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Summary of Actionable Criteria for Achieving Equitable, Climate-Resilient Water and Sanitation Laws and Policies

WATER, SANITATION, AND CLIMATE CHANGE IN THE UNITED STATES SERIES, PART 4

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ABOUT CENTER FOR WATER SECURITY AND COOPERATION

The Center for Water Security and Cooperation (CWSC) is a 501(c)(3) nonprofit organization based in Washington, D.C. Founded in 2015, the mission of the CWSC is to advance water security and cultivate cooperation by building a unified body of laws, policies, practices, and standards that ensure the availability of water for current and future generations, and a peaceful, stable, and vibrant global society. Ultimately, the CWSC works to ensure that law and practice guarantee water security and universal access to water and sanitation because without good law those people who have access will lose it, and those who don't, won't ever get it. More information about the CWSC can be found at www.thecwsc.org.

ABOUT THE PACIFIC INSTITUTE

The Pacific Institute envisions a world in which society, the economy, and the environment have the water they need to thrive now and in the future. In pursuit of this vision, the Institute creates and advances solutions to the world's most pressing water challenges, such as unsustainable water management and use; climate change; environmental degradation; food, fiber, and energy production for a growing population; and basic lack of access to fresh water and sanitation. Since 1987, the Pacific Institute has cut across traditional areas of study and actively collaborated with a diverse set of stakeholders, including leading policymakers, scientists, corporate leaders, international organizations such as the United Nations, advocacy groups, and local communities. This interdisciplinary and independent approach helps bring diverse groups together to forge effective real-world solutions. More information about the Institute and our staff, directors, funders, and programs can be found at www.pacinst.org.

ABOUT DIGDEEP

DigDeep is a human rights nonprofit working to ensure every person in the United States has access to clean running water and sanitation at home. We have served thousands of families across the country through our award-winning and community-led field projects: the Navajo Water Project (Arizona, New Mexico, and Utah), the Appalachia Water Project (West Virginia and Kentucky), and the Colonias Water Project (Texas). DigDeep is a leading force in US water access research, workforce development, and policy advocacy, underscoring our commitment to addressing the sector's lack of comprehensive data. Notable national reports, including "Closing the Water Access Gap in the United States: A National Action Plan" and "Draining: The Economic Impact of America's Hidden Water Crisis," unveiled the harsh reality that over 2 million people in the US live without a toilet or tap at home, which costs the American economy a staggering $8.6 billion annually. For more information, please visit digdeep.org.

ABOUT THE AUTHORS

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Alexandra Campbell-Ferrari is the Executive Director and Cofounder of the Center for Water Security and Cooperation. As a water lawyer, Alexandra works to create frameworks for understanding whether our laws create the rights and protections we need to achieve water security and universal access to water and sanitation, to evaluate existing laws against those frameworks, and to work with governmental and nongovernmental stakeholders to write for the first time, rewrite, or enforce water laws. Alexandra also teaches water law at the University of Maryland Carey School of Law and American University Washington College of Law as an adjunct professor. Before starting the Center for Water Security and Cooperation, Alexandra was Fulbright Scholar in Spain researching the implementation of the European Union Water Framework directive in Spain. Alexandra holds a bachelor's degree in political science and Spanish from Bucknell University, and a juris doctor degree from the George Washington University Law School.

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Morgan Shimabuku is a Senior Research Specialist at the Pacific Institute where she researches a wide range of water management issues, including water equity and access challenges, benefits and tradeoffs of water management strategies, water resilience, and more. Prior to joining the Pacific Institute, Morgan was a senior program manager at an environmental nonprofit in Colorado where she ran residential and commercial water conservation program operations in partnership with municipal water providers. Morgan received a bachelor's degree in environmental studies and geology from Whitman College and a master's degree in geography at the University of Colorado Boulder, where she studied climate change, hydrochemical cycling, and snow hydrology at the Institute of Arctic and Alpine Research.

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Shannon McNeeley is Associate Director, Water and Climate Equity at the Pacific Institute. Her work focuses on water and climate equity and justice for frontline communities. This engages an interdisciplinary and cross-cultural co-production approach, incorporating the social and natural sciences along with different ways of knowing to understand human-environment relationships and how people are impacted by and respond to environmental change. Her research has focused on climate change science and policy, water resources and drought preparedness, and climate planning and action, all with a strong focus on supporting those who are overburdened and underresourced through just and equitable solutions. Dr. McNeeley has worked closely for decades with a multitude of different partners, organizations, decision makers, Tribes and Indigenous peoples, and frontline communities bridging technical research with applied decision support information and tools. Prior to joining the Pacific Institute, she was at the North Central Climate Adaptation Science Center at Colorado State University and before that at the National Center for Atmospheric Research. Dr. McNeeley holds a master's degree in international environmental policy from the Middlebury Institute of International Studies at Monterey and a doctoral degree in environmental change and sustainability science, which integrated anthropology, ecology, and climatology, from the University of Alaska Fairbanks.

Luke Wilson

Luke Wilson is co-founder and Deputy Director of CWSC where he specializes in transboundary water issues and international law including human rights and international criminal law. Professor Wilson also teaches international law at the George Washington University Elliott School of International Affairs. Professor Wilson has worked with The World Bank, The American Bar Association and the US Government in various capacities, with a focus on law systems, dispute resolution, and enforcement issues. Additionally, Professor Wilson was the co-chair of the American Bar Association's International Human Rights Committee, leading one of the Association's largest committees and advancing policy proposals on behalf of the membership, and also served as a law clerk to judges of the International Court of Justice in The Hague. Professor Wilson has been an invited speaker at the Council on Foreign Relations, the American Bar Association, and Bowdoin College, among others, and is a member of international task forces focused on global water affordability and on sanitation policy. Professor Wilson is also a tenor with The Washington Chorus and has performed with the National Symphony Orchestra and the Philip Glass Ensemble. integrative conservation and geography from the University of Georgia.

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DEDICATION

This report is dedicated to the communities that experience the most immediate and severe impacts of climate change, particularly those that are underserved by current laws and policies.

Water is life.

Summary

This fourth report in the *Water, Sanitation, and Climate Change in the United States* series examines the essential legal and policy attributes needed to protect frontline communities from climate-driven disruptions to water and sanitation infrastructure and services. Climate change is intensifying droughts, floods, wildfires, extreme storms, and sea level rise, which threaten infrastructure, degrade water quality, and create lasting service gaps — impacts that fall disproportionately on frontline communities. While laws at federal, Tribal, state, and local levels could enable equitable, climate-resilient access to water and sanitation services, they often fail to account for these risks, leaving water and wastewater systems and the people they serve underprepared.

Building on earlier reports that reviewed climate impacts, analyzed existing laws, and outlined resilience strategies, this report focuses on identifying actionable legal attributes and criteria that enable equitable, climate-resilient water and sanitation. Attributes include climate-conscious siting and design standards, legal protections for household water use during climate disruptions, climate resilience planning requirements, robust systems for data collection and monitoring, equitable funding distribution, and enforceable compliance mechanisms.

For each attribute, the report outlines several criteria for determining whether it is adequately addressed within the law. Examples of laws from all levels of government and a diverse set of geographies help to illustrate where the laws and policies succeed or fall short.

While laws at federal, Tribal, state, and local levels could enable equitable, climate-resilient access to water and sanitation services, they often fail to account for these risks, leaving water and wastewater systems and the people they serve underprepared.

The attributes and criteria presented are intended as practical decision-support information and tools for frontline communities, policymakers, utilities, and advocates to assess and improve their own legal frameworks. By providing real-world examples and criteria, the report demonstrates how existing legal provisions can be adapted or newly drafted to ensure that water and sanitation infrastructure and services can withstand and recover from climate impacts. While not exhaustive, the findings offer a foundation for developing laws that prioritize equity, climate resilience, and the right to safe, reliable water and sanitation in the face of a changing climate.

This is a report focused on what is possible. Some critics, including some of our reviewers, will say some of these measures are too difficult, expensive, or improbable, especially in the context of extant political polarization and gridlock. To that we say that anything is possible with the right ideas, leadership, and organizing and advocacy behind it. Breakthroughs often begin as impossibilities — until someone with vision chooses to fight for them. Almost nothing worth achieving has ever come easily.

Here we summarize the key strategies and approaches for adapting and drafting laws and policies for equitable, climate-resilient water and sanitation, organized by the six attributes and associated criteria. These criteria are numbered here based on the section in which they appear.

SITING, DESIGN, AND CONSTRUCTION REQUIREMENTS ADDRESS CLIMATE CHANGE

Achieving equitable, climate-resilient water and sanitation for frontline communities in the US will require updating and adding new federal, Tribal, state, and local laws to address requirements and standards for water and wastewater system siting, design, and construction that explicitly incorporate the impacts of climate change. Three criteria that communities and their supporters can use to evaluate whether the laws they have are sufficient, and some strategies and approaches for updating and adopting better laws, include:

Achieving equitable, climate-resilient water and sanitation for frontline communities in the US will require updating and adding new federal, Tribal, state, and local laws to address requirements and standards for water and wastewater system siting, design, and construction that explicitly incorporate the impacts of climate change.

Criterion 3.1: Codes and standards require water and sanitation structures and equipment to be elevated and/or protected from flooding, wildfire, and other climate change disasters.

- State and local laws can require that building codes use the best available science to account for the impacts of climate change on climate risks.
- State and local governments can adopt standards that are more stringent than those currently offered by federal agencies.
- State or local laws governing the post-disaster rehabilitation or rebuilding of water and wastewater infrastructure can incorporate future climate risks.

Criterion 3.2: State law requires drinking water utilities to have adequate storage capacity or be physically connected to at least one backup or alternative source of water supplies.

- State laws can be created to enable interties (physical, piped connections) with neighboring water utilities or update existing laws that may inhibit interties.
- State laws can create incentives or guidance for water utilities to have more than one water source or sufficient backup storage.
- States can create policies that require augmentation plans.
- States can facilitate water availability for domestic supplies during droughts by authorizing rainwater harvesting for domestic use or allowing temporary reallocation of water rights.

Criterion 3.3: Water efficiency is incorporated into building codes for new construction and retrofits.

- States and local jurisdictions can adopt laws that require building and plumbing codes to incorporate higher water efficiency standards than exist at the federal level into new construction.
- State or local laws can require inefficient fixtures or appliances to be replaced upon sale or change of ownership of a property.
- State or local laws can ban nonfunctional turf or set requirements for installing water-efficient landscapes and irrigation systems in new and retrofitted properties.

WATER USES ARE LEGALLY PROTECTED IN FRONTLINE COMMUNITIES DURING CLIMATE DISRUPTIONS

Water governance varies by state and can involve laws from federal, Tribal, state, and local jurisdictions. Therefore, there are no universal approaches to incorporating climate change into laws related to water rights, allocations, and use. The ultimate goal of addressing these gaps in water laws is to create the enabling environment to achieve the human right to water and sanitation, even as climate change makes it more difficult. Four criteria for evaluating if laws have integrated climate change to help water systems manage their resources and protect water and sanitation access in times of water scarcity and drought, and some strategies and approaches for updating and adopting better laws include:

Criterion 4.1: Water laws allow for flexibility in the allocation of water during times of water scarcity.

- State or regional water managers can be given the ability to temporarily alter water allocations and priorities to ensure water remains available for drinking and sanitation during times of drought and scarcity.
- States can define and regulate wasteful or unreasonable uses of water, particularly during times of drought or scarcity.
- States can make water use permits time-limited so that permit holders must periodically renew their license, during which the water management agency can re-evaluate the water use in the context of changes in the hydrologic system, ideally including the most up-to-date projections of climate change.
- States can add flexibility and allow for the redistribution of water use allocations during drought by creating laws that allow for water shortage sharing agreements.

Criterion 4.2: The law protects and prioritizes household water use during times of water scarcity.

- States can make laws that prioritize water for household purposes by prioritizing municipal water use, even if the municipal use has more junior rights than other uses.
- Laws can create the ability for state or regional water managers to temporarily give preference to water rights for human consumption during officially declared droughts.
- States can adopt water laws to support rainwater harvesting for domestic use that do not require water rights.
- States can adapt laws to allow for temporary transfers of water rights to domestic or municipal users during times of drought.
- States can make laws that protect household water use by having more relaxed water permitting requirements for domestic use relative to other forms of use.

Criterion 4.3: The law explicitly requires the impacts of climate change to be considered when administering water rights.

- States can adopt laws that require climate change to be one of the factors considered when renewing or issuing a new water right or water use permit.

Criterion 4.4: Federal, state, and local laws recognize the human right to water and sanitation.

- The federal government can amend the US Constitution and/or codify the human rights to water and sanitation in federal law.
- States can codify the human right to water and sanitation through state constitutional amendments or state legislation.
- Local governments can enact laws or adopt amendments to municipal charters that recognize the human right to water and sanitation**.**
- Resolutions that direct programs, funding, and other resources to communities in need can support the realization of the human right to water and sanitation, especially as climate change threatens the reliability of drinking water and wastewater infrastructure and drinking water sources.

CLIMATE RESILIENCE IS REQUIRED IN PLANNING

Incorporating climate resilience into planning efforts can help to better prepare frontline communities, including their water and sanitation, for climate change impacts. To do this, laws can require state and local governments and utilities to assess and plan for climate change impacts on water and wastewater infrastructure and services. Here we summarize the two criteria that communities or policymakers can use to evaluate whether there are laws that require climate planning to prepare water and wastewater infrastructure and services for increasing risks from climate change, including a summary of examples of existing laws.

Laws can require state and local governments and utilities to assess and plan for climate change impacts on water and wastewater infrastructure and services.

Criterion 5.1: The law requires water and wastewater utilities or government agencies to conduct climate risk and vulnerability assessments, including mapping of critical infrastructure and service areas.

- Federal laws can require states and Tribes to create and submit hazard mitigation plans and integrate climate considerations into related hazard mitigation assistance programs.
- Federal laws can require water utilities serving more than 3,300 people to conduct risk and resilience assessments (RRAs) that evaluate the risk of different (climate) hazards on water utility infrastructure and operations and maintenance.
- State and local laws can require local-level risk and resilience assessments.
- Laws can require climate vulnerability assessments to include mapping of drinking water and wastewater infrastructure.

Criterion 5.2: The law requires states and water and wastewater utilities to adopt climate adaptation and emergency response plans to protect water and wastewater infrastructure and services.

- Federal laws can require water utilities serving more than 3,300 people to develop an emergency response plan. America's Water Infrastructure Act (AWIA) requires that the plan include both emergency measures and measures that proactively reduce the impacts of floods and droughts and other natural hazards on the ability of the utility to provide drinking water.
- State laws can require or encourage state agencies and local governments to conduct climate adaptation assessments and create climate adaptation plans. In California, state law requires city or county governments to adopt a general plan that addresses climate change impacts to critical infrastructure, like water and sanitation.
- State laws can encourage or require utilities to implement climate adaptation strategies, such as water conservation. In California for example, state law required urban water suppliers to develop urban water use targets that resulted in a 20% reduction in water use by 2020 compared to baseline daily per capita water use.
- States can pass laws that create state-level positions, offices, or taskforces dedicated to coordinating climate adaptation and emergency response activities.

WATER AND CLIMATE DATA COLLECTION, MONITORING, AND REPORTING ARE REQUIRED

The law can require that data and information are collected and monitored and that the public has opportunities to weigh into decision making. Laws requiring timely public notices help the public and decision makers stay informed during emergent events, like flooding, that can lead to drinking water contamination and/or sewer overflows. There are also laws in some states and at the federal level that require deeper assessments of different climate phenomena, creating opportunities for the public and decision makers to be informed on the expected impacts of climate change. However, mis- and disinformation are increasingly a challenge for accurate climate change information and may require new laws.

Information and engagement enable transparency, accountability, and responsiveness to challenges faced by water and wastewater utilities in providing safe and reliable services. The law can support engagement by requiring that data and information be published in a publicly accessible manner. Laws can also mandate opportunities for public input, such as through public comment periods. These create opportunities for the public to raise concerns about climate change. However, barriers to equitable public engagement remain, especially for marginalized groups, inhibiting equal opportunity for input and integration of input from all. Some laws support equitable integration of different knowledge systems, such as through the inclusion of Indigenous consultation processes, for example, but more work is needed to expand these types of legal provisions.

Here we summarize two criteria that communities and their supporters can use to evaluate whether the laws they have are sufficient for equitable, climate-resilient monitoring, data, and information on water and sanitation infrastructure and services, and some strategies and approaches for updating and adopting better laws:

Criterion 6.1: The law requires the collection and reporting to the public of relevant, credible climate and water data and information.

- Laws can require information to be provided to the public about the quality of drinking water and wastewater services and their compliance with health-based standards. These reports, however, rarely include information on how climate change is affecting service delivery, which makes it more challenging to plan for and respond to those impacts.
- Federal laws can create opportunities for oversight of critical functions of water and wastewater infrastructure and services that are susceptible to climate impacts, as have been done in the Safe Drinking Water Act (SDWA) and Clean Water Act (CWA).
- Laws can require public notices of higher risk drinking water and wastewater violations so that the public can take measures to protect themselves.
- Laws can require studies and assessments to be conducted through which data and information are collected and evaluated to inform recommendations for future action related to climate risks.

Criterion 6.2: The law facilitates the participation and engagement of the public in decision making about water-related climate adaptations.

- The law can require publication of data and information related to climate risks to water or wastewater infrastructure or services online to facilitate public access to the information.
- The law can require administrative agencies to offer the public the opportunity to provide feedback on draft regulations and guidance they issue. Diverse types of public engagement, including written comments and listening sessions, may ensure that more members of the public can provide feedback.
- The law can mandate consultation processes with historically marginalized groups such as Tribal Nations. For example, the US Global Change Research Act (1990) mandated an Indigenous consultation process as part of the National Climate Assessment.

LAWS GOVERN EQUITABLE DISTRIBUTION OF CLIMATE-RESILIENT INFRASTRUCTURE FUNDING

Laws help fund drinking water and wastewater infrastructure projects and rehabilitation efforts. Laws direct government funding to water and wastewater infrastructure as well as provide certain guidelines for how and on what the funding can be spent. Beyond appropriating greater funding to support the rehabilitation of water and wastewater infrastructure, laws could provide greater direction on how the funding should be used to ensure more funding is dedicated to enabling water and wastewater utilities to prepare for climate change impacts. By ensuring that investment in infrastructure considers climate change impacts, investments go further and have a long-term impact.

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Here we summarize three criteria that communities and their supporters can use to evaluate whether the laws they have are sufficient, and some strategies and approaches for updating and adopting better laws:

Criterion 7.1: Laws appropriate funding and create loan programs to enable climate-resilient access to water and wastewater services and to create and extend water and wastewater infrastructure to communities that currently lack access.

- Federal lawmakers can pass laws, such as America's Water Infrastructure Act of 2018, the CWA, and the SDWA, to create funding mechanisms and appropriate funding for specific types of projects that help water and wastewater utilities to provide safer, more resilient services.
- Federal and state legislatures can appropriate funding or provide supplemental funding for climate-resilient water and sanitation using laws.
- Federal lawmakers can create mechanisms that make climate disaster funding easier to access, such as by appropriating disaster relief through State Revolving Funds (SRFs).
- Lawmakers and government agencies can create laws and policies to more equitably distribute climate resilience funding.
- SRF intended use plans (IUPs) can prioritize funding for improving the climate resilience of water and wastewater infrastructure.
- State laws can authorize state governments to issue bonds to fund projects that help water and wastewater systems adapt to climate change.
- Laws can include provisions to prioritize funding for frontline communities. For example, the Texas Flood Infrastructure Fund was adopted through laws that specifically require prioritization of funds for low-income communities.

Criterion 7.2: Laws create economic incentives to consider the water and climate risks of new development and ensure proactive rehabilitation and responsible redevelopment in flood-prone areas.

- Federal and state lawmakers can pass laws that restrict the use of government funding from supporting development in certain flood-prone areas. For example, the Coastal Barrier Resources Act of 1982 restricted the use of Federal funding in coastal barriers.
- Federal lawmakers can encourage state and county governments to adopt more climate-resilient land-use practices by making federal flood insurance contingent on implementing and enforcing these practices.

- Federal law can incentivize states and Tribes to take proactive steps to improve disaster readiness and resilience by offering a higher share of assistance for these types of activities, as has been done under the Stafford Act.
- Laws can authorize funding to buy properties from people who choose to move after repeated climate disasters.

Criterion 7.3: Laws can mandate the tracking and reporting of climate disaster relief funding.

- Federal law can require governments to track funding obligations and expenditures to provide greater transparency on disaster assistance and preparedness.
- Laws can require nonfunding agencies, like the Government Accountability Office, to review and report on government funding expenditures.

LAWS TO MINIMIZE CLIMATE DISRUPTIONS ARE ENFORCEABLE AND ENFORCED

The law not only establishes the rules that must be followed, but the terms of enforcement and permitted actions. Enforcement of the rules is critical to ensuring that the law is followed. It puts the rules into practice, creating consequences if and when the laws are violated. The EPA and states have discretion in determining which enforcement actions they want to bring, depending on a variety of factors. Some states allow citizens to enforce the law as a backstop to the government. Having effective penalties and consequences increases the likelihood that people will stay in compliance with the law, including taking steps to anticipate how climate change threatens their compliance.

Here we summarize five criteria that communities and their supporters can use to evaluate whether the water laws are both enforceable and enforced, and some strategies and approaches for improved enforcement:

Criterion 8.1: The law establishes consequences for noncompliance with drinking water and wastewater standards that protect public health, water quality, and the environment and considers the equity and fairness of those consequences.

- Laws can establish penalties for noncompliance with regulations and determine who is responsible for enforcing specific regulations.
- Enforcement action settlement can require that utilities that fail to comply with regulations make specific updates to their systems on a certain timeline.
- The SDWA allows for water systems that are struggling to comply to explore consolidation or regionalization to address water quality issues.
- Monetary fines as consequences can create an additional burden on less well-resourced communities and their ability to come into compliance. Alternative penalties — like Supplemental Environmental Projects — can better support compliance.

Criterion 8.2: The law establishes enforcement tools that sufficiently deter behaviors that violate the law and increase the risks of climate disruptions to water and wastewater service.

- Federal laws can set priorities for how agencies determine enforcement penalties. For example, the EPA's General Enforcement Policy (1984) identifies three enforcement priorities that guide the agency in setting penalties for EPA regulations.
- Laws can set the maximum fine allowed but allow the courts to decide the level of penalty under that maximum. For example, the CWA identifies factors for the court to consider when calculating penalties under the law.
- States may adopt different maximum financial penalties for noncompliance with the CWA and SDWA, creating different incentives across the US for complying with the same laws.
- Government agencies can set policy that directs enforcement departments to incorporate climate change into their enforcement efforts. For example, EPA policy provided guidance to its enforcement arm to consider climate change in its efforts to bring violators into compliance with the SDWA and CWA.

Criterion 8.3: Enforcement actions are taken by governmental bodies responsible for implementing and enforcing the law.

- State and federal enforcement agencies can choose to enforce existing laws. While compliance with the law is mandatory, enforcement is discretionary.

Criterion 8.4: The law creates opportunities for the public to enforce implementation of and compliance with the law.

- Because federal laws allow it, citizens can bring lawsuits to enforce the CWA and SDWA against the government and other actors.
- State laws can allow citizens to bring lawsuits to enforce environmental laws. Citizen suit provisions are particularly important in states that have broader waterbody protections than covered by a post-Sackett Clean Water Act.

Criterion 8.5: Permits explicitly anticipate and address climate change impacts and do not undermine compliance and environmental protection.

- EPA Regions can issue National Pollution Discharge Elimination System (NPDES) permits to wastewater utilities that require the utilities to develop climate adaptation plans as part of the permitting process. EPA Region 1 issued three permits with this requirement in 2023.

CONCLUSION

The analysis in this report confirms a simple but powerful truth: without an explicit, enforceable legal foundation, the US will struggle to deliver safe, reliable water and sanitation to every community as the climate warms and extremes intensify. We reviewed hundreds of federal, state, and local statutes and distilled them into six core attributes — siting, design, and construction requirements; legal protections for household water use during climate disruptions; climate-resilience planning; monitoring, data collection and reporting; equitable funding; and enforcement — that together define an enabling environment for equitable, climate-resilient water and sanitation infrastructure and services. We identified 64 legal strategies that can be used to operationalize each attribute, demonstrating that workable language already exists in some jurisdictions and can be adapted elsewhere.

We reviewed hundreds of federal, state, and local statutes and distilled them into six core attributes that together define an enabling environment for equitable, climate-resilient water and sanitation infrastructure and services.

The 19 actionable criteria catalogued herein should not be construed as a uniform model code, but rather as a diagnostic checklist. Policymakers may employ it to benchmark existing statutes; regulators can integrate the criteria into guidance and permitting; utilities may use it to align capital plans; and communities and their supporters can use the criteria to drive change and improve the climate resilience of their water and sanitation systems.

Our review also identified three areas where there remain critical gaps in developing laws and policies that support equitable, climate-resilient water and sanitation.

- **Decentralized and onsite systems.** While most US households are served by centralized water and wastewater systems, millions who rely on decentralized and onsite systems are typically less protected legally from climate impacts.
- **Integration of climate science.** Many statutes still rely on historic understanding of climate patterns, and methods for regularly updating design storms (i.e., the intensity and/or frequency of a storm event to which infrastructure systems are designed to withstand), flood maps, and water rights require new laws and policies at all levels of government.
- **Effectiveness of enforcement.** New quantitative studies linking specific enforcement tools to improved climate outcomes for water systems are needed.

Addressing these gaps will require collaboration among legal scholars, policymakers, water resource managers, scientists, utilities, Tribal governments, and community organizers.

Water is life, and the obligation to secure it for current and future generations is, at its root, a matter of justice. Climate change is already testing the physical limits of the US's water and sanitation infrastructure along with the limits of the legal and policy frameworks that guide this infrastructure and services it provides. The attributes set forth in this report demonstrate that the law — when well-crafted, resourced, and enforced — can help create more equitable, climate-resilient water and sanitation for frontline communities.

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