacturing other products.⁹³

One specific application of circularity is the Platform for Accelerating the Circular Economy (PACE), which was created in 2018 by the World Economic Forum and is now hosted by the WRI. Lisa Jackson, Vice President Environment, Policy, and Social Issues for Apple noted that "[m]eeting our global circularity goals requires dedicated collaboration and partnership. PACE's electronics action agenda highlights important perspectives on shared challenges and provides a foundation to drive collaboration. In bringing together governments, NGOs and the business sector, PACE has a unique opportunity to break through challenges which no organization can solve alone."⁹⁴

PACE has proposed 10 steps to achieve a higher level of circularity in the electronics industry. They include the following steps:

1. Incentivize and Support Product Design for Circularity
2. Enable Producers to Increase Sourcing of Recycled Content
3. Transform Consumption Modes to Increase Market Demand for Circular Products and Services
4. Guide and Support New Business Models for Environmental, Financial, and Social Triple-Win
5. Encourage Bring-Back by Consumers
6. Set Up Effective Collection Systems

7. Enable Efficiency and Transparency in Compliant and Responsible Transboundary Movement
8. Strategically Plan and Install Sorting, Pre-Processing, and Recycling Operations
9. Increase Incentives for Investment in Recycling Technologies and Facilities
10. Integrate and Advance Decent Work in the Transition to a Circular Economy for Electronics⁹⁵

Solutions Re-Imagined

In light of the preceding discussion, reimagining materials conservation and use could include the following solutions.

Convene a national dialogue on a circular economy and materials conservation.

With growing corporate interest in the idea of a circular economy, it is a good time to convene a national dialogue to discuss how to move to a circular economy in the United States. President Bill Clinton's Council on Sustainable Development could serve as a model.

Propose extended producer responsibility (EPR) at the national level.

More than one-half the states have EPR legislation for electronic equipment. A national EPR for electronics waste would help reduce environmental impacts and could make it easier for businesses to set up systems. An important reference point for a new and broader EPR system is the European Union EPR system.¹⁰¹

Propose a national GHG policy that establishes a price on carbon that will help drive reductions in materials use and product redesign.

A price on carbon could drive business innovation by providing a financial incentive to look carefully at energy inputs needed to extract new resources, manufacture and transport products, and find ways to reuse them. These energy-efficiency steps would also contribute to achieving SDG13 (climate action).

Design federal procurement legislation and policies so that procurement criteria favor products and services that are consistent with a circular economy.

The federal government is the world's largest purchaser. Further, as part of the economic recovery effort, the federal government is likely to spend a great deal on infrastructure. As a result, the new Administration can have a major impact on responsible production and consumption by taking materials conservation and circular economy principles into account in procurement, perhaps through Executive Orders that build on available authority related to procurement. By adjusting its procurement process, the federal government could model desired behavior for state governments, universities, and other large procuring organizations. This effort could also support SDGs 7

(affordable and clean energy), 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure), and 13 (climate action).

RCRA¹⁰² regulations to reflect a new circular economy hierarchy.¹⁰³

The current system of regulation under RCRA, preoccupied as it is with avoiding mismanagement of hazardous waste, has the ironic consequence of driving large amounts of secondary material toward destruction rather than reuse. This dynamic needs shifting through legislative or regulatory reform. Additionally, as the WRI has suggested, there is a need for a new, more elaborate waste hierarchy that goes beyond the traditional reduce, reuse, recycle paradigm to include preventing the use of resources in the first instance, encouraging repairing and refurbishing, and supporting remanufacturing and repurposing. Besides better aligning its own regulations with this ideal, EPA could develop model state legislation and encourage states to adopt this new circular economy waste hierarchy. This approach could also support the same additional goals identified immediately above.

Introduce materials conservation as a factor that is considered in NEPA analysis.

Just as the impact of federal actions on climate change will be reintroduced to the NEPA process, the CEQ could contribute to responsible production and consumption by providing guidance to agencies on how to consider materials use and conservation in environmental impact reviews. In much the same way as GHG emissions can both by themselves and cumulatively have important environmental impacts, materials use can have both significant impacts on a project and significant cumulative impacts that could be mitigated. The circular economy hierarchy discussed above could be a useful analytical tool in this process.

Encourage design for circular economy.

EPA could support the circular economy by reinvigorating its Design for the Environment program, perhaps partially based on the EU Ecodesign Directive. EPA could also consider an Energy Star-like program for product circularity.

Consider including materials risks in the SEC definition of “materiality.”

As access to materials becomes more of a risk to the success of companies and product stewardship becomes a more significant issue for businesses, the EC should consider including these issues as an aspect of what companies must report as a material risk.

Consider consumer “fate labelling.”

Explore the possibility of fate labelling for consumer products, so that consumers can make more informed purchasing decisions. This could be done using QR codes or through a system such as the CE labeling under RoHS and planned for the EU Ecodesign program.

Consider “right to repair laws.”

Laws that would assure that repairs can be made by a wide range of providers could help facilitate longer use or reuse of products. These laws have been proposed for farm equipment in some states where concerns have arisen about manufacturers making it difficult for repairs to be made other than through the manufacturer’s outlets.

Chapter 4: Ecosystem Degradation

The Problem

Healthy populations cannot exist without healthy ecosystems. Driven primarily by anthropogenic activities, destroyed and degraded ecosystems threaten the natural world and critical resources in significant and varied ways.⁹⁶

Ecosystem degradation presents a host of complex and difficult environmental challenges. Land, ocean, and freshwater systems are all affected. While legal and policy efforts have attempted to address the problem through species- or resource-specific mechanisms within geopolitical borders, the lack of coordinated efforts built around ecosystem-based solutions has meant the problem continues relatively unchecked. Without changing current production and consumption patterns, precipitous population growth, and unsustainable practices, trends will continue to worsen.⁹⁷

Causes of ecosystem degradation are interrelated and well-known. Some of these include: land use practices related to grazing, crop production, and forest management; extractive industries; invasive species; fire regime changes; infrastructure development; industrialization; and urbanization.⁹⁸ Compounding the problem are indirect factors that amplify degradation from these direct causes,⁹⁹ coupled with governments policies that continue to grant subsidies to sectors and practices that have harmful environmental effects.¹⁰⁰ Climate change has also become a significant driver of ecosystem degradation.¹⁰¹ As a result, the scope of these causes, and therefore the problem, continues to grow and intensify.

Land use conversion presents the largest set of negative impacts to land and freshwater ecosystems.¹⁰² This accelerating problem—due in part to rising global populations and a shift to increasingly meat-intensive diets—has potentially dire consequences with respect to invasive species, biodiversity, soil health, erosion, air quality, water supplies, water quality, and pests, among others. The loss of wetlands in particular has devastating impacts due to the immeasurable ecosystem services they provide. With increased global trade, invasive species have dramatically increased in recent decades, leaving “nearly one fifth of Earth’s surface at risk of plant and animal invasions.”¹⁰³ These invasions threaten the long-term viability of species—nearly one-quarter of known species are in danger of extinction, and extinction rates are at unprecedented levels.¹⁰⁴ Irreversible, an extinct species means the loss of potentially incalculable medicinal and health benefits, the loss of the intrinsic value of the species itself, as well as decreased ecosystem resilience to the impacts of climate change and other pathogens.

The situation is critical for humans as well. Erosion, while a normal process, has been sped up by poor agricultural and land management practices.¹⁰⁵ Stopping runaway soil erosion can help ensure greater food security.¹⁰⁶ Better management techniques can also reverse the trend of deteriorating soil quality,¹⁰⁷ but current attempts to counteract the issue through fertilizer application have also led to

problems. The repeated use and overapplication of fertilizers provide just one example of how ecosystems, frequently soil and freshwater systems in this case, become polluted.¹⁰⁸ The process of industrialization has contributed to deteriorating air quality, particularly in parts of the world without stringent environmental laws. Healthy systems provide untold benefits, sometimes called ecosystem services, that must be adequately preserved. Responses to these challenges must be direct and swift to avert the most significant impacts of ecosystem degradation.

Current Practice

At the international level, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), an independent body that operates with assistance from the United Nations Environment Programme, has been working since 2012 to counteract degradation trends.¹⁰⁹ The UN has also initiated the Decade on Ecosystem Restoration (2021-2030) to focus on “preventing, halting and reversing the degradation of ecosystems worldwide.”¹¹⁰ Moreover, at least 80 countries have adopted policies to help ensure any impacts to biodiversity or ecosystem services from development projects are offset by mitigation, an approach known as “no net loss.”¹¹¹ One important goal of the no net loss method is to make sure any populations affected by the development project and associated mitigation are not left worse off, but are ideally better off after the plans are completed.

In the United States, no federal statute focuses exclusively or directly on mitigating ecosystem degradation. Generally, domestic environmental laws focus on addressing a single issue (e.g., air, water, species) rather than on ecosystems comprehensively.¹¹² As a result, impacts on ecosystem function are more often than not ignored in the course of project approval and listening activity. Attrition of ecosystem function is the natural byproduct of such neglect. Moreover, existing policies often do not account for the complex and interdependent nature of ecosystems. Rather, these issues are typically managed based on short-term goals and primarily within distinct political and jurisdictional boundaries that do not necessarily reflect the scope of affected ecosystem. Even when governmental bodies work together on a project or program, their mandate and funding allocation falls short of ambitious, long-term ecosystem restoration.¹¹³

The 2019 Wingspread and Airlie House Conference participants noted that governing ecosystems in this way presents grave problems. It leads to misaligned ecosystem management and subsequent degradation, in part because ecosystems often cross political and jurisdictional boundaries. Participants noted moving away from this viewpoint and toward one centered on a more robust rehabilitative scheme is critical because thresholds and tipping points are becoming nearer and less clear.

Some legal and policy mechanisms have been directed at promoting ecosystem health and resilience. For example, the National Forest Management Act (NFMA) has required the U.S. Forest Service to produce land management regulations that achieve the goal of animal and plant diversity.¹¹⁴ These regulations have not always fulfilled these goals, however, having been changed by multiple

administrations since the Clinton era. This includes being invalidated more than once by federal courts for violating NEPA, the Endangered Species Act, and the Administrative Procedure Act.¹¹⁵ The current NFMA regulations call for resource management plans that promote “ecosystems and watersheds with ecological integrity.”¹¹⁶ Even with progress on national forests, these regulations do not apply to agricultural lands, one of the most significant drivers of ecosystem degradation. And while a no net loss approach is taken when wetlands are involved, the application of such a method is overly narrow by only applying to wetlands¹¹⁷ and by not considering a more robust accounting of overall ecosystem services associated with those wetlands.

Solutions Re-Imagined

Promote “no net loss” of ecosystem services.

The current approach of environmental law typically considers each aspect of an ecosystem separately, leading to specific protections for only some of the specific characteristics of an ecosystem. Policies at the federal, state, and local level that emphasize the no net loss of ecosystem services are needed to ensure these services are preserved. This could be achieved by building on existing programs. For example, federal projects subject to review under NEPA could shift focus to considering ecosystem services impacts. Local and state land use decisions could build upon precedent set with mitigation banking under the Clean Water Act.

Immediate action. A governmentwide mandate should issue that requires agencies to consider ecosystem services when engaged in decisionmaking. This could be achieved by reviving the “Incorporating Ecosystem Services Into Federal Decision Making” Memorandum, issued jointly by the Office of Management and Budget, Council on Environmental Quality, and the White House Office of Science and Technology Policy in 2015.¹¹⁸ This Memorandum called on “agencies to develop and institutionalize policies to promote consideration of ecosystem services . . . in planning, investments, and regulatory contexts.”¹¹⁹ To the extent any agencies have made efforts in this direction, these plans should be updated and implemented. While not explicitly requiring no net loss, placing a direct focus on ecosystem services is a necessary step in accurately capturing the value these services provide.

Near-term actions. Policymakers should revise their environment and natural resources management frameworks with a goal of adopting a more holistic approach that prioritizes local ecosystem-level decisionmaking.¹²⁰ This includes enacting federal legislation that requires a no net loss of ecosystem services and encourages local and state-level ecosystem management. The framework would build on the existing approach to wetlands management but would provide expanded application and account for a wider array of natural benefits. Legislation should include provisions for grant funding for research and data collection and for the development of multi-stakeholder consensus-based ecosystem management plans because this information and structures will be critical components of the transition to ecosystem-based management.

Federal agencies should carry out the mandate in the 2015 Ecosystem Services Memorandum, exercise any rulemaking authority they have under existing law and, short of notice-and-comment rulemaking, agencies should consider publishing guidance documents that maximize ecosystem considerations where possible. It is critical to emphasize that this approach could become a major equity concern if mismanaged. Communities must be involved so that the damages and benefits are spread justly across communities and community members. This is especially true when addressing the legacy of discrimination faced by EJ communities and determining what damage is permissible under a no net loss framework. Making these decisions and processes more local provides an opportunity to protect communities from this potential concern.

Federal changes should be bolstered by efforts at the state level, including through revising or adopting state-level NEPA laws. These revisions might include requiring an analysis of how a project will affect ecosystems and ecosystem services in the long term, rather than simply considering relatively immediate project impacts. Any ecosystems analysis should also account for the fact that ecosystems are predicted to change at a rate faster than previously anticipated or experienced as a result of climate change and its impacts. Further, local ecosystem governance structures should be designed to follow ecological boundaries to properly account for a holistic picture of ecosystem services and ensure any incentives are properly aligned.

Long-term action. Widespread recognition of ecosystem-based management and sweeping adoption of policies that implement no net loss principles is needed. This requires larger public perception and behavioral changes, so education is key. One approach is to build on previous efforts to communicate the high value to human well-being of ecosystem services. A complementary strategy to encourage individuals to protect ecosystem services is by providing monetary incentives, through the tax code or elsewhere. This approach has the potential to build on and reinforce the U.S. strong property rights regime. An aspirational goal would be to improve on a policy of no net loss to one of “net gain” in ecosystem services.

Utilize ecological boundaries for governance purposes.

Policymakers at all levels should reform governance structures to complement ecological boundaries, rather than only concerning themselves with political boundaries. Ecologically oriented governance will prioritize the entire ecosystem and more effectively integrate natural systems and environmental media to better ensure impacts are accounted for and degradation is mitigated.¹²¹ That reorganization will necessarily require inter- and intra-governmental cooperation at all levels—federal, state, local, and tribal. Ideally, nongovernmental actors can also be brought into the conversation to leverage their expertise and support. Throughout, these techniques should involve communities and incorporate local perspectives and traditional ecological knowledge.

Immediate action. To better align ecology and governance, key federal agencies should be given the authority to work with multiple levels of government and private entities to negotiate land use plans that protect or enhance ecosystem services. Such authority would be useful, for example, when

endangered species and critical habitat are at issue, or when proposed development activity threatens hydrologic function, providing a protective mechanism through widespread stakeholder engagement. Bringing together all parties with jurisdiction within a given ecological context with federal oversight may enhance cooperation and better respond to ecosystem management challenges.

Near-term action. Provide new and existing regional governance bodies with “pre-authorization compacts” akin to water compacts and regional electricity grid agreements, to address different parts of the same environmental event or phenomenon. Since these agreements have some precedent in the form of current compacts and grid agreements, this solution can be drafted fairly rapidly. The adoption of these compacts, however, will require significant political will. While arguably less comprehensive than ecosystem-level management, compacts may be more feasible and can still help facilitate responsive coordination to environmental impacts.

Long-term action. An aspirational solution in this area includes creating watershed or airshed-based institutions that are given authority over their ecological jurisdiction, not just their political jurisdiction. While creating the institutions and defining responsibilities among partners would require significant negotiation time and widespread political will, the Chesapeake Bay Program demonstrates it can be done.¹²² The Bay Program can provide a starting point for considering watershed-based management more broadly. Further efforts might go beyond a watershed or airshed to include both (where overlaps occur) and be expanded to other aspects of the ecosystem (e.g., wildlife, soil).

Chapter 5: Environmental Justice

The Problem

Environmental injustice is manifest in several dimensions across the landscape of U.S. environmental law and policy, at all levels of governance from local actions to state and federal decisionmaking.

Minority communities/communities of color and low-income communities (environmental justice (EJ) communities) often experience new and increased pollution loadings, siting of undesirable land uses, and lack of access to environmental benefits and amenities. These same communities already bear a substantial health, social, and economic burden from pollution, poorer access to healthy living spaces, effects of poverty, and inadequate access to health care. Even where pollution and practices are similar to those experienced elsewhere, the addition of these burdens to existing health, socioeconomic, and community conditions can have greater cumulative adverse impacts on EJ community residents.

Furthermore, decisions are often made by private entities and governmental institutions without substantial attention to and consultation with these communities. Many lack access to legal and advocacy resources, political power, and the capacity to devote their energies to actions at issue given the other demands on their time and resources. Rules relating to legal standing to bring challenges, private rights of action, and access to administrative processes can impede residents' ability to affect outcomes.

EJ, as a movement, is usually traced to community organizing in Warren County, North Carolina, in 1982 in response to a proposal to locate a hazardous substance disposal facility in a minority community. Later in the decade, research and related community organizing actions first drew national attention to the dimensions of the problem.¹²³

But legal responses were slow in coming.

At the federal level, the framework for EJ has been almost entirely based on Executive Orders and agency memoranda, rather than on enforceable laws and regulations. In 1992, President George H.W. Bush established the Office of Environmental Equity at EPA, the predecessor of the EPA Office of Environmental Justice (OEJ). EJ gained more substantial federal recognition in Executive Order No. 12898, titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," issued by President Clinton in 1994 and still in effect today. This Order directed all federal agencies to promote nondiscrimination in health and environment, and further directed each federal agency to develop public policy approaches to identify and avoid "disproportionately high and adverse impacts" (DHAI) to human health and the environment affecting "low-income and minority" communities.

Current Practice

At the federal level, EJ (expressed primarily in terms of identifying and avoiding DHAI) is based on Executive Order No. 12898. The CEQ, working with the Interagency Working Group on Environmental Justice, developed EJ Guidance in 1997 for the entire federal government to assist agencies in carrying out these responsibilities.¹²⁴ This Guidance document and its appendix explain how to identify minority and low-income communities and how to assess DHAI using the concepts found in NEPA and its regulations. In 2020, however, the CEQ completely rewrote the 1978 NEPA regulations and announced that it expects to withdraw all previous NEPA guidance documents, including the EJ Guidance. The EJ Guidance relies heavily on the long-standing NEPA requirements for federal agencies to evaluate the “cumulative impacts” of their proposed actions on the human environment, including human communities. The newly issued regulations, in contrast, say that agencies will not assess cumulative impacts of their actions, nor any impacts that are not within their jurisdiction to prevent.¹²⁵

There is still no focused and specific federal statutory foundation for EJ. EPA’s Office of General Counsel has identified various provisions in federal law that can be cited by federal agencies when they desire to support an EJ-related decision.¹²⁶ But because these provisions often rely on discretionary action and are piecemeal rather than comprehensive in nature, they have proven an inadequate base of legal authority. OEJ also has developed EJScreen, a mapping and information tool, to assist agency decisionmakers and permit applicants in identifying communities and factors where cumulative adverse impacts may occur. In the absence of legal drivers, however, this kind of tool cannot alone produce substantive change.

Apart from environmental laws, Title VI of the Civil Rights Act of 1964 prohibits recipients of federal financial assistance from discriminating on the basis of race, color, or national origin in their programs or activities.¹²⁷ It has been used as a legal basis for EJ actions by federal agencies with respect to their state or local program grantees. Private parties can also file administrative complaints with federal agencies asking them to use their enforcement authorities under Title VI. However, the Supreme Court has held that private parties do not have the right under Title VI to file suit in court to enforce regulations prohibiting “disparate impacts” on minority communities.¹²⁸

The Court’s decision in this regard has greatly limited Title VI as an impetus for EJ. A number of states have enacted EJ legislation or adopted regulations or policy instruments to give EJ a greater role in decisionmaking. California’s EnviroScreen, for example, enables decisionmakers to identify environmentally burdened communities and create indices used for permitting, enforcement, and funding prioritization.¹²⁹ New York and Virginia have enacted legislation linking climate change decisions and funding to provisions ensuring a greater and more equitable sharing of benefits with EJ communities.

The 2019 Wingspread and Airlie Conference participants, reviewing this foundation, identified the need for a fresh look at the current system. They noted the following trends and concerns with current law and policy.

First, existing law and policy continues to ignore or gloss over the extremity of the issue at its source. Some EJ communities, particularly in the South, began as settlements of former enslaved persons. Still others were the product of segregation practices and policies. Historically, the placement of the undesirable activities or operations of the Industrial Age within these communities, rather than elsewhere, was often quite conscious and intentional. Even where unintentional, power dynamics and economic drivers led to land use decisions that left economically disadvantaged people more likely living in proximity to polluting operations. The injustice of systems that leave EJ communities on the receiving end of greater pollution burdens than society at large is the vexing problem for which EJ seeks redress.

Second, growing economic and social inequality is exacerbating the ongoing challenge of ensuring both procedural access and just outcomes for EJ communities.

Third, the increase in “big data” provides opportunities for more informed understanding, decisionmaking, and accountability. The enhanced understanding of pollution loadings and environmental conditions in EJ communities afforded by big data should help highlight problems and expose accountability lapses. But access to such data may be restricted or information may be rendered inaccessible by proprietary interests, lack of requirements for public disclosure, or lack of technical resources to interpret and use the data.

Fourth, some recent legal trends include declining opportunities for public participation in regulatory and decision processes. These include shortened comment periods, lack of access to underlying information supporting proposals (including lack of access to broadband and computing resources necessary to obtain and review information), and restrictions on standing to participate in or challenge decisions or review rules.

Fifth, at the same time, corporate social responsibility and environment, social, and governance commitments are likely to play increasing roles in this area, given many companies’ interests in social license to operate and desire for predictability and risk reduction. A key challenge in the EJ arena is moving EJ considerations up in the planning process so that they are integrated into build and build-out decisions rather than emerging as retrofit complications after plans are set and construction has begun. Equipped with a clearer roadmap, those companies now inclined toward socially just operations could be a much more meaningful part of the EJ solution.

Conferees also recognized the need for legal processes to be able to focus on obtaining just outcomes and not merely more accessible procedures—especially given cumulative impacts on EJ communities. Current legal structures are not well-constructed toward these ends, except for a handful of very recent state laws looking at distributing the benefits as well as burdens of policies.¹³⁰

The sense of the conferees was that, although EJ is important enough to warrant its own treatment in thinking about future legal development, in order to be effective, it must be thoroughly integrated into all decisionmaking affecting the environment. It cannot simply be an add-on or check-off at the end of a decision process. Rather, it should be built into the decisionmaking systems of environmental law dealing with every type of medium and pollutant. It also needs to be better integrated into land use planning and decisionmaking—the processes that greatly influence what goes where, including where people live. Without meaningful reforms in these areas, we risk repeating the failed approaches of the past that have unjustly distributed pollution burdens and cumulative impacts.

Solutions Re-Imagined

Promote adoption of effective “environmental rights” state constitutional amendments.

While an amendment to the U.S. Constitution to add environmental rights would be a powerful step toward a solution, it is not currently feasible. A minority of states already have such provisions, but only a few of these are self-executing and enforceable by members of the public and communities.¹³¹ EJ may be advanced by promoting adoption of such state constitutional amendments, a process which can run its course in 2-3 years in most states, and which provides an opportunity to channel social change through organizing. In those states that already have hortatory environmental amendments on the books, the approach would seek appropriate further amendment to enhance enforceability. Environmental rights amendments would not only provide a core legal basis for holding state and local governments accountable, but could also bring further definition to “fundamental rights” that, in combination with federal and state “Equal Protection” constitutional provisions, could provide a more solid legal basis for EJ claims and decisionmaking.

This approach would require careful drafting of amendments to ensure that they are self-executing and hence enforceable without the need for additional state legislation. Their impact may be more powerful if the amendments create or recognize a public trust in the natural resources of the state, including clean air, pure water, biological resources, and publicly owned lands and resources, and all the more so if they enshrine a human right to a clean and healthy environment.

Enact federal and state legislation that embodies important EJ procedural and outcome elements.

Such legislation might include:

1. Codification of Executive Order No. 12898 elements (including definition of minority and low-income communities, disproportionately high and adverse impacts, meaningful engagement, and other provisions);
2. Required development and use in decisions of screening tools (such as EJScreen, CalEnviroScreen, and other tools);

3. Requirements for new development in communities overburdened by pollution that offset any projected increases in pollution loadings with reductions in the existing pollution inventory on a 1:1 or net-reduction basis;
4. Mandate certain disclosures of information available to applicants or operators that will enable communities to participate in review processes as well as to take action to protect their health and resources;
5. Provide a private right of action for enforcement of civil rights (Title VI and state provisions).¹³²

With respect to the public disclosure, such legislation could provide for meaningful accessibility to big data and other relevant data, for example:

- Requiring that even proprietary information be made accessible in permitting/public decisionmaking in ways that render it usable by communities;
- Providing funds and technical support mechanisms to assist community access to and use of technical information; this could be coupled with assistance in the use of EJ mapping tools;
- Requiring permit conditions that mandate real-time ongoing disclosure by permittees of operating information needed to protect communities and to allow communities to protect themselves;
- Defining and protecting rights of communities to collect data; and
- Limiting by law the use of nondisclosure agreements in settlements with communities.

At the same time, either legislatively or through litigation, advocates could use the availability of such robust data as the basis for giving further definition to the “duty of care” for companies and governments. Where data are available to decisionmakers, such data must be used to identify and avoid impacts. Specifically, a great deal of information is available on the characteristics of communities’ environmental resources and exposures, public health, demographics, and cumulative impacts. The fact that such data are presumptively accessible to project developers, applicants, and decisionmakers, may facilitate development of standards through case law or legislation that help ensure that these data are used to avoid unnecessary harms and to define liability under tort law, nuisance law, and other legal doctrines.

Remove legal barriers to public participation in decisions affecting EJ communities.

Such reforms may also apply across all types of communities. The focus of reform efforts might include:

1. Ensuring that comment opportunities are offered and are sufficient to ensure meaningful opportunity for participation (including timely access to necessary information and interpretive resources, time to analyze information, and time to respond so as to affect the decision);

2. Definitions that ensure that participants are not limited to adjacent landowners or other definitionally constrained groups for purposes of administrative and judicial review;
3. Ensuring that standing rules/legal doctrines are not unduly limited by definitions of “imminent harm” and also recognize the interests of future generations;
4. Taking climate change impacts and other temporal and physical effects into account; and
5. Recognizing and supporting appropriate uses of citizen science and expressly providing for how it may be used in governmental processes.

Some of these approaches can be advanced by improved federal and state agency management policies and commitments. But these could also be reinforced (or required) by amendments to the Administrative Procedure Act or state equivalents or enactment of EJ legislation.

Citizen science can be integrated more readily into decisions affecting EJ communities where federal and state agencies have previously provided for the use of such information and identified how it may be submitted and to what extent it may be relied upon.¹³³

The environmental bar should increase its diversity and recruitment of people of color, and EJ should be a more central commitment of professionals in the environmental field as a core aspect of their practices.

Promote private governance and corporate commitments and accountability mechanisms for environmental justice.

Companies and groups of companies and organizations can develop best practices and codes of conduct that companies integrate into their decision processes, management systems, and internal and external accountability. Approaches may include commitments to public benefits and avoidance of cumulative harm, community outreach and sharing of information, disclosures, third-party certifications, exploration of good-neighbor agreements, model approaches for managing supply chains to drive EJ values, benchmarking of practices, and more. The private-sector contribution could be catalyzed through data flows that flag environmental problems in EJ communities and affirmatively transfer that information to private-sector leverage points, including supply chain managers, shareholder communities, investment portfolio managers, insurers, and consumers. A system of this kind for pressurizing responsiveness to community problems could prove a powerful complement to traditional government intervention models. The advancement of this approach is also likely to benefit from disclosures related to the commitments and accountability mechanisms. To have credibility and durability, the development of such corporate commitments and accountability mechanisms should include substantial input from EJ communities.¹³⁴

Conclusion

As the country embarks on the second half-century of the modern environmental law era, it is important to recognize both the successes of the past as well as the issues for which environmental law has not been as successful. The Reimagining process was designed to focus on some of the critical issues to ensure that policymakers seriously address remaining problems and inequities. It reflected on the main challenges remaining for environmental law, current regulatory practices and how reimagined changes in the governance, economy, politics, and society could serve to ameliorate these challenges.

Climate change presents many cross-cutting environmental challenges that require the reframing of government and societal actions. This transformation calls for an economywide price on carbon to provide the economic incentives that will aid in the shifts necessary to reach zero emissions. Government policies need to be geared toward decarbonization and providing incentives for innovation and investment toward a carbon-neutral future, while promoting social equity at every stage. Comprehensive and equitable policies, developed with the meaningful involvement of affected and vulnerable communities, are also needed to aid communities in their adaptation and resiliency to climate change.

Water quality improvement efforts in this country have largely plateaued. Much of the continuing impairment to water quality is from nonpoint sources. Recharacterizing these sources as *uncontrolled pollution* is one way to emphasize the importance of dealing with this issue if further gains in water quality are to be realized. Taking a watershed-health-focused system that considers land quality and water quality results instead of focusing permit-by-permit on individual sources and their effluent limits, was agreed by the Wingspread and Airlie House participants as the superior approach. In addition, policymakers should inventory effective regulatory and nonregulatory approaches, construct a database of effective tools, and target these to sectors, watersheds, and problems where they have been effective. Federal and state procurement, and private-sector supply chain management, should give priority to suppliers who engage in effective management of uncontrolled pollution in the supply chain. The reimagined approach contemplates disclosures, certifications, and perhaps pollution controls as conditions to market access and receiving funds.

The issue of material consumption in the United States is particularly challenging, but it has received relatively little attention in U.S. environmental law. Extended producer responsibility, or EPR, at the national level would create a level playing field across the country; a national EPR for electronics waste would, for example, help reduce environmental impacts from these materials. RCRA and/or its regulations could be revised to better reflect the circular economy priority and hierarchy, adding provisions that encourage repairing and refurbishing, support remanufacturing and repurposing, and/or discourage the use of resources in the first instance. Federal procurement rules could be redesigned to favor products and services that are consistent with a circular economy. Model laws that provide for the adoption of a new circular economy waste hierarchy could be developed for

states. Furthermore, a national GHG policy establishing a price for carbon could serve as a good incentive for companies to innovate product design to reduce waste and enable reuse of the materials used.

Policies and laws that emphasize no net loss of ecosystems services are needed at the federal, state, and local levels to ensure these functions are preserved. An immediate action that could be taken is to revive the 2015 “Incorporating Ecosystem Services Into Federal Decision Making” memorandum issued jointly by the Office of Management and Budget, CEQ, and the White House Office of Science and Technology Policy. Policymakers at all levels should reform governance structures to complement ecological boundaries. A governance construct that is ecologically oriented will prioritize entire watersheds or habitat zones and support effective integration of natural systems and environmental media to better ensure impacts are accounted for and degradation is mitigated.

In the United States, communities of color and low-income communities often experience higher pollution loadings, undesirable land uses, and lack of access to environmental benefits and amenities. Currently, the framework for EJ at the federal level has been based largely in Executive Orders and memoranda instead of enforceable laws and regulations. Consequently, federal and state legislation that embodies important EJ procedural and outcome elements is very much needed. Several states have already enacted EJ legislation or adopted regulations or policy instruments to give EJ a greater role in decisionmaking. However, for EJ to be realized, it cannot simply be an add-on or check-off at the end of a decisionmaking process. Rather, EJ must be thoroughly integrated into all decisionmaking affecting the environment. With respect to the private sector, policymakers should support private governance systems that include corporate commitments and accountability mechanisms for EJ.

It is our hope that when our successors look back on environmental law after another 50 years, they will be able to identify significant progress in the areas for reform identified in this report.

Endnotes

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¹⁵The most prominent case argued federal government action has caused climate change, thereby depriving citizens of their constitutional right to a stable climate. *Juliana v. United States*, No. 18-36082 (9th Cir. Jan. 17, 2020) (holding plaintiffs lacked standing to sue); *see also* Jennifer Hijazi, *Appeals Court Halts Historic Kids' Climate Case*, E&E NEWS (Jan. 17, 2020).

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¹⁷John C. Dernbach, *The Dozen Types of Legal Tools in the Deep Decarbonization Toolbox*, 39 ENERGY L.J. 313 (2018).

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¹⁹Gernot Wagner, *The True Price of Carbon*, PROJECT SYNDICATE (Feb. 28, 2020), <https://www.project-syndicate.org/commentary/calculating-true-price-of-carbon-by-gernot-wagner-1-2020-02>.

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²²*Id.*

²³*Id.* at 6.

- ²⁴NATHAN HULTMAN ET AL., *ACCELERATING AMERICA'S PLEDGE: GOING ALL-IN TO BUILD A PROSPEROUS, LOW-CARBON ECONOMY FOR THE UNITED STATES* 3 (Bloomberg Philanthropies eds., 2019).
- ²⁵For example, the green new deal of Los Angeles would allow the city to be carbon neutral by 2050, led by sector goals including zero carbon public transportation by 2030, zero carbon electricity by 2045, and zero carbon buildings by 2050. The city of Los Angeles owns much of the infrastructure and utilities in the city (e.g., water, electricity, sanitation, port, airport, public transit systems) giving the city government broad control to decarbonize.
- ²⁶Sam Ricketts et al., *States Are Laying a Road Map for Climate Leadership*, CTR. FOR AM. PROGRESS (Apr. 30, 2020), <https://www.americanprogress.org/issues/green/reports/2020/04/30/484163/states-laying-road-map-climate-leadership/>.
- ²⁷Hultman, *supra* note 24, at 4.
- ²⁸Louis G. Leonard III, *Under the Radar: A Coherent System of Climate Governance Emerges, Drive by Business*, 50 ELR 10546 (July 2020).
- ²⁹RE100 CLIMATE GROUP, https://www.theclimategroup.org/about_re100 (last visited Oct. 4, 2021).
- ³⁰The World Resources Institute recognizes corporate action, cities' resilience efforts, financial institution changes, technological advances, and civic engagement as contributing to momentum toward Paris targets. Molly Bergen & Helen Mountford, *6 Signs of Progress Since the Adoption of the Paris Agreement*, WORLD RES. INST. (Dec. 8, 2020), <https://www.wri.org/blog/2020/04/5-ways-momentum-climate-action-has-grown-paris-agreement-was-signed>.
- ³¹Mark Roelfsema et al., *Taking Stock of National Climate Policies to Evaluate Implementation of the Paris Agreement*, 11 NATURE COMM'N 2096 (2020).
- ³²THE WHITE HOUSE, *PARIS CLIMATE AGREEMENT* (Jan. 20, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/paris-climate-agreement/>.
- ³³Aggressive abatement goals such as the 80 by 2050 target are referred to as deep decarbonization and are based a goal of limiting global warming to 2°C or less, based on the scientific consensus that higher levels of warming pose an unacceptable risk of dangerous climate change. JAMES H. WILLIAMS ET AL., *POLICY IMPLICATIONS OF DEEP DECARBONIZATION IN THE UNITED STATES* 8 (2015). <https://irp.cdn-website.com/be6d1d56/files/uploaded/2014-technical-report.pdf>.
- ³⁴*Carbon Pricing Dashboard*, THE WORLD BANK, <https://carbonpricingdashboard.worldbank.org/what-carbon-pricing> (last visited Nov 23, 2021).
- ³⁵A Clean Energy Standard (CES) is similar to Renewable Portfolio Standard (RPS), which are popular, but is technology neutral so it will cost less to achieve and/or can have a higher percentage requirement without having a higher cost. CES will also raise electricity prices less than a price on carbon. KATHRYNE CLEARY ET AL., *CLEAN ENERGY STANDARDS 1-2* (2019), https://media.rff.org/documents/CleanEnergy-Issue20Brief_2.pdf.
- ³⁶MICHAEL B. GERRARD & JOHN C. DERNBACH, *ENV'T LAW INST., LEGAL PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES* (2019).
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- ⁴⁴Dernbach, *supra* note 17, at 320.
- ⁴⁵HOUSE SELECT COMM. ON THE CLIMATE CRISIS, *supra* note 43, at 12.
- ⁴⁶*Id.* at 10.
- ⁴⁷ENV'T LAW INST., *supra* note 21.
- ⁴⁸HOUSE SELECT COMM. ON THE CLIMATE CRISIS, *supra* note 43, at 10.
- ⁴⁹33 U.S.C. §§1251 et seq. (2018).

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- ⁵¹See *id.* §1342 (2018).
- ⁵²See Agriculture Improvement Act of 2018 (Farm Bill) Pub. L. No. 115-334, §§2101-2822, 132 Stat. 4491-4492 (2018); see also 33 U.S.C. §1329 (2018) (EPA Nonpoint Source Program).
- ⁵³33 U.S.C. §1313(d) (2018).
- ⁵⁴See *id.*
- ⁵⁵33 U.S.C. §1342(p)(2)(E) (2018); see also *id.* §1342(p)(5), (6) (2018).
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⁹⁵*Id.* at 13.

⁹⁶See WALTER V. REID ET AL., *ECOSYSTEM AND HUMAN WELL-BEING SYNTHESIS: A REPORT OF THE MILLENNIUM ECOSYSTEM ASSESSMENT* (Island Press eds., 2005); INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES), *SUMMARY FOR POLICYMAKERS OF THE GLOBAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES 13-14* (IPBES eds., 2019) [hereinafter IPBES, GLOBAL] (finding a doubling of human population, growing global economy and trade are “together driving up the demand for energy and materials.”).

⁹⁷IPBES, GLOBAL, *supra* note 1, at 15-17 (identifying five main levers that can generate transformative change: incentives and capacity building; cross sectoral cooperation; preemptive action; decision-making in the context of resilience and uncertainty; and environmental law and implementation).

⁹⁸INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES), *THE ASSESSMENT REPORT ON LAND DEGRADATION AND RESTORATION 140-81* (IPBES eds., 2018) [hereinafter IPBES, ASSESSMENT].

⁹⁹*Id.* at 145, 181-93 (describing five indirect drivers, including: demographic; economic; science, knowledge, and technology; institutions and governance; and cultural).

¹⁰⁰IPBES, GLOBAL, *supra* note 1, at 30.

¹⁰¹*Id.* at 13, 16.

¹⁰²*Id.* at 28.

¹⁰³*Id.* at 13 (stating invasive species “have increased by 40% since 1980”).

¹⁰⁴*Id.* at 11, 24 (stating that 25% of plants and animals assessed are threatened with extinction and finding “the global rate of species extinction is already at least tens to hundreds of times higher than the average rate over the past 10 million years and is accelerating”); see also Douglas W. Tallamy et al., *Do Non-Native Plants Contribute to Insect Declines?*, 46 *ECOLOGICAL ENTOMOLOGY* 729 (2020) (finding rapid declines in insect populations are in part the result of threats introduced by non-native species).

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¹¹²Fred P. Bosselman & A.D. Tarlock, *The Influence of Ecological Science on American Law: An Introduction*, 69 CHI.-KENT L. REV. 847 (1994).

¹¹³*See, e.g.*, N.Y. ASSESSMENT PARTNERS, PROGRESS ON THE NEW YORK DECLARATION ON FORESTS: BALANCING FORESTS AND DEVELOPMENT (Nov. 2020),

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¹¹⁴16 U.S.C. §1604(g)(3)(B) (2018).

¹¹⁵*Citizens for Better Forestry v. U.S. Dep't of Agric.*, 481 F. Supp. 2d 1059 (N.D. Cal. 2007) (2005 rule); *Citizens for Better Forestry v. U.S. Dep't of Agric.*, 632 F. Supp. 2d 968 (N.D. Cal. 2009) (2008 rule).

¹¹⁶36 C.F.R. §219.1(c)(2016), *see id.* §219.19. (2016).

¹¹⁷Not all wetlands are covered by this policy. Under the Navigable Waters Protection Rule promulgated by EPA in 2020, only wetlands adjacent to traditionally navigable waters are protected under the Clean Water Act. *See* ENV'T. LAW INST., ENVIRONMENT 2021: WHAT COMES NEXT? 27 (2020).

¹¹⁸EXEC. OFFICE OF THE PRESIDENT, MEMORANDUM FOR EXECUTIVE DEPARTMENTS AND AGENCIES M-16-01, INCORPORATING ECOSYSTEM SERVICES INTO FEDERAL DECISION MAKING (Oct. 7, 2015).

¹¹⁹*Id.*

¹²⁰*See* IPBES, GLOBAL, *supra* note 1, at 44 (promoting techniques "Enabling locally tailored choices about conservation, restoration, sustainable use and development connectivity that account for uncertainty in environmental conditions and scenarios of climate change").

¹²¹*See, e.g., id.* at 41 (advocating "Policy mixes that are harmonized across sectors, levels of governance and jurisdictions [that] can account for ecological and social differences across and beyond the landscape, build on existing forms of knowledge and governance and address trade-offs between tangible and non-tangible benefits in a transparent and equitable manner.").

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¹²³UNITED CHURCH OF CHRIST COMM'N FOR RACIAL J., TOXIC WASTES AND RACE IN THE UNITED STATES (1987), <https://www.nrc.gov/docs/ML1310/ML13109A339.pdf>.

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¹²⁵40 C.F.R. §1508.1(g) (2020). 85 Fed. Reg. 43304 (July 16, 2020) (effective Sept. 14, 2020). EJ analysis under NEPA up until now has expressly required an understanding of both existing and foreseeable impacts that affect a community and its health. COUNCIL ON ENV'T. QUALITY, ENVIRONMENTAL JUSTICE, *supra* note 2 (EJ Guidance):

Agencies should consider relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards . . . Agencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action.

see also FINAL GUIDANCE FOR INCORPORATING ENVIRONMENTAL JUSTICE CONCERNS IN EPA'S NEPA COMPLIANCE ANALYSIS, U.S. ENV'T. PROT. AGENCY (1998), <https://www.epa.gov/nepa/environmental-justice-guidance-national-environmental-policy-act-reviews> ("EPA NEPA analyses must consider the cumulative effects on a community by addressing the full range of consequences of a proposed action as well as other environmental stresses which may be affecting the community.").

¹²⁶U.S. ENV'T PROT. AGENCY, PLAN EJ 2014: LEGAL TOOLS (2011), <https://www.epa.gov/sites/production/files/2016-07/documents/ej-legal-tools.pdf>.

¹²⁷42 U.S.C. §§2000d et seq. (2018).

¹²⁸*Alexander v. Sandoval*, 532 U.S. 275 (2001) (holding there is no implied private right of action for disparate impact; private cause of action only for intentional discrimination).

¹²⁹*CalEnviroScreen*, CALIF. OFFICE OF ENV'T. HEALTH HAZARD ASSESSMENT, <https://oehha.ca.gov/calenviroscreen> (last visited Oct. 5, 2021).

¹³⁰*See, e.g.*, New York's Climate Leadership and Community Protection Act, N.Y. ENV'T CONSERV. LAW §§75-0101 et seq. (2019), adding §§75-0109(4)9j), 75-0017 (directing benefits of climate offset and other benefits to disadvantaged communities).

¹³¹James McElfish, *State Environmental Law and Programs* (ch. 7), in Sheldon M. Novick et al., *LAW OF ENVIRONMENTAL PROTECTION* (Thomson Reuters eds., 2020-2). *See also* James May & William Romanowicz, *Environmental Rights in State Constitutions*, *PRINCIPLES OF CONSTITUTIONAL ENVIRONMENTAL LAW* 305 (2011), <https://ssrn.com/abstract=1932753>.

¹³²In the current U.S. Congress, H.R. 5986, "The Environmental Justice for All Act," would codify many of the institutions that currently rely on the Executive Order. It would, for example, legislatively authorize both NEJAC and IWG. It would require federal agencies to consider cumulative health impacts under the Clean Air Act and Clean Water Act and would provide that permits not be issued unless they can provide reasonable certainty of no harm to human health. The bill would amend the Civil Rights Act to authorize private rights of action to enforce Title VI based on disparate impacts (reversing *Alexander v. Sandoval*). It would create a grant program on health impacts in EJ communities, and provide funding for just energy transitions, among other features.

¹³³*See* Kasantha Moodley & George Wyeth, *Citizen Science Programs at Environmental Agencies: Case Studies*, ENV'T L. INST. (2020), <https://www.eli.org/sites/default/files/eli-pubs/eli-citizen-science-case-study-report.pdf>. *See also* JAMES McELFISH ET AL., ENV'T. L. INST., *CLEARING THE PATH: CITIZEN SCIENCE IN PUBLIC DECISIONMAKING IN THE UNITED STATES* (2016), <https://www.eli.org/research-report/clearing-path-citizen-science-and-public-decision-making-united-states>.

¹³⁴*See* ENV'T. LAW INST., Working Paper on Corporate EJ Strategies (2020) (under review).



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