

ELR®

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ENVIRONMENTAL LAW & POLICY ANNUAL REVIEW

ARTICLES & COMMENTS

Analysis of Environmental Law Scholarship 2024-2025, Autumn E. Barfield, Linda K. Breggin, Rena M. Childers, and Michael P. Vandenbergh

Unwritten Administrative Law and the Regulatory Last Mile, Anthony B. Derron

Responses by Susan Parker Bodine, Amanda Garcia, and Reid Wilson

Indoor Air: The Forgotten Frontier of Environmental Law, Albert C. Lin

Responses by Elizabeth Beardsley, Laurence S. Kirsch, Emily Porcari, and Michelle E. Thompson

The Water District and the State, Dave Owen

Responses by Noa Bruhis, James Eklund, and J.D. Strong

The Cleanest Water and the Dumbest Kids, James Salzman and Ana Mackay Peltzer

HONORABLE MENTIONS

Overcoming Unreasonably Burdensome Restrictions on the Use of Farmland for Solar Generation, Matthew Eisenson

Spinning Off Carbon: Corporate Restructuring in a Climate Bankrupt World, Tracy D. Hester

State Trust Land Revenue Diversification Through Conservation, Temple Stoellinger, Travis Brammer, Bryan Leonard, Shawn Regan, and Jonathan Wood

A special edition of ***ELR*** in collaboration with VANDERBILT UNIVERSITY

The Environmental Law Institute's Law & Policy Journal

The **Environmental Law Institute®** makes law work for people, places, and the planet.

For more than half a century, the Institute has played a pivotal role in shaping the field of environmental law, domestically and abroad. Today, ELI is recognized worldwide as an independent research, publishing, and education center known for designing fair, creative, and sustainable approaches to implementation of law from the local level on up to international regimes.

ELI strengthens environmental protection by improving law and governance. The Institute delivers timely, insightful, impartial analyses to decisionmakers and opinion leaders, including government officials, environmental and business leaders, academics, members of the environmental bar, and journalists. ELI is a clearinghouse and a town hall, providing common ground for debate on important environmental issues.

The Institute is governed by a board of directors who represent a balanced mix of leaders within the environmental profession. Support for the Institute comes from individuals, foundations, governments, corporations, law firms, and other sources.

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About ELR® . . .

The Environmental Law Reporter® has three components:

- ***ELR—The Environmental Law Reporter***: Our highly-respected journal provides members with insightful articles* relevant to both legal practice and policy on today's most pressing environmental topics. The journal is available in print and online.
- ***Updates in Brief:*** ELI members receive via e-mail expert summaries three times a month on the latest court cases, federal and state agency developments, and federal legislative news.
- ***ELR online:*** A one-stop environmental law and policy research site, *ELR*'s website provides members access to our entire collection dating back to 1970. Visit www.elr.info.

Submissions . . .

ELR invites readers to submit articles and comments, which are shorter features, for publication. Manuscripts may be on any subject of environmental, sustainability, natural resources, energy, toxic tort, or land use law or policy. Citations should conform to *A Uniform System of Citation* (the "Bluebook"). Manuscripts should be submitted by e-mail attachment to austin@eli.org. We prefer that the file be in Microsoft Word® format.

*Opinions are those of the authors and not necessarily those of the Environmental Law Institute or of funding organizations.

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CONTENTS

COMMENT

Analysis of Environmental Law Scholarship 2024-2025
by Autumn E. Barfield, Linda K. Breggin, Rena M. Childers, and Michael P. Vandenbergh 5

ARTICLES AND COMMENTS

Unwritten Administrative Law and the Regulatory Last Mile
by Anthony B. Derron. 11

Does the Regulatory Last Mile Undermine Cooperative Federalism?
by Susan Parker Bodine 18

Roadblocks to Community Advocacy Along the Last Mile
by Amanda Garcia 21

North Carolina's Predictable Last Regulatory Mile
by Reid Wilson. 23

Indoor Air: The Forgotten Frontier of Environmental Law
by Albert C. Lin 26

The Role of Private Standards in Advancing Indoor Air Quality
by Elizabeth Beardsley 33

The Uncharted Legal Frontier of Indoor Air Quality
by Laurence S. Kirsch 35

Technical Standards for Indoor Air Quality in State Laws and Regulations
by Emily Porcari 37

The Next Frontier: Ensuring Safe Indoor Air for All
by Michelle E. Thompson 39

The Water District and the State
by Dave Owen 42

Equity and Governance
by Noa Bruhis 47

A Real-World Perspective on Western Water Governance
by James Eklund. 49

Western Water Governance: State Primacy Without State Takeover
by J.D. Strong 51

The Cleanest Water and the Dumbest Kids: Do Small Water Systems Comply With the Safe Drinking Water Act?
by James Salzman and Ana Mackay Peltzer. 53

HONORABLE MENTIONS

Overcoming Unreasonably Burdensome Restrictions on the Use of Farmland for Solar Generation
by Matthew Eisenson 60

Spinning Off Carbon: Corporate Restructuring in a Climate Bankrupt World
by Tracy D. Hester 61

State Trust Land Revenue Diversification Through Conservation
by Temple Stoellinger, Travis Brammer, Bryan Leonard, Shawn Regan, and Jonathan Wood 62

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ENVIRONMENTAL LAW AND POLICY ANNUAL REVIEW

Dear Readers:

The *Environmental Law and Policy Annual Review* (ELPAR) is published by the Environmental Law Institute and its *Environmental Law Reporter* (*ELR*) in partnership with Vanderbilt University Law School. For 18 years, ELPAR has provided a forum for presentation and discussion of the best environmental law and policy-relevant ideas from the legal academic literature. Published annually as a special issue of *ELR*, ELPAR is designed to fill the same important niche by helping to bridge the gap between academic scholarship and environmental policymaking.

ELI and Vanderbilt formed ELPAR to accomplish three principal goals. The first is to provide a vehicle for moving ideas from the academy to the policymaking realm. Academicians in the environmental law and policy arena generate hundreds of articles each year, many of which are written in a dense, footnote-heavy style that is inaccessible to policymakers with time constraints. ELPAR selects the leading examples from this large pool of articles and makes their ideas digestible by reprinting them in a short, readable form accompanied by expert, balanced commentary.

The second goal is to improve the quality of legal scholarship. Professors have strong institutional incentives to write theoretical work that ignores policy implications. ELPAR seeks to shift these incentives by recognizing scholars who write articles that not only advance legal theory, but also offer concrete law and policy proposals. By doing so, ELPAR seeks to induce them not only to generate new policy ideas, but also to improve theoretical scholarship by asking them to account for the hard choices and constraints faced by policymakers.

The third and most important goal is to provide a first-rate educational experience to the Vanderbilt Law School students who enroll in the two-year ELPAR class through a competitive process and help screen, analyze, and select the articles for recognition each year.

To select candidate articles, the ELPAR Editorial Board and Staff conducted a keyword search for "environment!" in an electronic database. The search was limited to articles published from August 1, 2024, through July 31, 2025, in the law reviews from the top 100 *U.S. News and World Report*-ranked law schools and the "environmental and land use law" and "energy and natural resources law" journals ranked by the Washington & Lee University School of Law. Journals that are solely published online were searched separately and must offer free access. Student scholarship, in most cases, and nonsubstantive content were excluded.

The Vanderbilt students then screened articles for consistency with the ELPAR selection criteria. They included only articles that met the threshold criteria of addressing an issue of environmental quality and offering a law or policy-relevant solution. Next, they considered the articles' feasibility, impact, creativity, and persuasiveness. Through discussion and consultation, the students ultimately chose 11 articles for review by ELPAR's Advisory Committee members, who provided invaluable insights on topics and article selection. Vanderbilt University Law School Prof. Michael Vandenbergh, ELI Senior Attorney Linda Breggin, and *ELR* Editor-in-Chief Jay Austin also assisted in the final selection process.

This year, four articles were selected, and three received honorable mentions. On March 27, ELI and Vanderbilt cosponsored a hybrid conference in Washington, where authors of the articles presented their ideas to an audience of business, government (federal, state, and local), think-tank, and nonprofit participants, while practicing experts from the private and public sectors provided comments. The articles featured there were *Unwritten Administrative Law and the Regulatory Last Mile*; *Indoor Air: The Forgotten Frontier of Environmental Law*; and *The Water District and the State*. The conference was structured to encourage dialogue among presenters and attendees. In addition, on February 2, ELI and Vanderbilt cosponsored a webinar featuring the article *Do Small Water Systems Comply With the Safe Drinking Water Act?*.

The students worked with the authors to shorten the original articles and to highlight the policy proposals presented, as well as to edit transcripts of the expert commentary delivered at the conference. These edited articles and comments are published here as the 2026 ELPAR, a special issue of *ELR*. Also included is a comment analyzing the year in environmental legal scholarship, which is based on data collected through the ELPAR review process. We are once again pleased to present the results of this year's efforts.

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COMMENT

ANALYSIS OF ENVIRONMENTAL LAW SCHOLARSHIP 2024-2025

by Autumn E. Barfield, Linda K. Breggin, Rena M. Childers, and Michael P. Vandenbergh

Autumn E. Barfield is a recent graduate of Vanderbilt University Law School. Linda K. Breggin is a Senior Attorney with the Environmental Law Institute and a Lecturer in Law at Vanderbilt University Law School. Rena M. Childers is a recent graduate of Vanderbilt University Law School. Michael P. Vandenbergh is the David Daniels Allen Distinguished Chair in Law, Co-Director of the Energy, Environment, and Land Use Program, and Director of the Climate Change Research Network at Vanderbilt University Law School.

The Environmental Law and Policy Annual Review (ELPAR) is published by the Environmental Law Institute's (ELI's) *Environmental Law Reporter* in partnership with Vanderbilt University Law School. ELPAR provides a forum for the presentation and discussion of some of the most creative and feasible environmental law and policy proposals from the legal academic literature each year. The articles that are considered include all environmental law articles published in select law journals during the previous academic year.[1] The law journal articles that are republished and discussed are selected by Vanderbilt University Law School students with input from their course instructors and an outside advisory committee of experts.

The purpose of this Comment is to highlight the results of the ELPAR article selection process and to report on the environmental legal scholarship for the 2024-2025 academic year, including the number of environmental law articles published in general law reviews versus environment-focused law journals and the topics covered in these articles. We also present the top 11 articles that meet ELPAR's criteria of persuasiveness, impact, feasibility, and creativity. From the top 11 articles, we selected four articles to be republished in shortened form in this issue, including some with commentaries from leading practitioners and policymakers. This Comment provides an empirical snapshot of the environmental legal literature during the past academic year and provides information on the top articles chosen by ELPAR.

I. Methodology

A detailed description of ELPAR's methodology is posted on the ELI website.[2] In brief, the initial search for scholarship that qualifies for ELPAR review is limited to articles published from August 1 of the prior year to July 31 of the current year, roughly corresponding to the academic year. The search is conducted in general law reviews from the top 100 law schools, as ranked by *U.S. News and World Report* in its most recent report, counting only articles from the first 100 schools ranked for data purposes. Additionally, journals listed in the "Environment and Land Use Law" and "Energy and Natural Resources Law" subject areas of the most recent journal rankings compiled by Washington & Lee University School of Law are searched,[3] with certain modifications.[4]

The ELPAR Editorial Board and staff start with a keyword search for "environment!" in an electronic legal scholarship database.[5] Articles without a connection to the

1. *See* Environmental Law and Policy Annual Review, Env't L. Inst., https://www.eli.org/sites/default/files/files-pdf/ELPAR%20Updated%20Methodology%202024-2025%20%5BFINAL%5D%20%281%29.pdf (last visited July 14, 2026) [hereinafter ELPAR Methodology].

2. *Id.*

3. *W&L Law Journal Rankings*, Wash. & Lee Sch. of L., https://management-tools4.wlu.edu/LawJournals/ (last visited Apr. 27, 2026) (select a category in the "Subject" dropdown menu, then click "Submit").

4. *See* ELPAR Methodology, *supra* note 1.

5. ELPAR members conduct a search in the spring semester of articles published from August 1 through December 31 of the previous year. In the fall semester, members search each journal for articles published earlier that year, from January 1 through July 31. The exact date of access for each journal varies according to when each individual ELPAR member performed the searches on their assigned journals, but the spring searches were performed in the second and third weeks of January 2025, and the fall searches were performed in the last full week of August 2025. In order to collect articles from "embargoed" journals (which are only available on Westlaw after a delay) as well as articles from journals that are published after their official publication date, a Westlaw Alert is set up to provide notification when an article meeting ELPAR's search criteria is uploaded to Westlaw after ELPAR members conducted initial searches. A Westlaw Alert was set up for the spring search on January 1, 2025, and ran until August 11, 2025. An alert was set up for the fall search on August 12, 2025, and ran until September 1, 2025. Articles caught by the Westlaw Alert system were subsequently considered for selection by ELPAR and added to the data analysis. Law reviews of schools added to the *U.S. News and World Report* top 100 during the spring search are searched for the entire year the following fall,

natural environment (e.g., "work environment" or "political environment") are removed, as are book reviews, eulogies, non-substantive symposia introductions, case studies, presentation transcripts, and editors' notes. Student scholarship is excluded if the piece is published as a note or comment by a student who is a member of the staff of the publishing journal. We recognize that all ranking systems have shortcomings and that only examining top journals imposes limitations on the value of our results. Nevertheless, this approach limits the number of articles reviewed to a manageable number while providing a useful glimpse of leading scholarship in the field.

For purposes of tracking trends in environmental scholarship, the next step is to cull the list generated from the initial search to ensure that the list contains only those articles that qualify as "environmental law articles." Determining whether an article qualifies as an environmental law article is more of an art than a science, and our conclusions should be interpreted with this caveat in mind. We have, however, attempted to use a rigorous, transparent process. Specifically, an article is considered an "environmental law article" if environmental law and policy are a substantial focus of the article. The article need not focus exclusively on environmental law, but environmental topics should be given more than incidental treatment and should be integral to the main thrust of the article. Many articles in the initial pool, for example, address subjects that influence environmental law, including administrative law topics (e.g., standing) and tort law topics (e.g., punitive damages). Although these articles may be considered for inclusion in ELPAR and may appear in our selection of top articles, they are not included for purposes of tracking environmental law scholarship since environmental law is not the main thrust of these articles.

Each article in the dataset is categorized by environmental topic to allow for tracking of scholarship by topic area. The 10 topic categories are adopted from the *Environmental Law Reporter* subject matter index and consist of air, climate change, energy, governance, land use, natural resources, toxic substances, waste, water, and wildlife.[6] ELPAR students assign each article a primary topic and, if appropriate, a secondary topic. ELPAR students also assign each article a subtopic for both the primary and secondary topics if appropriate.[7]

The ELPAR Editorial Board and staff work in consultation with the course instructors, Prof. Michael P. Vandenbergh and ELI Senior Attorney Linda K. Breggin, to determine whether articles should be considered environmental law articles and, in some cases, how to categorize the article by environmental topic for purposes of tracking scholarship. The articles included in the total for each year are identified on a list posted on the Environmental Law Institute website.[8]

II. Data Analysis of Environmental Legal Scholarship

For the 2024-2025 ELPAR review period (August 1, 2024 through July 31, 2025), the ELPAR Editorial Board and staff identified 255 environmental articles published in top law reviews and environmental law journals. One hundred and fifty-four were published in journals that focus on environmental law, and 101 were published in general law reviews.

Aggregate data on the articles' primary topics are displayed in Figure 1 below. Of the 255 environmental articles published during the 2024-2025 review period, there are 131 governance articles (51.4%), 33 energy articles (12.9%), 23 water articles (9.0%), 20 climate change articles (7.8%), 14 wildlife articles (5.5%), 13 land use articles (5.1%), 11 natural resources articles (4.3%), six waste articles (2.4%), two air articles (0.8%), and two toxic substances articles (0.8%).

ELPAR members additionally identified secondary topics for 162 articles; these data can be seen in Figure 2 below. The most common secondary topic is governance (92 articles) followed by: climate change (33 articles); land use (12 articles); energy (eight articles); water (six articles); wildlife (four articles); natural resources (three articles); waste (two articles); air (one article); and toxic substances (one article). Figure 3 shows the breakdown by subtopic for articles in the governance category for both primary and secondary topics, demonstrating the wide variety of governance subject areas observed.

III. Top 11 Article Analysis

In prior years, the ELPAR selection process identified 20 top articles, but the retrenchment in federal legislative and regulatory policy after the 2024 election narrowed the pool of articles that met the ELPAR feasibility criterion, which led the journal editors to identify 11 articles for 2024-2025. The top 11 articles chosen from the pool of eligible environmental law and policy-related articles published during the 2024-2025 academic year are listed in Table 1. The 11 articles include a range of law and policy proposals, and some articles offer more than one proposal. Based on the principal proposal in each article, the articles recommend: changes to federal laws, regulations, or policies (5); changes to state or local laws, regulations, or policies (5); and adoption of private governance solutions (1).

and journals from schools removed from the top 100 after the spring search are removed and not considered.

6. *Subject Matter Index (Articles)*, ELR, https://www.elr.info/subject-matter-index/articles (last visited June 18, 2026).

7. The *ELR* subject matter index includes subtopics for each topic. For example, subtopics for the governance topic consist of administrative law, agencies, bankruptcy, constitutional law, courts, enforcement and compliance, environmental justice, environmental law and policy/governance, infrastructure, institutional controls, insurance, international, liability, private governance, public participation, risk assessment, states, sustainability, tax, trade, tribes, and U.S. government. For a list of all the subtopics in each topic, see *id*. (click on one of the listed topics to view related subtopics therein).

8. Env't L. Inst., https://www.eli.org/sites/default/files/files-pdf/Full%20List%20of%20Reviewed%20Articles.pdf (last visited July 14, 2026).

Primary topics identified in the top 11 articles are as follows: four governance articles, three water articles, two land use articles, one air article, and one climate change article. Secondary topics were identified for several articles, including five governance articles and two energy articles.

This year's pool of top articles came from both general and environmental law journals. Nine of the top 11 articles were published in general law journals, while two were published in environmental law reviews. The lead authors of the top articles came from a wide range of law schools and academic backgrounds.

Table 1, below, lists every article included in the top 11 along with a brief description of each article's main take-away or proposal. The proposal descriptions were drafted by the ELPAR Editorial Board and staff with input from the course instructors and describe the contribution to the environmental law and policy literature. Links are provided to free-to-access versions of the full articles, and most of the articles include a brief abstract summarizing the piece.

Figure 1. 2024-2025 Articles Categorized by Primary Topic

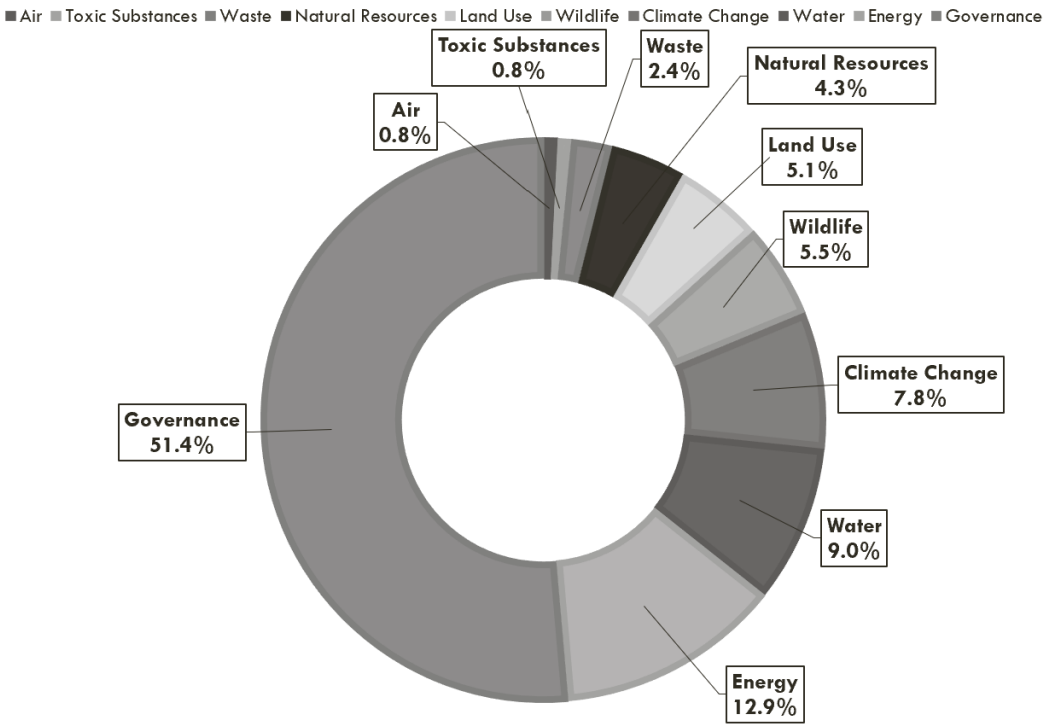


Figure 2. 2024-2025 Article Count by Primary and Secondary Topic

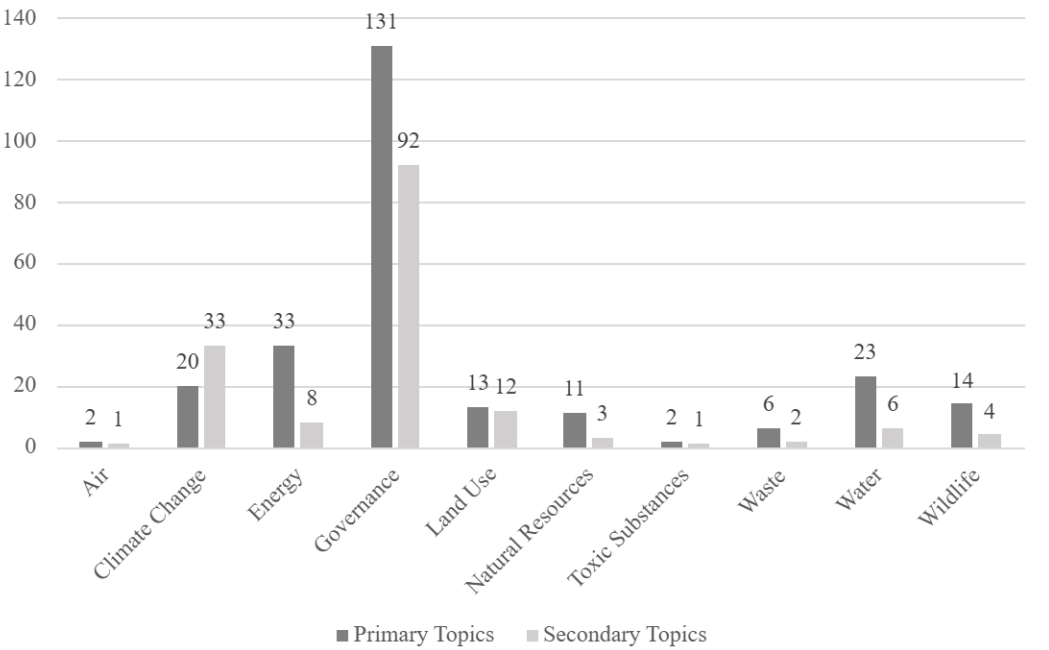


Figure 3. 2024-2025 Subtopics for Articles Assigned Governance as a Primary or Secondary Topic

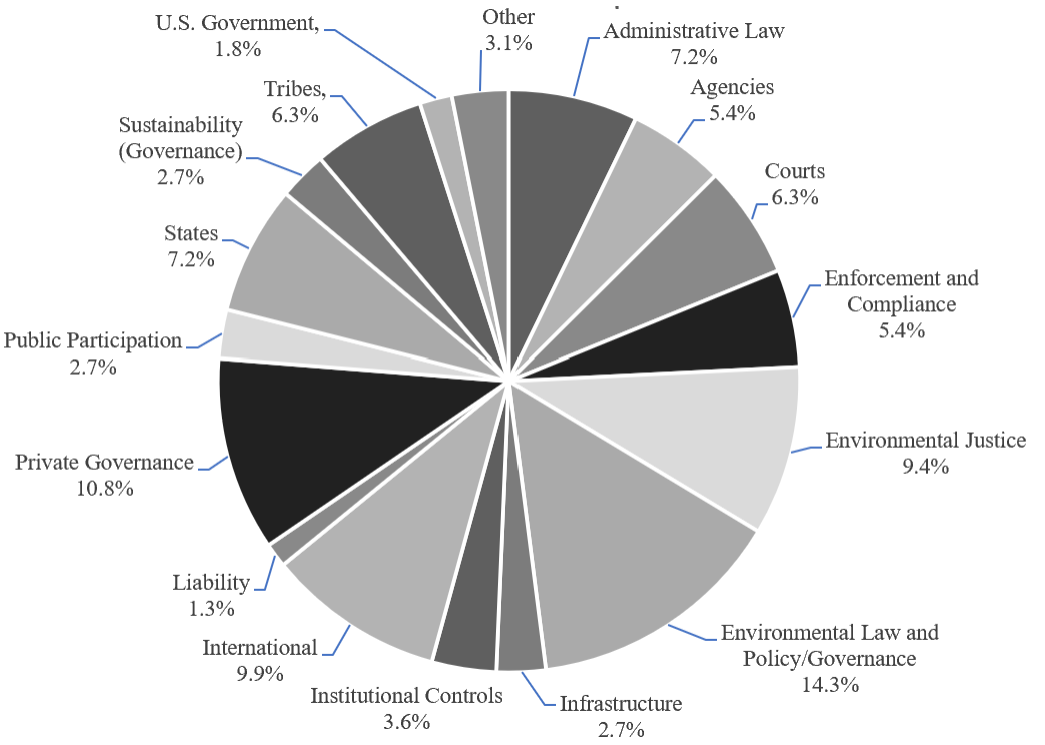


Table 1: 2024-2025 Top 11 Articles Overview Chart

Author(s)	Title	Citation and URL	Topic(s)	The Big Idea
Derron, Anthony B.	*Unwritten Administrative Law and the Regulatory Last Mile*	173 U. Pa. L. Rev. 1657 https://doi.org/10.58112/uplr.173-6.2	Governance (Administrative Law); Governance (States)	State courts and legislatures should "build out legal frameworks that direct how, when, and where agencies make decisions," in order to advance the virtues of administration, such as notice and reason given, and realize the benefits of cooperative federalism, such as participation and experimentation—thereby ensuring that federal environmental programs are successfully implemented at the state level.
Eisenson, Matthew	*Overcoming Unreasonably Burdensome Restrictions on the Use of Farmland for Solar Generation*	75 Case W. Rsrv. L. Rev. 117 https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=5079&context=caselrev	Energy (Generally); Land Use	The author proposes a menu of options for overcoming the growing number of local restrictions on using farmland for utility-scale solar facilities: (1) pursuing relief under existing law through state statutes that preempt or limit local restrictions or through alternative strategies such as exclusionary zoning; and (2) advancing state and federal legal reforms—including new and amended states laws (e.g., on preemption, zoning, right-to-farm), new state or federal measures (e.g., on identification of solar development sites, promotion of agrivoltaics), and federal action to limit state and local restrictions.
Hester, Tracy D.	*Spinning Off Carbon: Corporate Restructuring in a Climate Bankrupt World*	32 N.Y.U. Env't L.J. 339 https://nyuelj.org/wp-content/uploads/2024/09/Hester-Spinning-Off-Carbon.pdf	Governance (Private Governance)	To minimize public health, environmental protection, and equity concerns arising out of corporate use of restructuring to avoid future climate liability, state and federal "regulators should explicitly adopt governance principles" that rely on "disclosure transparency standards, expanded use of existing regulatory authorities for environmental liability transfers, and instituting new statutory authorities" that target carbon-liability spinoffs.

Author(s)	Title	Citation and URL	Topic(s)	The Big Idea
Lin, Albert C.	*Indoor Air: The Forgotten Frontier of Environmental Law*	85 Ohio St. L.J. 1291 https://moritzlaw.osu.edu/sites/default/files/2025-05/1.8%20A%20Lin.pdf	Air (Generally)	Federal, state, and local governments should pursue a "systemic effort" to improve indoor air quality by using a combination of: (1) voluntary guidelines (e.g., measures for reducing risks); (2) procedural regulations (e.g., monitoring and reporting requirements); and (3) substantive regulations (e.g., mandatory pollutant-specific and setting-specific standards)—thereby addressing a pervasive threat to human health.
Miazad, Amelia	*Investor Climate Alliances*	102 Wash. U. L. Rev. 797 https://www.bing.com/ck/a?!&&p=491c2dbcd5b5ab8c847b11656766bb5a2c1e8ab79cce5176d0fbb54a1eaac240JmltdHM9MTc4NDE2MDAwMA&ptn=3&ver=2&hsh=4&fclid=13202999-2bf1-62de-3212-3f042a74-6300&psq=Investor+Climate+Alliances%2c+miazad&u=a1aHR0cHM6Ly93dXN0bGxhd3Jldmlldy5vcmcvMjAyNS8wMi8yNS9pbnZlc3Rvci1jbGltYXRlLWFsbGlhbmNlcy8	Governance (Private Governance)	To support collaborative climate stewardship and remove "chilling effects" that impede investor climate alliances—"transnational alliances of public and private actors that use shareholder stewardship to minimize the financial impacts of climate risk on investors' portfolios"—reforms are needed to antitrust laws (e.g., a state action doctrine exemption) securities laws (e.g., a safe harbor), and investor fiduciary duties (e.g., an amendment to the Uniform Prudent Investor Act).
Owen, Dave	*The Water District and the State*	134 Yale L.J. 1 https://yalelawjournal.org/pdf/134.1.Owen_7c37t157.pdf	Water (Generally); Governance (States)	To ensure water districts do not undermine state conservation, equity, and other policies—and to address democracy deficits and outdated district boundaries—state governments should play more active roles and reforms should: advance voting rights and election transparency; implement boundaries adjustments; and develop standards and procedures for taking water district operations under state control.
Rosenbloom, Jonathan	*Catching Nutrients in a Net: Collective Action, Institutional Impediments, and the Mississippi River Watershed*	109 Minn. L. Rev. 2949 https://scholarship.law.umn.edu/minnlrev/vol109/iss6/7/	Governance (States); Water (Generally)	To bypass state and federal regulatory constraints and reduce collective action problems, local governments should exercise their land use authorities to protect and restore the Mississippi River watershed by regulating: (1) vegetation (e.g., wetlands regeneration); (2) soil (e.g., development restrictions); and (3) water (e.g., setback requirements).
Salzman, James Peltzer, Ana Mackay	*The Cleanest Water and the Dumbest Kids: Do Small Water Systems Comply With the Safe Drinking Water Act?*	44 Stan. Env't L.J. 276 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5436835	Water (Safe Drinking Water Act)	"More serious consideration" of small public water system Safe Drinking Water Act noncompliance is needed due to: (1) persistent patterns of noncompliance, as indicated by a comprehensive review of published research; (2) the need for further understanding of the key factors driving noncompliance; (3) the failure of state and local strategies, such as funding, variances, consolidation, and privatization, to solve the problem; and (4) new standards for "forever chemicals" that will "intensify" burdens on small systems.
Stoellinger, Temple Leonard, Bryan Brammer, Travis Regan, Shawn Wood, Jonathan	*State Trust Land Revenue Diversification Through Conservation*	2025 Utah L. Rev. 1 https://dc.law.utah.edu/cgi/viewcontent.cgi?article=1398&context=ulr	Land Use (Public Lands); Governance (States)	State land trust managers, who manage over 45 million acres that typically are used to generate revenue from consumptive uses such as timber harvesting, are obligated to consider generating revenue from conservation uses, such as conservation leases and sales, which could foster diversified portfolios that generate long-term and sustainable benefits for current and future trust beneficiaries.
Stokes, Danielle	*Renewable Energy Federalism 2.0*	109 Minn. L. Rev. 3017 https://scholarship.law.umn.edu/viewcontent.cgi?article=1175&context=minnlrev	Energy (Generally); Governance (States)	A new "sustainable collaborative governance framework" should inform a just transition to a renewable energy future whereby "various stakeholders work together to address social, economic, and environmental challenges in a way that meets the needs of the present without compromising future generations," using an iterative, five-step process "closely related" to land use and environmental justice that includes—stakeholder identification, clear articulation of roles and responsibilities, joint decisionmaking, plan execution, and outcome evaluation.

Author(s)	Title	Citation and URL	Topic(s)	The Big Idea
Viscusi, W. Kip Schoonover, Sydney C.	*Equitable Assignment of Standing for Intergenerational and International Environmental Policies*	66 Ariz. L. Rev. 643 https://arizonalaw-review.org/pdf/66-3/66arizlrev643.pdf	Climate Change (Generally); Governance (Administrative Law)	Policymakers should reform how agencies calculate the social cost of greenhouse gases (GHGs) in quantifying and reporting the benefits and costs of environmental policies by adopting six legally sound, inter- related principles that will ensure efficiency and promote intergenerational equity: (1) accounting for future generations in regulatory analyses; (2) using country-specific preferences to monetize future mortality risks; (3) applying country-specific discount rates to reflect countries' intertemporal preferences; (4) reporting country-specific estimates of global costs of GHGs; (5) subsidizing countries with a lower share of domestic benefits from climate change reductions to incentivize necessary climate action; and (6) allowing representation of future generations in environmental litigation.

ARTICLE

UNWRITTEN ADMINISTRATIVE LAW AND THE REGULATORY LAST MILE

by Anthony B. Derron

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I. Introduction

Federalism has a last-mile problem. Known in industries ranging from telecommunications to transportation, the "last mile" is the issue of how to bring the remaining bit of some good to its end consumer. The same problem occurs with federal programs delegated to the states for implementation. While the federal government will set out the broad contours through substantive guidelines, exactly how that program is put into action is handled by the states. Yet, the way they do so is radically underspecified.

Across the states, questions of what I call "agency process," or the means by which an agency comes to a decision (or the "process" of agency policymaking), remain unanswered by state statutes and supreme courts. Issues such as when an agency can make policy through adjudication,[1] what counts as guidance versus a rule,[2] which standard governs the revocation of a rule as compared to its initial promulgation,[3] and what, if any, restrictions there are when an agency refuses to promulgate a rule,[4] remain undeveloped, even as most states have said something on issues of timing, deference, and substance.[5]

This lack of clarity about the frameworks governing agency process collides with another common practice: state agencies rarely publish guidance, adjudications, or denials of petitions for rulemaking. Courts have thus given state agencies little direction in their decisionmaking, and state agencies don't notify the public of those decisions, either. State administrative law is, in other words, unwritten.

This isn't just some quirk of the states. Enormously consequential federal programs are implemented through state statutes and regulations, not direct enforcement of the *United States Code*. After the lead is passed from national to subnational, a state will often need to enact its own set of laws, promulgate its own guidance, and adjudicate matters according to state law, even if it's in service of a larger federal program. How or when permits will be issued, what enforcement actions will be taken, and who the relevant regulated entity is are nuances that aren't necessarily determined by national law but, rather, through the interstices of state interpretation. And state agencies, in service of federal law but pursuant to state authority, do this with little ex post supervision from either the courts or the public. So, the bread-and-butter of cooperative administration is through state law. That means federal law's last mile is governed not by the norms and procedures of federal law, but by those of state law, which is itself undeveloped.

In Part II, I demonstrate how enmeshed federal law is with state law. At the same time, I outline the stakes of leaving these sorts of decisions unwritten. Then, in Part III, I find state agency process is generally undeveloped. If a state has no statewide legal framework for governing the four means by which agencies make decisions—through (1) rules or adjudication, (2) rules or guidance, (3) revocation of previous rules, and (4) regulatory inaction—I call it a gap. The top-line result is that each of the 50 states has a gap in at least one of the four metrics I examined. In Part IV, I offer explanations for why unwritten administrative law is possible. State governmental structure and political culture, usually distinguished by a strong executive[6] and weak civil society,[7] present one possible answer. Finally, in Part V, I address how gaps in law at the regulatory last mile implicate both the virtues of administrative law and the benefits of federalism.

Editors' Note: This Article is adapted from Anthony B. Derron, *Unwritten Administrative Law and the Regulatory Last Mile,* 173 U. Pa. L. Rev. 1657 (2025), *under copyright with the journal and used with permission.*

1. SEC v. Chenery Corp., 332 U.S. 194, 203 (1947) ("[T]he choice made between proceeding by general rule or by individual, *ad hoc* litigation is one that lies primarily in the informed discretion of the administrative agency.").
2. Chrysler Corp. v. Brown, 441 U.S. 281, 301 (1979) ("In order for a regulation to have the 'force and effect of law,' it must have certain substantive characteristics and be the product of certain procedural requisites.").
3. Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins., 463 U.S. 29, 57 (1983) ("An agency's view of what is in the public interest may change, either with or without a change in circumstances. But an agency changing its course must supply a reasoned analysis . . . .").
4. Massachusetts v. EPA, 549 U.S. 497, 527-28 (2007) ("Refusals to promulgate rules are thus susceptible to judicial review, though such review is 'extremely limited' and 'highly deferential.'").
5. An entire symposium in the *Harvard Journal of Law and Public Policy* was dedicated to issues of "Administrative Law in the States." *See generally* Symposium, *Administrative Law in the States*, 46 Harv. J.L. & Pub. Pol'y 303 (2023). The symposium showcased the writiing of several state supreme court justices, who all focused on substance, deference, and timing with no mention of process. *Id.*
6. *See* Miriam Seifter, *Gubernatorial Administration*, 131 Harv. L. Rev. 483, 488-91 (2017) (identifying the rise of "gubernatorial administration," whereby governors exert outsized control over state governance).
7. *See* Miriam Seifter, *Further From the People? The Puzzle of State Administration*, 93 N.Y.U. L. Rev. 107, 109-10 (2018) (demonstrating civil society's diminished oversight role at the state level).

II. State as Federal (or Federal as State)

Federal law, for all its national scope, lives much of its life in the states. Federal programs are built on the assumption of a national policy floor, with states tackling the day-to-day administration. But when states implement many federal programs, they do so through their own law, not the *United States Code*.

A. The Primacy of State Law

States run the day-to-day life of environmental law, where states conduct roughly 90% of inspections and enforcement actions.[8] This is the result of states being given "primacy" to implement and enforce environmental statutes.[9]

But to say that a state "implements" a federal program like the Resource Conservation and Recovery Act (RCRA),[10] the Clean Air Act (CAA),[11] or the Clean Water Act(CWA)[12] is to say that a state passes its own statutes that contain the substance, even if not the exact text, of federal law. For example, Minnesota's water quality standards, which include the CWA, are 221 pages.[13] Even if the U.S. Environmental Protection Agency (EPA) grants initial approval, once the CWA is enshrined in Minnesota statute, it is Minnesota administrative law that governs its enforcement and implementation. While federal law might set the statute's substantive contours, Minnesota law determines who gets into court, how agencies organize their rulemaking, and the formality of agency decisions (such a rulemaking, guidance, or adjudication). As a result, more than being a complex maze of interlocking regulations and statutes, as much of even pure federal administration is, this regulatory labyrinth is further complicated by the concurrent authorization and authority of both state and federal law. And once a federal program is made into a state one, the well-trodden guardrails of administrative law may not exist.

B. Process and Administration

The focus here is on what I call "agency process." I want to distinguish between the process by which an agency comes to a decision, substantive review of that decision, and the timing for seeking such review. Process, as I define it here, is the actual means by which the agency makes its decision: Did it go through rulemaking? Was there an adjudication? Is the agency's view set out in guidance or an interpretive rule? Has the agency's policy choice been expressed as an action or as a decision not to act? These questions raise distinct concerns separate and apart from the substance of the action and when it should be challenged: the choice between adjudication and rulemaking raises questions of flexibility and participation; guidance and rulemaking of notice and finality; reversals of reason-giving, and inaction of ensuring faithful execution of statutory mandates.

III. Unwritten Administrative Law

Many states, whether in court opinions or statutes, still need to address questions of agency process. At the same time, state agencies could be better publishers; finding guidance, adjudicatory decisions, and denials of rulemaking petitions is supremely challenging in most states.

A. Unwritten in Action

Unknown policy decisions occur every day. The state bureaucrat's decision to grant a permit under slightly changing circumstances, to implement a new statute with little statutory guidance, or to modify a budget are all examples of difficult-to-track policy decisions that have regulatory impacts. When the legal framework governing these decisions remains unwritten, the primary virtues of administrative law go unfulfilled. As inconsequential as a single adjudication or missing guidance document may be, 100 similar decisions could mean millions in either compliance costs or environmental harm, all without public notice and input. The nub is that stakeholders, courts, and regulated entities don't know when these decisions are made and have little occasion to find out.

For example, in *PNW Metal Recycling*, the Oregon Supreme Court addressed what a "rule" is under the state administrative procedure act.[14] It had occasion to do so because the Oregon Department of Environmental Quality (ODEQ) decided to change its long-standing interpretation of RCRA. According to this new interpretation, Oregon cash-for-cars dismantlers must get a state-issued permit if they want to not only dismantle cars but also dispose of other solid waste. But ODEQ had previously exempted auto-dismantlers from the requirement since it began enforcing RCRA. A trash fire at a dismantling facility changed all that. ODEQ thus reversed its interpretation, alerting two dismantlers (not the fire starters) in separate, unpublished letters that they would need to apply for RCRA permits. ODEQ didn't promulgate a new rule or develop this interpretation in the course of an adjudication. It just told these dismantlers of the change while informing them that it "intended" to apply the requirement to others. The dismantlers sued, arguing that ODEQ changed its mind as to a new regulation without going through notice and comment.

8. *See* David L. Markell, *The Role of Deterrence-Based Enforcement in a "Reinvented" State/Federal Relationship: The Divide Between Theory and Reality*, 24 Harv. Env't L. Rev. 1, 32 (2000) ("States conduct roughly ninety percent of the inspections in this country, and . . . they bring approximately eighty to ninety percent of all enforcement actions.").
9. *Id.* at 32; *see also* Matthew D. Zinn, *Policing Environmental Regulatory Enforcement: Cooperation, Capture, and Citizen Suits*, 21 Stan. Env't L.J. 81, 91 (2002) (noting that the states "perform most environmental enforcement as a function of their 'primacy'").
10. 42 U.S.C. §§6901-6992k, ELR Stat. RCRA §§1001-11011.
11. 42 U.S.C. §§7401-7671q, ELR Stat. CAA §§101-618.
12. 33 U.S.C. §§1251-1387, ELR Stat. FWPCA §§101-607.
13. Minn. R. 7050.0110-.0470 (2024).
14. *See* PNW Metal Recycling, Inc. v. Dep't of Env't Quality, 540 P.3d 523, 526 (Or. 2023).

The decision is emblematic of the regulatory last mile. First, despite Oregon adopting the initial iteration of its administrative procedure act in 1965, the Oregon Supreme Court did not answer the basic question of what a "rule" is until December 7, 2023. And to do so, it was required to patch together somewhat disparate strands of state administrative law. Second, it had no case law to draw from governing the standard of review when an Oregon agency reverses its prior determination. Third, the agency adopted its new interpretation in an informal document that it did not publish, even though it intended to apply it broadly. Fourth, and finally, this was a change of interpretation pursuant to *federally* delegated power under RCRA. In other words, a change in federal law (as applied in Oregon) occurred through an unpublished state agency decision that raised a novel question of state administrative law, all the result of a perfectly sensible policy requiring those who dismantle cars and dispose of other solid waste to get permits for both. Taken together, several interweaving parts of RCRA's last mile in Oregon—guidance, adjudication, reversals in position, and definitions of a "rule"—were undeveloped until late 2023.

B. Unwritten Judicial Review

Unwritten administrative law as a function of judicial review is widespread among the states. This means that, whenever process questions make it into the hands of state courts, those courts have little to draw on from either their own state or, to the extent they want to, others.

1. Defining a Gap

Identifying a gap requires a definition: no statewide legal framework for when, how, or why an agency may choose, or decline to choose, a particular means of decisionmaking. Two words require further precision.

First, framework. Gaps can only exist if the state Administrative Procedure Act (APA) doesn't provide a means of directing agency action. And framework encompasses more than judicial doctrine; it also includes statutory guidelines. Critically, then, the state legislature is equally as responsible for filling a gap as are the courts.

Second, statewide. I'm interested in frameworks that apply to the entire state, not particular agencies or regions. Thus, a solitary agency providing guidance or issuing a regulation as to when it would refuse to promulgate a rule is insufficient to fill a gap.

2. Metric #1: Policy by Adjudication

Fifteen states have never addressed the question of whether an agency can make policy through both adjudication and rulemaking, and others only began to fill in the gap as recently as 2019.

3. Metric #2: Rule or Guidance

Guidance, interpretive rules, and the like fare little better than the adjudication question. Ten states have no framework for determining the difference between a rule and guidance, and nine others only addressed it for the first time in the last 10 years.

4. Metric #3: Revocation or Change in Position

Revocations and changes in policy positions are particularly uneven. While a sizable number of states tackled the issue soon after or even before *State Farm*, slightly more than half of the states have never answered the question of how searching—or not searching—review should be when an agency reverses a prior position, whether in rulemaking or guidance.

5. Metric #4: Nonpromulgation and Inaction

Of the process questions, nonpromulgation, or agency inaction in the face of a statutory mandate or request, is the most underspecified. Given that the U.S. Supreme Court only addressed the issue in 2007 in *Massachusetts v. EPA*,[15] this might be expected. That said, most state decisions regarding agency inaction predate the Supreme Court. At the same time, that's only 13 states, despite most state APAs having a specific provision providing the opportunity to review a refusal to promulgate a rule.

C. Unwritten Policy

Much agency policy also remains unwritten across the states. While notice-and-comment rulemaking (or the state equivalent) is disseminated, more informal actions often are not. So, while undeveloped judicial doctrines might not create cause for concern if at least the substance of an informal policy could be debated, there is little chance for deliberation to happen. Some states, of course, do have relatively well-run systems of publication. And a recent and promising trend requires the publication of guidance documents. But for states without these provisions, securing guidance and adjudications requires proactively asking an agency for them. That might be simple if you're already investigating a particular issue or starting up operations for the first time. But how will anyone else have occasion to know when to ask for them?

While brisk, the preceding snapshot should make the picture clear: there is gappiness in state law governing agency process. As a result, depending on the state, there are vastly different means of policing agency policymaking. On average, state agencies seemingly have few ex ante guideposts for their process decisions, and no ex post supervision either. It's not that diversity isn't a feature or virtue of cooperative federalism but that this feature rests on the assumption that there is law—statewide legal frame-

15. *See* Massachusetts v. EPA, 549 U.S. 497, 527-28 (2007).

works—behind it. Without those frameworks, how that diversity manifests is left primarily to agency discretion.

At first blush, it might be possible to brush this off as a parochial concern for those states that haven't addressed certain issues. If state law was just that, *state* law, this might be a perfectly reasonable response. But that isn't the case. Federal statutes and regulations operate under the guise of state law. The assumption in empowering states to implement federal programs is that there will be legal frameworks for ensuring that states meet federal baselines while considering local conditions and preferences. But that law is underspecified, rendering much of federal law unwritten, too.

IV. Supply and Demand for State Administrative Law

States are no strangers to administrative agencies. Yet, the framework surrounding how an agency comes to a decision has remained undeveloped or underdeveloped. While it's easy enough to describe a pattern across the states, it is more difficult to assign a specific causal explanation for that pattern in any particular state.

Still, sufficient similarities allow lessons to be drawn. In doing so, I focus on one aspect of unwritten administrative law: the absence of judicial review, offering two explanations. First, state governmental structure and political culture, with weak civil society and a strong governor, lead to dollars being better spent at the ballot box rather than on court filings. Second, the types of actions I highlight are naturally susceptible to evading judicial review.

A. State Structure

States are distinctive political creatures. While the federal constitution grants authority, a state constitution limits it; a state legislature's power is plenary, but the U.S. Congress's is not.[16] Over 90% of state judges "face the voters in some form of election."[17] Unlike the federal executive (the President), states have "unbundled" executives.[18] State citizens elect all sorts of executives. At the same time, these elections are increasingly "second-order."[19]

But what is it about structure, elections, and the states that leads to a lack of demand for (litigants bringing cases involving process) answers to questions of agency process? I suggest that there are two main drivers: weak civil society and strong governors.

1. Weak Civil Society

Much like "the states" are different from the "United States," state civil society is different as well. The byline is that "state agencies are, on the whole, less transparent than their federal counterparts, less closely followed by watchdog groups, and less tracked by the shrinking state-level media."[20] This results in a mutually reinforcing cycle, with non-rulemaking agency decisions remaining unwritten because there aren't any requirements to make them accessible, rendering them harder to track by weak state-level interest groups, and resulting in less litigation that might raise their visibility.

At the same time, the ones that do know about agency process are regulated entities. They must comply with state guidance, whether or not it is published, so businesses have the incentive to seek out, understand, and implement agency interpretations of law. But regulated parties might not challenge guidance or process decisions. Indeed, they're often the ones asking for guidance in the first place. These "satisfied consumers"[21] don't show up in court.

2. Strong Governors

Many governors today have both ex ante and ex post control of agency action.[22] Governors are visible,[23] their elections high profile,[24] and their regulatory decisions often considered final.[25] All of this adds up to the public and media frequently blaming governors for regulatory action, and state agencies, much like their federal counterparts, can be considered "part of the 'Governor's name' Administration."[26] If true, then accountability is achieved through the governor, rather than through direct citizen oversight of agency action. If people are generally unaware of the specific process decisions that agencies make—and the cost of finding them is too great—the better practice might be to vote for a governor who will generally implement preferred policies.

While this might be a rational response to agency opacity, stilted state media, and the rise of governors, it's far from second-best as an oversight mechanism. Guidance, adjudication, inaction, and revocation are not the sorts of things that governors use their bully pulpit for. As a result, although the rise of so-and-so administration's agency will shift the incentives to focus on the governor, perhaps resulting in less litigation, it won't provide a robust means of monitoring agency process.

B. Nature

Agency process, on its own terms, is inherently difficult to police and litigate. Even in a world with strong civil

16. *See* Jim Rossi, *Institutional Design and the Lingering Legacy of Antifederalist Separation of Powers Ideals in the States*, 52 Vand. L. Rev. 1167, 1230 (1999); U.S. Const. art. I, §1 ("All legislative powers herein *granted* shall be vested in a Congress of the United States . . . ." (emphasis added)).
17. Aaron-Andrew P. Bruhl & Ethan J. Leib, *Elected Judges and Statutory Interpretation*, 79 U. Chi. L. Rev. 1215, 1217 n.1 (2012).
18. Christopher R. Berry & Jacob E. Gersen, *The Unbundled Executive*, 75 U. Chi. L. Rev. 1385, 1386 (2008) ("The unbundled executive is a plural executive regime in which discrete authority is taken from the president and given exclusively to a directly elected executive official.").
19. David Schleicher, *Federalism and State Democracy*, 95 Tex. L. Rev. 763, 765 (2017).
20. Seifter, *supra* note 7, at 110.
21. Peter L. Strauss, *The Rulemaking Continuum*, 41 Duke L.J. 1463, 1483 (1992).
22. Seifter, *supra* note 6, at 499.
23. *Id.* at 502.
24. Seifter, *supra* note 7, at 110.
25. Seifter, *supra* note 6, at 502.
26. *Id.* at 500-02, 536.

society oversight, weak governors, or some combination of societal conditions that would make administrative action more visible, that wouldn't necessarily be the case for agency process. Even if all the guidance were published somewhere, the most well-funded watchdog group couldn't keep up. Inaction, too, is difficult to pin down. An agency not responding to a petition for an extended period, or responding and not publishing its decision, isn't easily knowable unless the agency announces that it's not acting.

The result is that, on average, regulated entities remain the only ones with any knowledge of agency process. Regulated entities have little incentive to speak out, though. If a state agency doesn't publish or announce its enforcement action and reasoning, there is no incentive for the subject of the action to do so either. And when it comes to adverse decisions, regulated entities—all else being equal—generally follow guidance and forgo duking it out in an adjudication or litigation, fearing adverse market consequences from failing to go along with agency desires.[27]

V. The Regulatory Last Mile

When a federal agency delegates a program to a state, it conducts a substantive review to ensure that the proposed state apparatus, including statutes and regulations, contains federal *substantive* law.[28] The implicit assumption is that there is a sufficiently detailed body of state *administrative* law to carry that federal baseline into action. But this assumption is misplaced.

How should cooperative federalism account for unwritten administrative law in the regulatory last mile? I offer two suggestions. The first is that, even if variety in substance is baked in, the norms that administrative law has been striving for should filter through the states. The conceptions that drive administration should play a role in how stakeholders monitor the last mile of implementation. Second, the values of federalism, whether normative, descriptive, or expressive, are potentially diminished when the last mile is unwritten.

A. Administrative Norms and Virtues

The administrative state as we generally conceive it—for all its flaws—relies on certain norms and values. These values, broadly encompassed in "the rule of law," but more granularly, things like notice, discourse, participation, and reason-giving, should filter down to the last mile. First, and most importantly, they're valuable on their own terms. Ensuring adequate notice, discourse, and reason in the last mile will better ensure faithfulness to the enabling statute, predictability for both agencies and regulated entities, and enhanced accounting of the costs and benefits of the interstices of administrative implementation. Second, because states implement federal law, and because federal law assumes that there is law in the last mile, it is critical that gappiness is attended to. A substantive review of a state's program that doesn't examine whether there is adequate administrative law, and not just personnel staffing, programmatic capacity, and substantive obligations, fails to take seriously the task handed to the states.

The issue is that agency process is a critical means of achieving each of these values, yet the law guiding it is missing in the regulatory last mile. Depending on which state and which issue (choice of policymaking forum, guidance, reversal of position, or inaction), the outcomes might differ dramatically. If those outcomes diverged due to local circumstances—say the presence of alluvial versus non-alluvial soil in determining the bounds of a CWA permit—it would be a virtue. But variation due to a lack of law risks failing to meet not only the ideals that administration has been striving toward for decades, but also the core comparative advantage of administration over pure politics. To make matters worse, the lack of publication means that agency action is far from "transparent and easy . . . to follow."[29] And because state law is federal law, that means following federal law isn't easy and transparent, either. Demanding that states take seriously the rule of law values and norms that administration embodies is only to say that, when the law runs out, the ability to ensure notice, discourse, accountability, and predictability is significantly diminished.

In other words, while agencies already make law, unwritten administrative law also grants agencies discretion to determine *how* they make it. But the how is precisely what promotes reasoned discourse, expertise, and the rule of law. It's certainly correct that guidance is better in some circumstances and adjudications in others. But when an agency can pick and choose in the shadows, without providing notice or a justification for its decision, the risk of poor agency decisionmaking goes up. Of course, it won't always be a net negative to grant agencies discretion in agency process. In some areas, a discretion-forward model might be preferable by reducing ossification, promoting efficiency, and engendering quick responses to dynamic problems. But that might not always be the case, and the current system doesn't promote the types of discussion needed to figure out the when and where. Picking and choosing requires more than what the states currently provide.

To be clear, I am not suggesting that state process frameworks must look like the federal APA. Nor am I offering a ringing endorsement of federal administrative law. A state need not, and perhaps should not, treat rules and guidance the same as federal law might, but there should at least be law behind that decision. A state could, like California, completely get rid of guidance. Or it could, like Hawai'i, prohibit policymaking in adjudication. These decisions,

27. Nicholas R. Parrillo, *Federal Agency Guidance and the Power to Bind: An Empirical Study of Agencies and Industries*, 36 Yale J. on Regul. 165, 185, 191-92 (2019).

28. *See, e.g.*, 42 U.S.C. §7410(a) (requiring state implementation plans to contain measures "to meet the applicable requirements" of the CAA, as well as "necessary assurances" that a state has "adequate personnel, funding, and authority" to do so).

29. Miriam Seifter, *States, Agencies, and Legitimacy*, 67 Vand. L. Rev. 443, 482 (2014).

according to the specific variances of state law, such as its constitution or APA, are active decisions grounded in state preferences and legal conditions. And they are a type of law that strives for the same administrative values and norms the federal bench and bar have been developing for decades. Moreover, by having law rather than gaps, these choices empower stakeholders at both the federal and state levels to question and critique the best means of achieving a well-run administrative state.[30]

And so, administrative law should be written. More specifically, courts and legislatures should build out the statewide legal frameworks that direct how, when, and where agencies make decisions. Doing so will reinforce the values of administration and ensure that cooperative programs make it through the regulatory last mile. In writing it, state courts, scholars, advocates, and civil servants need not borrow directly from federal law. States can and should borrow from other states that have tested new methods of administration. Moreover, I'm not simply calling for more procedure. But constructing a "positive vision of the administrative state"[31] requires knowing what the administrative state is doing. To choose "the type and quantity of procedures"[32]—notice and comment, guidance, adjudication—requires knowing how those procedures are used. The states offer a plethora of options from which we can plumb the best ones. "[K]nowing more about the effects of particular procedures at particular agencies"[33] requires written law in the last mile.

B. Federalism

State agencies often have significant discretion that is unreviewed, unpublished, and untested. This discretion complicates the various, sometimes tidy, views of federal-state interactions. Whatever form of federalism is descriptively or normatively correct, it is difficult to square the benefits of any with the unwritten regulatory last mile. Gappiness in the last mile elevates concerns over notice, reasoned decisionmaking, participation, and open discourse, each of which is implicit or explicit in the variegated forms of our federalism.

This is particularly true with environmental programs, the exemplar of cooperative federalism. These statutes don't contemplate a vast system of unchecked state administrative discretion. They rely on restrained discretion within federally set boundaries to marry the safety net of national baselines with the benefits of diffuse, local expertise and efficiency to "overcom[e] stubborn local particularism."[34]

But once a program is handed over to the states, robust federal supervision isn't possible. This means that, even when a state has gaps in its ability to get a program through the last mile, there are few remedial tools available.[35] Without law forcing the production of knowledge—such as judicial or statutory doctrines that police informal agency action—potential federal supervision and the benefits of a national baseline are diminished.

Even the promise of *un*cooperative federalism, which emphasizes the ability of a state to make decisions contrary to federal law, is weakened when considering gaps in the last mile. The normative hook is that the discretion granted through these programs allows states to administratively go against national interests, pushing local conversations into the spotlight and accentuating the value of a pluralistic, federal system. But this presupposes both that states and their agencies are purposefully acting contrary to federal law and that there's some way to know about it. To reap the benefits of uncooperative federalism, we need to see how the states are being uncooperative, and those states must choose to be uncooperative.

While part of federalism's payout is variation, it doesn't stem from something inherent to variation, but rather from what variation can provide. The sort of variance the system is designed to handle is one that can be noted and corrected when needed and borrowed when desired. Equally important, if there is meant to be value in state experimentation, then it benefits the national to know about it, not for it to be lost in an unpublished adjudication, untested in the courts, and unknown to the public. Less information about how our institutions work is not the ideal configuration for identifying the proper balance of state-federal implementation and regulation.

In other words, gaps in the regulatory last mile are not intrinsic to or necessarily required by any form of federalism. Nor should gappiness be taken as an indictment of the states, which do superlative work across any number of issues. But to secure all the benefits of federalism, the regulatory last mile must be closed.

VI. Conclusion

As states continue to innovate and drive regulatory change, Congress will funnel more and more tasks to them. For all the good this might generate, we need to be realistic about how the "implementation" of federal law often works: it is the adoption of federal law as state law, which, so long as state administrative law remains unwritten, creates room for state administration to operate unbound. Even if there were an easy and concrete way to encourage more litigants to bring process claims or to force legislatures to take state administration seriously, it wouldn't be quick. It will be a slow march to writing administrative law.

30. In other words, gappiness can increase the costs of slack in cooperative administration. The already increasing number of tools and complexity involved in environmental law "has the potential to increase accountability and transparency concerns." *See* David Markell, *Slack in the Administrative State*, 84 Or. L. Rev. 1, 48 (2005). When combined with undeveloped doctrines of agency process, the challenges of accountability and transparency raise these costs even higher.
31. Nicholas Bagley, *The Procedure Fetish*, 118 Mich. L. Rev. 345, 350 (2019).
32. *Id.* at 352.
33. *Id.* at 387.
34. *See* Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 Md. L. Rev. 1141, 1171 (1995) (internal quotation marks omitted).
35. This isn't to say there are no remedies. But they are limited, time-intensive, and often up to the discretion of EPA in coordination with the state agency. *See* Emily Hammond & David L. Markell, *Administrative Proxies for Judicial Review: Building Legitimacy From the Inside-Out*, 37 Harv. Env't L. Rev. 313, 333-53 (2013).

In the meantime, we can use fresh eyes to analyze, support, and critique federalism and administrative law, if we recognize that the full life cycle of state administration does not walk or talk like federal administration. The invitation for states to adopt federal law as their own includes an invitation for them to do much of what they like. By identifying gaps in the last mile, we can ensure that, whatever states do, there is regulation in the regulatory last mile.

COMMENT

DOES THE REGULATORY LAST MILE UNDERMINE COOPERATIVE FEDERALISM?

by Susan Parker Bodine

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The basic premise of Prof. Anthony Derron's article, *Unwritten Administrative Law and the Regulatory Last Mile*, is that weaknesses in state administrative law and processes undermine the cooperative federalism model that most of our federal environmental laws embrace.[1] He offers observations on state implementation of the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), and the Clean Air Act (CAA) to support this premise.

I appreciate Professor Derron's research on state administrative law and his identification of gaps in that law, but I cannot agree with his premise. Many of the examples he uses to frame his argument are inapposite. Many of the weaknesses he identifies in state administrative law are present in federal law as well. Finally, the cooperative federalism model is more robust than he gives it credit for.

I. Problem Identification

To frame his argument, Professor Derron first postulates a hypothetical situation where the Connecticut environmental agency changes its interpretation of the CWA to exempt boat rental companies from the need to obtain vessel discharge permits but does not publish this decision. He is concerned that such a shift in state interpretation could undermine the CWA in that state. Professor Derron need not be concerned about this particular fact pattern. Discharges from vessels are subject to section 312 of the CWA, which preempts state law because vessels move across jurisdictions.[2] Further, the vessels described in Professor Derron's hypothetical are exempt from permitting.[3]

Professor Derron also repeatedly cites an actual Oregon Supreme Court case to provide an example of the problem he wants to solve.[4] He claims that *PNW Metal Recycling* represents "a change in federal law (as applied in Oregon)."[5] However, *PNW Metal Recycling* has nothing to do with federal law.

PNW Metal Recycling involved change in how a state agency interpreted an Oregon state law that exempts from solid waste disposal permitting those metal recyclers that hold an auto-dismantler certificate. The scope of a state permitting requirement for solid waste disposal sites in no way affects RCRA. With one exception, RCRA does not authorize federal permits for the management of *solid* waste.[6] Whether a facility requires a permit under Chapter 459 of the Oregon Revised Statutes (regulating solid waste disposal) is purely a matter of state law.

Professor Derron cites a state implementation plan (SIP) revision in Colorado to provide a CAA example of how "state law governs even when it diverges from federal guidelines." In that example, the U.S. Environmental Protection Agency (EPA) partially disapproved the state SIP imposing technology-based requirements on two industry sectors because under that SIP compliance records for those sectors were available upon request rather than being automatically sent to the state.[7] Professor Derron appears troubled by the fact that the state requirements remained enforceable by the state even if not part of the federally approved SIP. Yet, he never explains why this is a problem. Unless there is federal preemption (such as is the case for vessel discharges) it is a core principle of cooperative federalism that state programs can be different as long as they are as stringent as federal law even if this creates a patchwork of requirements that regulated entities must meet.

During the March 27, 2026, conference another panelist also cited a difficulty in determining which local ordinances implemented a state SIP as an example of a problem with the cooperative federalism structure of the CAA. In her example, the panelist admitted that it was

1. Anthony B. Derron, *Unwritten Administrative Law and the Regulatory Last Mile*, 173 U. Pa. L. Rev. 1657 (2025).
2. 33 U.S.C. §1322.
3. Section 402(r) of the CWA exempts recreational vessels and Section 502 defines recreational vessels to include those that are rented out. 33 U.S.C. §1342(r); 33 U.S.C. §1362(25).
4. PNW Metal Recycling, Inc. v. Dep't of Env't Quality, 540 P.3d 532 (Or. 2023).
5. Derron, *supra* note 1, at 1661.
6. In 2016, the U.S. Congress gave EPA the authority to establish a federal permitting program for coal ash by adding subsection (d) to section 4005 of RCRA. 42 U.S.C. §6945(d). EPA proposed a federal coal ash permitting program in 2020 but has not finalized that rulemaking so there is no federal solid waste permitting program, even for coal ash.
7. 88 Fed. Reg. 29827-28 (May 9, 2023).

easy to determine which state regulations were part of the SIP (and therefore federally enforceable) but determining which municipal ordinances implemented the SIP was more difficult. This issue mattered to her organization, Southern Environmental Law Center (SELC), because they wanted to bring a lawsuit relating to compliance with the SIP under the citizen suit provisions of the CAA. Air pollution, and therefore a SIP, is geographically based and so implementation can appropriately rely on local air pollution control measures. Given that the information sought by the SELC was available, even if difficult to find, this example too should not be considered an indictment of cooperative federalism.

II. "Gaps" in State Administrative Law

Professor Derron then identifies "gaps" in state administrative law that could allow changes in how a state implements a federal program: (1) regulating through enforcement, (2) regulating through guidance, (3) mixed processes for revoking rules or guidance, and (4) inaction. However, these criticisms apply equally to the administration of environmental law at the federal level and therefore do not implicate cooperative federalism.

A. *Regulating Through Enforcement*

While I agree that it is inappropriate to change policies in an enforcement action, that example does not support the argument that such actions weaken the cooperative federalism framework of environmental law. As endorsed by the U.S. Supreme Court in *SEC v. Chenery Corp.*, federal agencies also may establish new policies through adjudication.[8] Further, in the context of a settlement, EPA can ask for and receive injunctive relief that goes beyond statutory requirements and can use enforcement settlements to advance policy objectives even in the absence of any authority developed in compliance with the federal Administrative Procedure Act (APA).[9] Finally, Professor Derron expresses concern that the Commonwealth of Virginia allowed Smithfield Foods to remain in operation under a state water control board order even though it was violating state phosphorus standards.[10] However, it is common for EPA to use enforcement actions to allow facilities to remain in operation even though they are in violation of an environmental law. The EPA enforcement action will provide a roadmap for the facility to come into compliance, but depending on what actions need to be taken, full compliance might be decades away. In the meantime, the facility is protected by the EPA consent decree.

B. *Regulating Through Guidance*

Professor Derron criticizes the practice in some states of issuing substantive interpretations of a regulation through guidance, rather than through rulemaking. Again, this example does not provide a contrast with federal law and therefore does not support the premise that cooperative federalism is flawed.

Many EPA offices interpret the statutes and regulations they administer through guidance. Every EPA guidance document includes a disclaimer that it is not binding, but as the case law demonstrates, sometimes EPA treats guidance as binding. Under the federal APA, a legislative rule (i.e., one that is binding) must go through notice-and-comment rulemaking while an interpretive rule (i.e., one that states EPA's view but is not binding) need not.[11] EPA's guidance can be and often is challenged as an invalid rule. If EPA treats it as binding, it is a rule.[12]

Professor Derron also criticizes state failure to make its interpretations public. EPA's record on this issue has been mixed. Currently, EPA is required to make all of its guidance publicly available.[13] But, that requirement is a policy, not a consequence of federal administrative law.

C. *Revocation of Prior Rules*

Professor Derron notes that not all states follow *Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, which stands for the proposition that agencies may change their regulations as long as they provide an adequate explanation.[14] The absence of such a requirement may make it easier for a state agency to make regulatory changes. However, as explained below, under the cooperative federalism framework of environmental law, there are limits on what changes a state can make.

Finally, Professor Derron notes that states have different standards when determining whether a decision to forego regulatory action is reviewable. Again, it is not clear how great an impact such differences have on the implementation of environmental law, given the need for states to be at least as stringent as federal law.

8. SEC v. Chenery Corp., 332 U.S. 194, 203 (1947).
9. While since superseded by a 2025 memorandum, several enforcement memoranda issued during the Joseph Biden Administration embraced the concept of using enforcement as a tool to advance policy objectives in the absence of regulatory or statutory authority. *See, e.g.*, Larry Starfield, "Using All Appropriate Injunctive Relief Tools in Civil Enforcement Settlements," Apr. 26, 2021, *available at* https://www.epa.gov/sites/default/files/2021-04/documents/usingallappropriateinjunctivereliefttoolsincivilenforcementsettlement0426.pdf.
10. Derron, *supra* note 1, at 1684.
11. 5 U.S.C. §553(b).
12. *See* Appalachian Power Co. v. EPA, 208 F.3d 1015 (D.C. Cir. 2000) (finding emissions monitoring guidance was legislative rule requiring notice and comment).
13. Posting all EPA guidance on the Internet was a requirement imposed during President Donald Trump's first term. Inexplicably, the Biden Administration revoked this requirement. It was reinstated in August 2025, https://www.epa.gov/newsreleases/epa-announces-relaunch-comprehensive-guidance-document-website-advances-total.
14. Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co. 463 U.S. 29 (1983).

III. Strength of Cooperative Federalism

The integrity of federal environmental law is maintained even when states are authorized to implement their own statutes in lieu of federal law (CWA and RCRA) or are delegated federal authority (parts of the CAA).

First, under all three statutes, even where the state is the permitting authority, the federal government retains the authority to enforce federal law, including federal law governing when a permit is needed. As with most topics relating to federal environmental law, there are nuances. For example, section 309(g)(6) of the CWA bars federal *administrative* (but not judicial) enforcement if a state is diligently prosecuting an action for the same violation under state law. A court also has interpreted RCRA to preclude EPA over-filing a state enforcement action.[15] However, *Harmon v. Browner* is more often distinguished than followed. The opinion says that if EPA believes a state enforcement action is inadequate, then EPA may take its own enforcement action.[16] Thus, EPA retains vigorous enforcement authority.

Second, a state's interpretation of its own environmental law cannot supersede federal law.[17] Thus, even if the *PNW Metal Recycling* case addressed hazardous waste instead of solid waste, it could not change federal law.[18]

Finally, even though it is unlikely that EPA will review state administrative law judicial opinions, the regulations governing state authorization do require a review of procedural as well as substantive requirements.[19]

In sum, the cooperative federalism model allows both consistency and some variation, without undermining the efficacy of federal environmental law.

15. Harmon Indus. v. Browner, 191 F.3d 894 (8th Cir. 1999).

16. *Id.* at 1901.
17. U.S. Const. Art. IV, para. 2.
18. *Contra* Derron, *supra* note 1, at 1661.
19. *See* 40 C.F.R. §123.22(c) (2015) (regarding the CWA); 40 C.F.R. §271.6(c) (1984) (regarding RCRA).

COMMENT

ROADBLOCKS TO COMMUNITY ADVOCACY ALONG THE LAST MILE

by Amanda Garcia

Amanda Garcia is a Senior Attorney at the Southern Environmental Law Center. The views expressed in this Comment are the personal views of Ms. Garcia as an advocate, not the views of the Southern Environmental Law Center.

I am a Senior Attorney in the Tennessee office of the Southern Environmental Law Center (SELC). SELC is one of the most powerful defenders of communities and the environment in the country, and we are rooted in the South. Our theory of change is place-based. We have attorney boots on the ground in all six states where we operate, including Virginia, North and South Carolina, Georgia, Alabama, and Tennessee.

I also serve as SELC's regional Data Center Project leader. Although I now work across the region, I am going to talk about Tennessee today because that is where I have the most experience on the ground interacting with state and local implementation of federal environmental law. In my work, I have regularly participated in the implementation of federal law through state and local agencies, primarily through state permitting actions and some rulemaking as well.

I think my role on this panel is to provide the ground-level view of what it is like to work on and implement federally delegated programs through state and local processes. As I was saying to Prof. Anthony Derron before the panel, when I read his article, I felt seen.

It is very much my experience that we lack publication of important information at the state and local level by the agencies that are implementing federal environmental law. In addition, judicial review of state agency action is the exception rather than the rule. Even when judicial review does occur, it is often unpublished because it is happening either through administrative adjudications or at the trial court level which in Tennessee, at least, means those decisions are either not published—or as Professor Derron found out when he tried to search—not easily accessible.

So, I agree with the premise that we are at least risking the implementation of federal environmental law and policy not quite being what the U.S. Congress envisioned when it is being implemented through delegated programs.

I want to lay out the stakes, because this discussion is happening at a very theoretical level—but what we are really talking about is protection for people's health. I work primarily under the Clean Air Act (CAA).[1] When we talk about the rules—including which rules apply and how we can ensure proper administration—what is actually at stake is the quality of the air that people are breathing. Are they going to get sick? How can agency decisionmakers be held accountable for ensuring those protections?

And in the South in particular, where I work, federal law is a very important backstop. In Tennessee and other southern states, we rely a lot on the backstop of federal law in order to protect basic public health in our state.

Part of the reason I felt seen when I read the article is that, as a descriptive matter, the article does a great job of pointing out the lack of publication. I currently have multiple public records requests out asking for local ordinances that amend provisions of local regulations or state regulations that are incorporated into a local implementation plan under the CAA. It is not clear which portions of the local ordinances are enforceable under federal law and what the exact contours of those ordinances are.

Everybody laughed when Professor Derron discussed the crosswalk of "here's the federal regulation and here's where it's found in state law." In my office, we literally have spreadsheets that show: the local ordinance at the city level, the county level, the state level, and the part of a *Federal Register* notice that confirms it has actually been incorporated into the state implementation plan.

Depending on where you are litigating—whether you are trying to bring an enforcement action or trying to bring a permit appeal in a state administrative forum or state court—you might be relying on different versions of the same law or regulation, even though in theory they are all implementing federally delegated authority under the CAA.

Editors' Note: Amanda Garcia's Comment is based on an edited transcription of her remarks at the Environmental Law and Policy Annual Review conference. A recording of the conference is available here: https://www.eli.org/events/2026-environmental-law-and-policy-annual-review-elpar-conference.

1. Clean Air Act, 42 U.S.C. §§7401-7671q.

Transparency and accountability for government agencies when you cannot even find the governing law is a big problem, especially if you are an outsider and representing communities that are affected by pollution, as opposed to regulated entities that have more regular access to the state and local regulators.

I also wanted to touch on the judicial review side of things. This is another area where there are a lot of barriers to entry for third-party litigants. Professor Derron talked about why we are not seeing more state supreme court decisions about administrative law, and he made the very good point that part of the reason is that regulated industry is not taking cases up to the top—usually because they are repeat players who want to have a good working relationship with the local regulatory authority.

There are also a lot of hurdles to third-party participation. In particular, at least in Tennessee—and I think this is true in a lot of states in the South—administrative appeals are de novo, full evidentiary litigation. There is a lot of cost, both in terms of time and actual expense to hire experts, involved in prosecuting even that first step toward getting a permit appeal up to the trial court level. Then, after the trial court, there is the court of appeals, and then discretionary review by the state supreme court—that is a lot of time and investment. By that point, whatever you were challenging—especially if you raised a process issue—has already been built and people have been breathing that air for a decade by the time you get up to the state supreme court. As a practical matter, this is just another issue in terms of establishing administrative process rules through judicial review.

I was reflecting on why agencies are unlikely to publish rules, guidance, or decisions in Tennessee. Professor Derron's article points to weak civil society and a strong governor.[2] In Tennessee, a large component of the calculus has to do with legislative oversight over state agencies and our state environmental agency, in particular.

There is a saying that if a regulator does their job too well, politicians will punish them. Basically, we have open hostility to protective policies in our state. If our state agency publishes a rule or even writes a letter, the regulated party can take a number of actions, most of which end up with legislation being proposed that is directly in opposition to whatever the state agency has proposed.

I have even seen several instances where the state legislature threatened to remove the agency's authority from regulating the issue altogether, or above the federal minimum—which then raises the question: what's the point of cooperative federalism if you can't have a more protective statute than the federal floor is intending?

We also have legislative rule review on the rulemaking front. This means that any sort of rule gets reviewed by our legislature, and they can reject the rule if the regulated industry lobbies and says this is too onerous. Just to clarify, there is a carveout for rules that are federally required for delegated programs.

Right now, in our General Assembly, there is a bill that was originally floated by Americans for Prosperity called the Regulatory Freedom Act. It would require agencies to run their rules only by regulated parties. Regulated parties could comment and provide information anonymously; they would not have to disclose who they are. And, if the overall impact of the rule is going to be above a million dollars across the whole industry, it has to be approved by both houses of the legislature. This bill has traction. It is moving through our legislature.[3]

In closing, I agree with Professor Derron that the lack of clarity and transparency in the last regulatory mile is a problem. My concern with relying on state legislatures and judicial review to solve the problem is that, on the legislative side, there are not shared administrative norms. There is active hostility to administrative norms. And on the judicial review side, there are simply barriers to entry for cases to proceed through the courts. Thank you.

2. Anthony B. Derron, *Unwritten Administrative Law and the Regulatory Last Mile*, 173 U. Pa. L. Rev. 1657, 1709-13 (2025).

3. The bill was subsequently enacted by the state legislature. H.B. 1913, 113th Gen. Assemb., Reg. Sess. (Tenn. 2024) (enacted as 2024 Tenn. Pub. Acts ch. 818).

NORTH CAROLINA'S PREDICTABLE LAST REGULATORY MILE

by Reid Wilson

Reid Wilson serves as Secretary of the North Carolina Department of Environmental Quality.

Good afternoon and thanks to the Environmental Law Institute and, in particular, to my old U.S. Environmental Protection Agency (EPA) colleague, Mike Vandenbergh—and to Linda Breggin as well—for the invitation.

A few words about the North Carolina Department of Environmental Quality (DEQ). We are essentially the state-level environmental protection regulatory agency, but we have a number of nonregulatory divisions as well—like water infrastructure and also a State Resilience Office.

We work on a wide range of issues—everything from mapping landslides at the tops of mountains to protecting flounder populations on the ocean floor. We have a wide purview.

In terms of responding to Prof. Anthony Derron's article, I can only speak for North Carolina and our experience. I am sure if you had the 49 other DEQ secretary equivalents, they would have slightly different perspectives because we are all working in different situations. But our situation in North Carolina is fairly different from the situations described in the article.

One important point is that in all of our work we depend on strong partnerships—whether that is regulated entities, nongovernmental organizations, communities, local governments, or a number of federal government agencies. We work closely with them and, in particular, we have a great relationship with EPA Region 4. I cannot say enough good things about those folks.

These partnerships are really important when you are thinking about this concept of the regulatory last mile because, in North Carolina, it feels to us like that last mile is not "radically underspecified," to use Professor Derron's words.[1] Part of that is because we have these close working relationships. We can work things through, have honest discussions, and figure out if there is a solution.

Like other DEQs, we have more than 30 years of experience implementing the various federal rules and laws through our delegated authority. In that time, we have refined and improved the way we do that business. In North Carolina, the administrative law structure is anything but undeveloped. We do have a structure that minimizes uncertainty and unpredictability, specifically for purposes of the major federal environmental laws that we implement at the state level.

North Carolina has rulemaking bodies that are separate from the agencies that administer and enforce the rules, and we have essentially an administrative court that weighs in when it is appropriate.

We also have nine citizen commissions that we interact with, but I will focus on the one that does the EPA-type regulatory work: the Environmental Management Commission (EMC). It has 15 members. Seven are appointed by the governor—and bear in mind that seven out of 15 is a minority. Six are appointed by the General Assembly and two by the agriculture secretary, who happens to be of the same party as the legislature. Accordingly, the party that controls the legislature right now has eight votes compared to seven for the governor—this is an important point.

Years ago, the General Assembly created the EMC for two reasons. One, to make rules, and it does so in accord with standard Administrative Procedures Act (APA) procedures.[2] There is robust consideration and discussion among these 15 commissioners, notice-and-comment periods, and a lot of public hearings.

Furthermore, important rules adopted under the environmental laws must also undergo EPA Region 4 review and sometimes EPA national review as well. For example, under the Clean Air Act (CAA),[3] all North Carolina rules must be reviewed, publicly noticed, and federally adopted into the State Implementation Plan (SIP). If they are not adopted by EPA into the SIP, the rule does not go into effect.

Just two weeks ago, after public comment, hearings, and open meetings, the EMC approved a rule concerning preconstruction air quality permits.[4] The rule was man-

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1. Anthony B. Derron, *Unwritten Administrative Law and the Regulatory Last Mile*, 173 U. Pa. L. Rev. 1657, 1659 (2025).
2. Administrative Procedure Act, 5 U.S.C. §§551-559.
3. Clean Air Act, 42 U.S.C. §7401-7671q.
4. N.C. Dep't of Env't Quality, *Pre-Permitting Construction Activities*, https://www.deq.nc.gov/about/divisions/air-quality/air-quality-planning/air-quali-

dated by the legislature, because they were unhappy with the existing situation at the time. Now that the EMC has approved the rule, EPA Region 4 will review it to ensure that it actually complies with the CAA and the SIP. We have been talking to EPA folks on and off throughout this process.

At the same meeting,[5] EMC approved a different legislatively mandated rule concerning treated wastewater flows into low-flow or no-flow water bodies.[6] We have been engaged with EPA Region 4 on that as well, and they will weigh in as to whether this rule passed by the EMC complies with the Clean Water Act.

To recap, the first thing the EMC does is pass rules. Second, they adjudicate and settle certain questions of law. Under North Carolina law, the EMC and all the other commissions can issue declaratory rulings.[7] Admittedly, this doesn't happen very often, but it does from time to time. An aggrieved party can ask the EMC to issue a declaratory ruling as to the applicability of a rule or statute that we administer. These declaratory rulings are a way for a regulated entity to get a definitive answer as to the application of a rule in the last regulatory mile. These declaratory rulings are published, and they are subject to judicial review.

An example from not too long ago involved a truck petroleum spill enforcement action.[8] The company challenged DEQ's interpretation and application of a cleanup rule. The EMC reviewed the whole thing and determined that DEQ had gotten it right—that the rule did apply in the way staff had determined it should. So, there is that process that the EMC can pursue when an aggrieved entity asks.

In addition, on the subject of judicial review, our state has an administrative court called the Office of Administrative Hearings (OAH),[9] that is specifically set up to resolve administrative law disputes. Administrative law judges, or ALJs, preside over full evidentiary hearings in which the rules of civil procedure apply. Decisions are published. There is judicial review by the superior courts of ALJ decisions. While ALJs are not bound by prior decisions, those decisions usually are persuasive and often followed—although not always—and ALJs are bound by judicial case law. This administrative law structure tends to diminish uncertainty.

In addition, we have significant statutory bounds, including what is known in our state as the Hardison Amendment, which went into effect in 2013. It provides subject to certain exceptions laid out in the statute:

> An agency authorized to implement and enforce state and federal environmental laws may not adopt a rule for the protection of the environment or natural resources that imposes a more restrictive standard, limitation, or requirement than those imposed by federal law or rule, if a federal law or rule pertaining to the same subject matter has been adopted."[10]

We cannot be more stringent, which is not our favorite statutory limitation. But it does place primacy on the federal standards and requirements, and we comply with them.

Our courts in recent years have also shown a penchant for erasing uncertainty in the last regulatory mile. In a recent North Carolina Supreme Court case that did not go our way, the Farm Bureau challenged some conditions in concentrated animal feed operation general permits arguing that there should be rules rather than conditions. The Supreme Court agreed, and now we are going back to the EMC, because they want to review the whole general permit and make it a rule rather than a set of conditions.[11]

In addition, in North Carolina, the courts recently have been striking down agency deference in state law, which of course is consistent with the *Loper Bright*[12] case at the federal level.

Another point—and this gets back to the concept of cooperative federalism—is that we actually are cooperating with our federal friends. EPA and the U.S. Army Corps of Engineers are more like partners and collaborators rather than just backstops. I could give you a couple of other examples of current hot issues right now that involve our EMC or legislature thinking of doing something, and EPA is saying that does not seem to comply with federal law. We continue to work with EPA so that we are on the same page, which is really important.

Our reality in North Carolina is that our regulatory structure is not unbounded. In fact, on a lot of days it feels like we have a lot of bounds, and we don't have much wiggle room or flexibility to do things. I know not every state is like this, but that is the way it is in North Carolina.

I would argue from my vantage point, 250 miles south of Washington, D.C., that if you are looking for uncertainty, the place to look right now is at the federal level. Priorities, rules, regulations, and laws are changing rapidly, including the overturning and delay of regulations and revocation of grant programs.

Furthermore, a really important point about cooperative federalism is that it does not work unless there's enough money at the state level to cooperate. We were looking at huge cuts in our budget but, fortunately, they did not hap-

ty-rules-regulations#Pre-PermittingConstructionActivities-19223 (last visited June 24, 2026).

5. N.C. Dep't of Env't Quality, *Environmental Mgmt. Comm'n, Proposed Amendments to 15A NCAC 02T .0114 and .0118*, https://www.deq.nc.gov/about/divisions/water-resources/water-resources-commissions/environmental-management-commission/emc-proposed-rules#ProposedAmendmentsto15ANCAC02T0114and0118-17332 (last visited June 24, 2026).
6. N.C. Gen. Assemb., *Bill Summary: S.B. 802, Sec. 5.1: Modernize Wastewater Permitting to Support Environmentally Sound Economic Development*, https://www3.ncleg.gov/Legislation/SummariesPublication/Summary/2024/10/S802-SMRI-86(sl)-v-3 (last visited July 20, 2026).
7. 15A N.C. Admin. Code 21.0601-.0605.
8. *See* Eagle Transport Petition for Declaratory Ruling, No. 20-34, (N.C. Env't Mgmt. Comm'n 2021), https://www.deq.nc.gov/emc-et-atte-jan2022-13/open.
9. N.C. Off. of Admin. Hearings, *Welcome to OAH*, https://www.oah.nc.gov/about/welcome-oah (last visited July 1, 2026).
10. N.C. Gen. Stat. §150B-19.3.
11. N.C. Dep't of Env't Quality v. N.C. Farm Bureau Fed'n, Inc., 388 N.C. 366 (2025).
12. Loper Bright Enters. v. Raimondo, 603 U.S. 369 (2024).

pen. Sometimes, people focus on saying "yes to cooperative federalism," but it really doesn't work unless EPA is delivering the funding that it has over the years.

In sum, at the federal level there is a lot of uncertainty, which will produce even more lawsuits that will take years to travel through the system. But at least in North Carolina, when you get to the last regulatory mile, there is more certainty for us, for the regulated community, and for local governments—a more predictable landscape.

ARTICLE

INDOOR AIR: THE FORGOTTEN FRONTIER OF ENVIRONMENTAL LAW

by Albert C. Lin

Albert C. Lin is a Martin Luther King Jr. Professor of Law and Co-Director of the California Environmental Law and Policy Center at University of California, Davis, School of Law.

I. Introduction

Poor indoor air quality (IAQ) poses a pervasive and serious threat to human health. Various indoor pollutants—chemical and biological—cause respiratory illness, cardiovascular disease, cancer, and death for millions annually. In recent years, the COVID-19 pandemic and episodes of widespread wildfire smoke have underscored IAQ's importance. Nonetheless, governments have paid limited attention to the problem.

Ongoing initiatives suggest pathways for tackling this important and complex problem. A suite of complementary approaches—including voluntary guidelines, procedural requirements, and substantive mandates—can yield IAQ improvements and resulting benefits for human health and well-being.

II. Background

Americans spend the vast majority of their time inside.[1] Indoor air pollution is one of the top environmental risks to public health in the United States[2] and is responsible for approximately 3.2 million deaths per year worldwide.[3] As climate change worsens, hotter days and increased wildfire smoke could drive people indoors even more, while other responses to climate change, such as weatherizing homes, may worsen IAQ.[4]

Pollutant concentrations tend to be much higher in indoor air than outdoor air.[5] These pollutants come from outside air that enters a building; building materials, furnishings, and products within a building; and cooking, cleaning, and other activities by building occupants.[6] Yet, there is often little information about the identity, properties, concentration, and toxicity of chemicals in a building, nor is there readily accessible information about the reactions between those chemicals.[7] Additional uncertainties surround the cumulative and long-term effects of exposure to mixtures of chemicals.[8]

III. Existing Law

A patchwork of federal, state, and local standards relates to IAQ.[9]

A. *Federal Law*

1. The U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) has long interpreted its Clean Air Act (CAA) authority over air pollution to cover only air outdoors.[10] Under the Toxic Substances Control Act (TSCA),[11] EPA can regulate chemical substances that pose unreasonable risks to health or the environment, including chemicals that contribute to indoor air pollution.[12] However, difficulties in exercis-

Editors' Note: This Article is adapted from Albert C. Lin, *Indoor Air: The Forgotten Frontier of Environmental Law,* 85 Ohio St. L.J. 1291 (2025), *and used with permission.*

1. Neil E. Klepeis et al., *The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants*, 11 J. Exposure Analysis & Env't Epidemiology 231, 239, 248 (2001).
2. *Why Indoor Air Quality Is Important to Schools*, U.S. Env't Prot. Agency (Nov. 28, 2023), https://www.epa.gov/iaq-schools/why-indoor-air-quality-important-schools [https://perma.cc/LA62-X9AY] (archived Aug. 2, 2024).
3. *See Household Air Pollution*, World Health Org. (Dec. 15, 2023), https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health [https://perma.cc/HE5C-V98U] (archived Aug. 2, 2024).
4. Marshall Burke et al., *The Contribution of Wildfire to $PM_{2.5}$ Trends in the USA*, 622 Nature 761, 765 (2023); Comm. on the Effect of Climate Change on Indoor Air Quality & Pub. Health, Inst. of Med. of the Nat'l Acads., Climate Change, the Indoor Environment, and Health 6 (2011).
5. Comm. on Emerging Sci. on Indoor Chemistry, Nat'l Acads. of Scis., Eng'g & Med., Why Indoor Chemistry Matters 15 (2022) [hereinafter NASEM, Why Indoor Chemistry Matters]; Joseph G. Allen & John D. Macomber, Healthy Buildings: How Indoor Spaces Can Make You Sick—or Keep You Well 44-45 (2022) (noting that indoor levels of pollutants can be over 10 times greater than outdoor levels).
6. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 1-2.
7. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 1-4; Alastair C. Lewis et al., *Indoor Air Pollution: Five Ways to Fight the Hidden Harms*, 614 Nature 220, 221 (2023).
8. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 6.
9. *See* 3 Laurence S. Kirsch & D. Bruce Myers Jr., Environmental Law Practice Guide §§17A.03, 17.05, n.239. (Michael B. Gerrard ed., 2024).
10. Arden Rowell, *Indoor Environmental Law*, 54 Env't L. 327, 329-30 (2024).
11. 15 U.S.C. §§2601-2692, ELR Stat. TSCA §§2-412.
12. 15 U.S.C. §2601.

ing this authority have led to feeble and infrequent use.[13] Instead, EPA has focused its IAQ efforts on research, assistance, guidance, and voluntary programs.

2. The Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) has the authority to promulgate standards requiring conditions or practices "reasonably necessary or appropriate to provide safe or healthful employment and places of employment."[14] OSHA has not set overarching IAQ standards per se but has established standards for ventilation and some indoor air contaminants.[15]

3. The Consumer Product Safety Commission

The Consumer Product Safety Commission's (CPSC's) authority is limited to "consumer products."[16] Moreover, it must rely on voluntary safety standards if compliance is likely and "would eliminate or adequately reduce the risk of injury addressed."[17] If voluntary standards are inadequate, the CPSC may resort to mandatory product safety standards "reasonably necessary to prevent or reduce an unreasonable risk."[18]

B. Nongovernmental Standards

Building standards developed by nongovernmental organizations also influence IAQ.

1. The American Society of Heating, Refrigerating, and Air Conditioning Engineers

The American Society of Heating, Refrigerating, and Air Conditioning Engineers' (ASHRAE's) standards for ventilation rates, filtration efficiency, and air cleaners have been adopted into most U.S. building codes.[19] These standards set out "minimum requirements" to promote "acceptable" IAQ in commercial, institutional, and residential buildings.[20] However, the ASHRAE standards generally govern building design, not operation,[21] and are not intended to guarantee specific levels of human health protection.[22]

1. Leadership in Energy and Environmental Design

The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) system is a widely used, voluntary rating system that considers a building's design, construction, operation, and maintenance.[23] The system awards points for incorporating elements that reduce contributions to climate change, enhance human health, and promote sustainability.[24] LEED certification does not necessarily ensure safe IAQ,[25] however, as a building can earn the highest certification without earning any points in indoor environmental quality.[26]

2. The World Health Organization Guidelines

The World Health Organization (WHO) published IAQ guidelines in 2010.[27] Developed through expert reviews of scientific evidence linking pollutant exposure with health impacts, these guidelines identify "acceptable levels of population exposure."[28] The guidelines are based solely on anticipated health effects and do not consider implementation costs.[29]

IV. Developing an IAQ Strategy

Multiple factors have hindered development of robust federal or state responses. An effective approach to improving IAQ should account for these factors. In addition, efforts to improve IAQ in other countries can serve as reference points for designing IAQ measures in the United States.

13. Rachel Rothschild, *Unreasonable Risk: The Failure to Ban Asbestos and the Future of Toxic Substances Regulation*, 47 Harv. Env't L. Rev. 529, 588-97 (2023) (discussing EPA strategies during the first Donald Trump Administration for avoiding determinations that chemicals pose unreasonable risk); Valerie J. Watnick, *The Lautenberg Chemical Safety Act of 2016: Cancer, Industry Pressure, and a Proactive Approach*, 43 Harv. Env't L. Rev. 373, 404 (2019) (discussing the "exceedingly slow process of review" of existing chemicals for toxic risks); Corrosion Proof Fittings v. EPA, 947 F.2d 1201, 1215 (5th Cir. 1991) (vacating phased ban of asbestos in various products).
14. 29 U.S.C. §652(8).
15. *Indoor Air Quality: Overview*, U.S. Occupational Safety & Health Admin., https://www.osha.gov/indoor-air-quality [https://perma.cc/WWR9-525D] (archived Oct. 17, 2024); 29 C.F.R. §1910.94 (2024); 29 C.F.R. §1910.1000 (2024).
16. Laurence S. Kirsch, *Behind Closed Doors: Indoor Air Pollution and Government Policy*, 6 Harv. Env't L. Rev. 339, 377 (1982).
17. 15 U.S.C. §2056(b)(1).
18. 15 U.S.C. §2056(a).
19. *See* NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 101-02.
20. ASHRAE, ANSI/ASHRAE Standard 62.1-2022, at 2 (2022); ASHRAE, ANSI/ASHRAE Standard 62.2-2022, at 2 (2022).
21. Emily Anthes, *The New War on Bad Air*, N.Y. Times (June 23, 2023), https://www.nytimes.com/2023/06/17/health/covid-ventilation-air-quality.html [https://perma.cc/3W5Y-2M22] (archived Feb. 3, 2026).
22. Andrew Persily, *Challenges in Developing Ventilation and Indoor Air Quality Standards: The Story of ASHRAE Standard 62*, 91 Bldg. & Env't 61, 62 (2015).
23. Geoffrey M. White et al., *Green Building Rating Systems and Green Leases*, 41 ELR 10049, 10050-51 (Jan. 2011).
24. *LEED Rating System*, U.S. Green Bldg. Council, https://www.usgbc.org/leed [https://perma.cc/JQ4F-Y435] (archived Aug. 2, 2024).
25. *See* Hannah Phillips et al., *Taking the "LEED" in Indoor Air Quality: Does Certification Result in Healthier Buildings?*, 15 J. Green Bldg. 55, 63 (2020) (finding lower levels of particulate matter in college campus buildings with LEED certification).
26. Comm. on the Effect of Climate Change on Indoor Air Quality & Pub. Health, *supra* note 4, at 222.
27. World Health Org., WHO Guidelines for Indoor Air Quality: Selected Pollutants xvi (2010).
28. *Id.* at 4-7.
29. *See* Lidia Morawska & Wei Huang, *WHO Health Guidelines for Indoor Air Quality and National Recommendations/Standards*, *in* Handbook of Indoor Air Quality 1494 (Yinping Zhang et al. eds., 2022).

A. *Barriers*

1. Lack of Obvious Externalities

Negative externalities serve as a prominent justification for government regulation.[30] Indoor air pollution involves fewer obvious externalities than outdoor pollution: IAQ in one building typically has little effect on IAQ in another building, and individuals exercise some control over air quality in their homes.[31] However, homeowners may lack sufficient information and resources to make and implement informed decisions about IAQ.[32] Many factors that influence IAQ, including outdoor air pollution, lie outside the control of a building's occupants.[33] In commercial and public buildings, indoor air pollution squarely presents a public health issue because visitors, employees, and other occupants typically have little or no control over IAQ.[34]

2. Low Visibility

Inattention to indoor air pollution can be attributed in part to the problem's largely invisible nature.[35] Indoor air pollution is often invisible and odorless.[36] Symptoms of poor IAQ vary widely and may be mistaken for symptoms of allergies, colds, or stress.[37] Linking symptoms to specific pollutants is often difficult if not impossible.[38] Long-term risks, such as increased rates of cancer or heart disease from exposure to volatile organic compounds (VOCs), may not be immediately apparent to building occupants.[39]

3. Privacy Concerns

Regulating IAQ in the home raises worries about privacy and government intrusion. Although administrative inspections of homes and businesses require probable cause or consent, less is required in the civil context than for a criminal search warrant.[40] Even if constitutionally permissible, government IAQ inspections or monitoring in homes would be politically unpopular.

As a technical matter, monitoring IAQ in the home is increasingly feasible. Low-cost IAQ monitors vary widely in terms of their accuracy, reliability, and durability,[41] but are reliable enough to help identify emission sources, notify building occupants, and prompt responses that reduce indoor air pollution.[42]

4. Complexity and Perceived Cost

Indoor air pollution is comprised of numerous and diverse substances generated by multiple sources and processes, and pollutants' composition and concentration vary over space and time and from one building to another.[43] Improving IAQ will require further research and multiple approaches rather than any single prescription.

Some indoor air pollution can be readily addressed by ceasing the pollution-causing activity or by opening a window. In contrast, installing or upgrading heating, ventilation, and air conditioning (HVAC) or exhaust systems may require substantial expenditures.[44] As a general matter, the public health and productivity benefits of improved IAQ would "likely far outweigh the investment costs in achieving clean [indoor air]."[45]

5. Commerce Clause Limits

Whereas state authority to regulate IAQ falls squarely within states' general police power,[46] federal regulation would rely heavily on the U.S. Congress' power to regulate interstate commerce.[47] Regulating consumer products and other items in commerce that affect IAQ lies clearly within federal authority.[48] However, federal regulation of private residences may be limited to specific circumstances, such as the sale of residences.[49]

B. *Comparative IAQ Regulation*

IAQ management outside the United States relies primarily on source controls, building code ventilation requirements, or voluntary guidelines.[50] Because of the difficulty of monitoring and enforcing air quality standards, these policies rarely mandate the achievement of specific IAQ levels.[51]

30. *See* E. Donald Elliott & Daniel C. Esty, *Environmental Law for the 21st Century*, 40 Pace Env't L. Rev. 454, 456 (2023).
31. *See* Kirsch, *supra* note 16, at 383.
32. *Id.* at 383-85.
33. Allen & Macomber, *supra* note 5, at 42-43.
34. *See* Kirsch, *supra* note 16, at 385.
35. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 107.
36. *See id.*
37. U.S. Occupational Safety & Health Admin., Indoor Air Quality in Commercial and Institutional Buildings 4 (2011); H.E. (Barney) Burroughs & Shirley J. Hansen, Managing Indoor Air Quality 29-36 (5th ed. 2011).
38. Burroughs & Hansen, *supra* note 37, at 23.
39. *See id.* at 57.
40. Camara v. Mun. Ct., 387 U.S. 523, 530-38 (1967).
41. *See Low-Cost Air Pollution Monitors and Indoor Air Quality*, U.S. Env't Prot. Agency (Jan. 3, 2024), https://www.epa.gov/indoor-air-quality-iaq/low-cost-air-pollution-monitors-and-indoor-air-quality [https://perma.cc/DK43-EW8J] (archived Aug. 2, 2024).
42. Milagros Ródenas García et al., *Review of Low-Cost Sensors for Indoor Air Quality: Features and Applications*, 57 Applied Spectroscopy Revs. 747, 750, 769 (2022).
43. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 21-22.
44. Lewis et al., *supra* note 7, at 223.
45. Lidia Morawska et al., *Mandating Indoor Air Quality for Public Buildings*, 383 Science 1418, 1420 (2024).
46. Frank P. Grad, 1 Treatise on Environmental Law §2.04[2] (2024).
47. *Legislation for Clean Air: An Indoor Front*, 82 Yale L.J. 1040, 1051 (1973).
48. *See* U.S. v. Lopez, 514 U.S. 549, 558 (1995) (recognizing Congress' authority to regulate "things in interstate commerce" under the Commerce Clause).
49. *See* David M. Driesen, *The Economic/Noneconomic Activity Distinction Under the Commerce Clause*, 67 Case W. Rsrv. L. Rev. 337, 372 (2016) (discussing when commercial transactions constitute economic activity under *Lopez*).
50. United Nations Env't Programme, Regulating Air Quality: The First Global Assessment of Air Pollution Legislation 56-57 (2021).
51. *Id.* (noting challenges of monitoring IAQ in private settings).

1. Canada

Health Canada issues voluntary IAQ guidelines pursuant to the Canada Environmental Protection Act.[52] Health Canada has developed quantitative guidelines for 11 contaminants, guidance to reduce exposure to other contaminants, and Indoor Air Reference Levels for certain pollutants that lack recommended exposure limits.[53] Guidelines, guidance, and reference levels serve as benchmarks for government risk assessments and provide direction for managers of public spaces.[54]

2. Japan

Japan's Ministry of Health, Labour, and Welfare established individual IAQ guidelines for 13 VOCs between 1997 and 2002 as well as a provisional target for total VOCs.[55] These guidelines apply generally to indoor spaces, including housing, but not to industrial plants.[56] Japan has also established IAQ requirements for designated categories of buildings, including stores, offices, and schools.[57]

3. South Korea

South Korea's Indoor Air Quality Control Act requires "public-use facilities" of a prescribed size to meet IAQ standards for pollutants identified by the Ministry of Environment.[58] The government may enforce IAQ standards by ordering ventilation or other measures and penalizing violators with fines and prison time of up to one year.[59] The statute also regulates construction materials and requires public-use facility owners to measure IAQ.[60]

4. Taiwan

Taiwan adopted a regulatory program similar to South Korea's and has gradually expanded the premises to which its standards apply.[61] Regulated premises—including colleges, government offices, public transportation, and malls—must meet IAQ standards, prepare and implement IAQ management plans, regularly test IAQ, and make test results publicly available.[62] Taiwan also established a voluntary program that allows building operators to earn and publicize a certification if they meet specified standards.[63]

5. Belgium

In the wake of the COVID-19 pandemic, Belgium established a relatively limited scheme of IAQ regulations. The regulations, which are largely procedural, apply to enclosed spaces open to the public and workspaces open to the public, but not to residences or office meeting rooms.[64]

6. The European Union

The European Parliament included several provisions focused on IAQ in its 2024 revisions to the Energy Performance of Buildings Directive.[65] Article 13 requires Member States to "set requirements for the implementation of adequate indoor environmental quality standards in buildings in order to maintain a healthy indoor climate."[66]

V. A Pathway for Improving IAQ

An IAQ improvement regime should incorporate voluntary guidelines, procedural regulations, and substantive standards. Over time, these options can build off each other, bridge policy gaps, and collectively form an increasingly comprehensive approach to addressing indoor air pollution.

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52. Jocelyn Moore et al., Health Canada's Indoor Air Program: Risk Assessment and Research to Support Standards Development 1-2 (2022).
53. *Id.* at 2; *Indoor Air Quality Resources for Professionals*, Health Can. (Dec. 9, 2022), https://www.canada.ca/en/health-canada/services/air-quality/residential-indoor-air-quality-guidelines.html [https://perma.cc/FJE3-S7B8] (archived Aug. 2, 2024); *Indoor Air Reference Levels*, Health Can. (Feb. 2, 2018), https://www.canada.ca/en/health-canada/services/publications/healthy-living/indoor-air-reference-levels.html [https://perma.cc/Z5UC-N395] (archived Aug. 2, 2024).
54. Stephanie Wille & Jocelyn Moore, Indoor Air Quality Exposure Limits at Health Canada (Health Can., 2023), https://ww2.arb.ca.gov/sites/default/files/2023-06/Moore_IACAS_guidelines.pdf [https://perma.cc/4SCR-7CYZ] (archived Feb. 4, 2026).
55. Kenichi Azuma et al., *Risk Assessment Concepts and Approaches for Indoor Air Chemicals in Japan*, Int'l J. Hygiene & Env't Health, Apr. 2020, at 3; Kayo Tsumura et al., *Is Indoor Environment a Risk Factor of Building-Related Symptoms?*, PLOS ONE, Jan. 25, 2023, at 1-2.
56. Azuma et al., *supra* note 55, at 2.
57. Hayashi Motoya et al., *The State of the Indoor Air Environment in Buildings and Related Tasks in Japan*, 69 J. Nat'l Inst. Pub. Health 63, 63-64 (2020).
58. Indoor Air Quality Control Act, arts. 2-3 (S. Kor.), *translated in* Korean Legislation Research Institute's online database, https://elaw.klri.re.kr/eng_service/lawView.do?hseq=41231&lang=ENG [https://perma.cc/7ZY2-44VZ] (archived Feb. 4, 2026).
59. *Id.* arts. 10, 14, 16; Maia Foster, *Legal Strategies to Minimize Subway Air Pollution in the United States*, 72 Duke L.J. 1345, 1364 (2023).
60. Indoor Air Quality Control Act, *supra* note 58 arts. 11-12. One study found lower indoor pollutant concentrations in regulated facilities. Jinho Yang et al., *Effects of Legal Regulation on Indoor Air Quality in Facilities for Sensitive Populations—A Field Study in Seoul, Korea*, 64 Env't Mgmt. 344, 349-51 (2019).
61. Indoor Air Quality Management Act, art. 6 (Nov. 23, 2011) (Taiwan), Fawubu Fagui Ziliaoku (全國法規資料庫) [Laws and Regulations Database of the Republic of China] https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=O0130001 [https://perma.cc/P39W-6YHQ] (archived Aug. 24, 2024); Chih-Pei Hu & Jen-Hsiung Cheng, *Indoor Air Quality Certification and Consumers' Willingness: Taiwan's Experience and Survey*, Atmosphere, Oct. 9, 2021, at 3; *Indoor Air Quality*, Ministry of Env't (Taiwan), https://air.moenv.gov.tw/airepaEn/EnvTopics/IndoorAirQuality_1.aspx [https://perma.cc/Y7CA-T4H8] (archived Oct. 16, 2024).
62. Indoor Air Quality Management Act, *supra* note 61, arts. 7-10.
63. Hu & Cheng, *supra* note 61, at 4-5.
64. Dyani Lewis, *Diseases in the Room*, 615 Nature 206, 206 (2023); Maïthé Chini, *Bars, Cinemas, Gyms: Belgium Agrees on 'Ventilation Plan' for Public Places*, Brussels Times (Apr. 4, 2022), https://www.brusselstimes.com/214866/bars-cinemas-gyms-belgium-agrees-on-ventilation-plan-for-public-places [https://perma.cc/8ZCY-J4LX] (archived Aug. 9, 2024); *Legal Framework Regarding Indoor Air Quality*, Fed. Pub. Serv. Health, Food Chain Safety, & Env't (Belg.), https://www.health.belgium.be/en/closer-legal-framework-indoor-air-quality [https://perma.cc/D8NG-RJUE] (archived Aug. 2, 2024).
65. Directive 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the Energy Performance of Buildings (Recast), 2024 O.J. (L 2024/1275), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401275 [https://perma.cc/YCC4-G8SL] (archived Feb. 4, 2026).
66. *Id.* art. 13, ¶ 4.

A. *Voluntary Guidelines*

One important step would be for federal or state regulators to issue voluntary IAQ guidelines, as Canada has.[67] A significant advantage of this approach is that agencies can sometimes issue guidelines without new statutory authority. At the federal level, the Radon Gas and Indoor Air Quality Research Act authorizes EPA to research indoor air pollution and disseminate information on indoor air pollution and methods for reducing it.[68] EPA might issue voluntary IAQ guidelines based on this information dissemination authority.[69]

Though voluntary in nature, guidelines can inform product safety standards, agency program implementation, building codes, building certification programs, and consumer behavior.[70] Voluntary standards may be especially appropriate where private actors lack information on the steps needed to improve IAQ.[71] In the current political environment, mandatory federal IAQ standards would likely face an uphill struggle, especially in light of historical norms of state and local control of building safety standards and land use.[72]

Widespread acceptance of ASHRAE's standards for ventilation and HVAC system design suggests a potential pathway for making voluntary guidelines effective. In addition, certification schemes can encourage commercial building managers to make IAQ improvements, which often pay for themselves in terms of productivity gains and reduced absenteeism.[73]

B. *Procedural Regulation*

Another option is to institute procedural requirements aimed at improving IAQ. Such a scheme could require owners and operators of regulated indoor environments to measure pollution levels or ventilation rates or test for IAQ and make results available to building occupants or the public.[74] It could also require risk analyses, IAQ management plans, and air quality certifications.[75] Officially promulgated reference levels for measured pollutants would facilitate interpretation and use of test results by interested parties and the public.[76]

Motivating individual action generally has proven more difficult because individuals "remain largely unaware of or fail to understand the information subject to disclosure."[77] Unfortunately, as this insight suggests, IAQ disclosure requirements may have limited impact in the very context—i.e., residential dwellings—in which such requirements may be most politically necessary. It also points to the importance of ensuring disclosures are clear and coupled with educational outreach and incentives for individual action.

C. *Substantive Regulation*

The architects of substantive regulation will have to make fundamental choices regarding which indoor environments and pollutants to regulate, as well as which regulatory tools to use.

1. Which Indoor Environments?

Indoor air pollution encompasses a wide range of indoor environments, including industrial workplaces, offices, schools, multifamily residential buildings, and single-family homes.[78] This variety of indoor environments—and the differences between them—points toward a tailored rather than a uniform approach to addressing IAQ issues.[79] Existing legal regimes already single out industrial workplaces and schools for regulation. Substantive regulations might also focus on larger facilities used by the public in significant numbers—as in Japan, South Korea, and Taiwan—or even multifamily residential buildings.[80]

A tiered regulatory approach could account for the differing feasibility, effectiveness, and impact of substantive IAQ regulation in varying environments. The most stringent protections should apply in schools, hospitals, senior living facilities, and other buildings with large numbers of users who are especially susceptible to poor IAQ.[81] More modest protections might apply in workplaces and public buildings, where users are generally less vulnerable to poor IAQ. In private residences, more limited and less-intrusive protections could apply, such as product bans.[82]

2. Which Pollutants?

Oversight should focus on a small handful of common pollutants that are more readily measured and pose significant health risks. Monitoring requirements focused specifically on carbon monoxide (CO), carbon dioxide (CO_2), and fine

67. Nina Prescott et al., *The Need for US Indoor Air Quality Guidelines*, Rocky Mountain Inst. (Oct. 11, 2023), https://rmi.org/the-need-for-us-indoor-air-quality-guidelines [https://perma.cc/R3XG-J9JP] (archived Aug. 2, 2024).
68. 42 U.S.C. §7401.
69. Prescott et al., *supra* note 67.
70. *Id.*; Kirsch, *supra* note 16, at 390-91.
71. *See* Kirsch, *supra* note 16, at 387-88.
72. Johns Hopkins Ctr. for Health Sec., Model Clean Indoor Air Act 7 (2023).
73. Allen & Macomber, *supra* note 5, at 56-59.
74. *Cf.* Johns Hopkins Ctr. for Health Sec., *supra* note 72, at 26-27.
75. *Cf. id.* at 26-28.
76. *See supra* Part IV.B.1.
77. Katrina Fischer Kuh, *Informational Regulation, the Environment, and the Public*, 105 Marq. L. Rev. 603, 660 (2022).
78. Ken Sexton, *Indoor Air Quality: An Overview of Policy and Regulatory Issues*, 11 Sci. Tech. & Hum. Values 53, 59 (1986).
79. John Saffell & Sascha Nehr, *Improving Indoor Air Quality Through Standardization*, 3 Standards 240, 257 (2023) ("[I]t is necessary to consider the specific requirements for air quality management approaches in different indoor environments.").
80. *See* Foster, *supra* note 59, at 1376.
81. *See Indoor Air Quality*, U.S. Env't Prot. Agency (2024), https://www.epa.gov/report-environment/indoor-air-quality [https://perma.cc/AZ72-5Q4R] (archived Sept. 11, 2024) (mentioning "the very young, older adults, people with cardiovascular or respiratory disease" as especially susceptible to the adverse effects of pollution).
82. *Cf.* Lidia Morawska et al., *Mandating Indoor Air Quality for Public Buildings*, 383 Science 1418, 1418 (2024). ("Although enforcement of IAQ performance standards in homes is not possible, homes must be designed and equipped so that they could meet the standards.").

particulate matter ($PM_{2.5}$) can generate a general snapshot of IAQ at reasonable cost.[83] CO monitoring can readily identify life-threatening levels resulting from incomplete combustion.[84] CO_2 concentrations serve as a proxy for ventilation rates and emissions linked to people—such as bioeffluents and respiratory viruses—which are not easily monitored.[85] Elevated $PM_{2.5}$ levels can not only reveal inadequate ventilation and poor air filtration, but also cause health risks from $PM_{2.5}$ exposure itself.[86]

Regulations already govern the use or concentration of a few substances, such as formaldehyde, in specified products.[87] Many hazardous substances, however, are unregulated.[88] Product-focused standards, which might be applied to building materials, gas stoves, and other consumer products that emit indoor pollutants, "are relatively simple to devise and administer" but offer only a piecemeal approach to indoor air pollution.[89]

3. Which Tools?

Architects of environmental regulation can draw upon a wide range of policy options for improving environmental quality—including ambient standards, design standards, product bans, and subsidies.[90]

Those seeking to establish indoor standards analogous to the CAA's[91] ambient standards would face serious practical challenges—including a multitude of pollutants with varying and synergistic effects, variations in individual behavior and susceptibility to pollutants, a diversity of building stock as well as varying conditions within buildings, and difficulty in measuring ambient concentrations of specific chemicals at high spatial and temporal resolution.[92]

Under the CAA, regulation is concentrated on a relatively small number of polluters, such as power plant operators and motor vehicle manufacturers, for whom pollution reduction is relatively feasible and effective.[93] Building owners, operators, and occupants are more numerous and have a more limited capacity to address indoor air pollution, which arises from multiple and varied sources.[94]

Design standards, which either specify a pollution control technology or allow entities to choose any technology that meets a quantitative or qualitative standard, would be easier to implement and potentially more effective in improving IAQ than ambient standards.[95] Design standards could include building code requirements governing air filtration efficiency, ventilation rates, ventilation and exhaust equipment, and the like. Through dilution and filtration, each such standard can reduce concentrations of multiple pollutants—as opposed to ambient standards, which take a more tedious pollutant-by-pollutant approach.[96] Design standards should be accompanied by operating, maintenance, and inspection standards that help ensure actual and effective use of mandated equipment.[97]

Product regulation might include prohibitions or restrictions on the use of specified products or building materials that contribute to indoor air pollution. However, regulating all products that contribute to poor IAQ is not feasible, nor would such regulation alone solve the problem.[98] Lack of information about the thousands of chemicals in indoor products and their potential health effects will confound a purely product-based approach to improving IAQ.[99]

Finally, subsidies, though they do not impose substantive mandates, can help pay for improvements aimed at bettering IAQ.[100] Although subsidies can involve significant public expenditures, they represent potentially important tools for generating public health benefits and improving IAQ, particularly when regulation may be infeasible or ineffective.

VI. Conclusion

Poor IAQ is an overlooked yet serious threat to the health of millions of Americans. Federal, state, and local governments have taken piecemeal approaches that have yielded

83. Fed'n of Eur. Heating, Ventilation & Air Condition Ass'ns, Nordic Ventilation Grp. & Eurovent, Proposed Modifications and Guidelines for Implementation of Article 11a "Indoor Environmental Quality," *in* EPBD Draft 3, 5 (2023); Saffell & Nehr, *supra* note 79, at 250 (noting that CO_2 monitors are readily available at low cost).
84. Morawska et al., *supra* note 82, at 1419.
85. Persily, *supra* note 22, at 66-67; Morawska et al., *supra* note 82, at 1418-19 (recommending use of proxy parameters); Lewis et al., *supra* note 7, at 221 (noting that CO_2 levels offer little or no information about VOCs and other pollutants).
86. Fine particulate matter ($PM_{2.5}$) can cause cancer, respiratory illness, cardiovascular disease, and impairment of the immune system.
87. Formaldehyde Emission Standards for Composite Wood Products, 81 Fed. Reg. 89674 (Dec. 12, 2016).
88. *See* Martin Wagner et al., State of the Science on Plastic Chemicals 38 (2024), https://plastchem-project.org [https://perma.cc/9VPQ-AUDN] (archived Oct. 20, 2024).
89. *See* Kirsch, *supra* note 16, at 388-89.
90. Holly Doremus et al., Environmental Policy Law 631-34 (6th ed. 2012).
91. 42 U.S.C. §§7401-7671q, ELR Stat. CAA §§101-618.
92. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 36, 148, 156-57; Comm. on the Effect of Climate Change on Indoor Air Quality & Pub. Health, *supra* note 4, at 25; Foster, *supra* note 59, at 1374; Kirsch, *supra* note 16, at 389-90; Andrew K. Persily & Steven J. Emmerich, *Indoor Air Quality in Sustainable, Energy Efficient Buildings*, 18 HVAC&R Rsch., Jan. 2011, at 3.
93. *See* Util. Air Regul. Grp. v. EPA, 573 U.S. 302, 322-23 (2014) (explaining permitting requirements focus on "a relative handful of large sources").
94. Sexton, *supra* note 78, at 60 (indoor ambient air quality standards "would be impractical because of the prohibitive monitoring costs and the difficulty of enforcement").
95. Robert M. Friedman et al., *Environmental Policy Instrument Choice: The Challenge of Competing Goals*, 10 Duke Env't L. & Pol'y F. 327, 338-39 (2000); *see* Kirsch, *supra* note 16, at 389 (building codes "are administrable" and "do not involve restrictions on personal behavior").
96. *See* Morawska et al., *supra* note 82, at 1419; *see* U.S. Env't Prot. Agency, EPA/400/1-89/001C, Report to Congress on Indoor Air Quality Volume II: Assessment and Control of Indoor Air Pollution 10-3, 10-4 (1989).
97. Zeynep Tufekci, *Why Haven't We Made It Safer to Breathe in Classrooms?*, N.Y. Times (Aug. 9, 2023), https://www.nytimes.com/2023/08/09/opinion/air-filter-covid-smoke-schools.html [https://perma.cc/FFT3-EBEJ] (archived Feb. 4, 2026).
98. Kirsch, *supra* note 16, at 388-89 ("[M]any indoor air pollution problems are at most only partially attributable to products.").
99. NASEM, Why Indoor Chemistry Matters, *supra* note 5, at 36.
100. *See* Erica Werner, *How to Make Your Home More Energy Efficient—and Get a Tax Break Too*, Wash. Post (Jan. 26, 2023), https://www.washingtonpost.com/climate-solutions/interactive/2023/home-energy-tax-breaks/ [https://perma.cc/3756-HLMR] (archived Feb. 4, 2026).

only modest impacts. Instead, they should undertake a more systematic effort to improve IAQ using a combination of voluntary guidelines, procedural regulations, and substantive standards. Voluntary guidelines can serve as a foundation for mandatory standards and inform action by government actors, industry, and consumers. Procedural requirements can direct attention to the issue, generate information, and catalyze action based on that information. Finally, substantive requirements can focus initially on key indoor pollutants and settings where regulation would be both impactful and feasible as a technical and political matter.

THE ROLE OF PRIVATE STANDARDS IN ADVANCING INDOOR AIR QUALITY

by Elizabeth Beardsley

Elizabeth Beardsley serves as Senior Policy Counsel at the U.S. Green Building Council.

I am Liz Beardsley with the U.S. Green Building Council (USGBC). For those who don't know USGBC, we are a mission-based nonprofit, which was started over 30 years ago, that is focused on a theory of market transformation with a vision of sustainable, resilient, and healthy buildings and communities.

Prof. Albert Lin's article was very helpful in laying out the legal structure for indoor air quality (IAQ) and some of the challenges as well.[1] I have not seen this presented in one place before, so it is really valuable. It just scratches the surface in terms of what we can do, so I will talk about what we are doing at USGBC and then offer my opinions on some different government approaches that might be most promising right now.

First off, the biggest lever that we have at USGBC is the Leadership in Energy and Environmental Design (LEED) program which is a green building certification.[2] We have well over 100,000 certified buildings around the globe, and the number continues to grow. It is a multi-outcome, holistic approach to buildings. There is a system for design and construction of new buildings and major renovations. There is one for existing building operations and one for interiors as well.

And the idea is that we establish these best practices which include both minimum criteria and optional credits. Projects have to meet all the minimums, and then they choose the credits that fit their goals and their project. Based on how many credits they achieve, they are awarded a level which goes from certified up to platinum.

We have had IAQ as a performance category in LEED since the very first pilot version in 1999. It has been part of the baseline for how we view holistic green buildings. The main strategies include: IAQ assessment; proactive building operations that control and reduce exposure to pollutant sources; ventilation beyond minimum code and high-efficiency filtration; and operation and maintenance plans for all of the systems to provide better IAQ.[3] Those are the different big-picture strategies, and we do reference a number of ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers)[4] standards. We generally look for the best practices and standards in existence—and sometimes, if there isn't one, we work with our thousands of volunteers and experts to try to create something to fill the gap.

We are now trying to update LEED every five years, and we just launched the latest version, v5,[5] last year. In v4,[6] (which was in place for about seven years) and in version 5, we do reference target threshold values for contaminants and indicators such as carbon dioxide, carbon monoxide, ozone, volatile organic compounds, and particulate matter, which I point out because developing standards was one of the potential areas for government work identified in the article.[7]

We have data on LEED projects and credits achieved that I thought would be interesting to share. Beyond the prerequisites that all projects must meet—there are two for IAQ for new construction under LEED v4—in the United States, about 95% received the construction IAQ credit and over 85% of the projects include enhanced IAQ management and meet the low-emitting materials specifications.[8] This addresses, for example, when you walk into a room or a building, and it has that new carpet smell—it is not a good smell and it is not good for you. There are a lot of other certifications and labels to identify materials that have low emissions. Paint is a good example—there is a credit for that, and it is a well-utilized strategy.

Overall, for perspective on the existing building program, about 50% of projects did the more advanced IAQ assessment; about 95% met enhanced IAQ management

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1. Albert Lin, *Indoor Air: The Forgotten Frontier of Environmental Law*, 85 Ohio St. L.J. 1291 (2025).
2. Leadership in Energy and Environmental Design (LEED), *LEED Rating System*, https://www.usgbc.org/leed (last visited June 4, 2026).
3. *See* LEED, *LEED v5 and the Next Big Shift in Indoor Air Management*, https://www.usgbc.org/articles/leed-v5-and-next-big-shift-indoor-air-management (last visited Aug. 4, 2026).
4. Am. Soc'y Heating, Refrigerating & Air-Conditioning Eng'rs, https://www.ashrae.org/ (last visited June 4, 2026).
5. Leadership in Energy & Env't Design V5, *LEED Rating System*, https://www.usgbc.org/leed/v5 (last visited June 4, 2026).
6. Leadership in Energy & Env't Design V4, *LEED Rating System*, https://www.usgbc.org/leed/v4 (last visited June 4, 2026).
7. Lin, *supra* note 1, at 1330-33.
8. *Id.*

requirements; and over 85% sourced green cleaning equipment and green cleaning products. In addition, over 75% achieved another advanced IAQ management credit, such as green cleaning custodial training, occupant comfort surveys, and integrated pest management, which is another area that has picked up in state legislation.

We are really excited about LEED v5, which goes further and updates these strategies. We learn from each successive version. There has been an explosion in terms of data, sensors, and new research, and we are trying to capture this in LEED.

This points to one of the other areas in which we are working—research on practices. We are trying to see who the top performers are, where the leaders are, and how technology has developed—and to help communicate a direction for IAQ improvement in buildings.

For example, we have a report on sensors and are trying to educate the building community on how they should be used. There are still a lot of questions about these sensors—is the data quality good enough, does it point to action? And if we have these thousands of data points, does that actually translate into environmental quality improvement and, in turn, health improvements? We are trying to make connections and get people together to talk, as well as conducting education—through fact sheets, courses, reports, and the like.

We also have a Center for Green Schools.[9] Schools are a particular use case and focus area for IAQ. The relevance of IAQ for schools is more intuitively obvious, and people are more interested or willing to accept additional costs or additional work when children are affected. And, of course, we know a lot about children's vulnerability—their environmental exposure and susceptibility are heightened for various reasons.

Turning to government approaches, one of the most promising in our view right now is for public entities to lead by example in their own buildings. We see this in some states and until very recently in the federal government.

The General Services Administration, for example, has had guidelines for many years for building construction and renovation that included a number of IAQ measures.[10] They have also developed resources for the federal building ecosystem. This is a nonregulatory, owner role for the government, but because there are a lot of public buildings and they are visible, people see them and learn from them.

There is research showing that there is a spillover effect. You can imagine that contractors adopt the practices because agencies are requiring it, but then the trades start to learn the practices, and awareness grows. IAQ practices can spread this way especially if more data are developed showing the benefits outweigh the costs, because some private-sector leaders are paying a lot of attention to IAQ.

The second role for government right now is to look at how IAQ-related requirements can be wrapped into energy efficiency regulations. The nexus of ventilation and tight envelope is really important for both efficiency and IAQ.

The European Union's Energy Performance of Buildings Directive[11] on renovating buildings includes energy requirements and a requirement for IAQ. It will be really interesting to see how individual countries try to operationalize this and how it rolls out in the coming years. It really takes advantage of an intervention point—for example, if you are updating a heating, ventilation, and air conditioning (HVAC) system or have to meet an energy requirement—because it is also a time to make sure you are considering air quality.

In terms of tracking impact of existing efforts, the Boston Public Schools in its capacity as an owner (not as a regulatory agency) is taking an information-forcing approach with its IAQ sensors in every classroom.[12] Also, we are looking deeper at some of the state HVAC operational laws: Are they being followed, what is the experience, and are there benefits to be documented? And there are also some green codes. California has CALGreen,[13] which also incorporates IAQ—what can we learn from that as an example? And Montgomery County, Maryland, also uses a green code.[14] These are some examples that we can learn from.

In addition, I advise not trending too heavily toward a hardcore command-and-control approach right now. I am not sure we are ready for that—even within the high-performing building community we see a lot of wariness. There is a lot more education, experience, and practice needed to be ready for some types of regulations. Furthermore, we can borrow from the water world in terms of the Safe Drinking Water Act water quality information reports, which have made a big difference.[15]

Those are a few thoughts to consider, and I look forward to the discussion.[16]

9. Ctr. for Green Schs., *Center for Green Schools*, https://centerforgreenschools.org/ (last visited June 29, 2026).
10. *See, e.g.*, 48 C.F.R. §570.117-2 (2026).
11. Council Directive 2024/1275 of Apr. 24, 2024, Energy Performance of Buildings Directive (En.).
12. Bos. Pub. Schs., *Indoor Air Quality Sensor Dashboard*, https://www.bostonpublicschools.org/students-families/respiratory-illness-protocols/air-quality/indoor-air-quality-sensor-dashboard (last visited June 26, 2026).
13. Cal. Code Regs. tit. 24, pt.11 (2025).
14. Md. Code Regs. 09.12.57 (2023).
15. U.S. Env't Prot. Agency, *CCR Information for Consumers*, https://www.epa.gov/ccr/ccr-information-consumers (last visited June 26, 2026).
16. Mass.gov, *Trichloroethylene in Indoor Air*, https://www.mass.gov/info-details/trichloroethylene-tce-in-indoor-air (last visited June 4, 2026).

COMMENT

THE UNCHARTED LEGAL FRONTIER OF INDOOR AIR QUALITY

by Laurence S. Kirsch

Laurence S. Kirsch is Senior Counsel at Sidley Austin LLP.

It is always a pleasure to be here at the Environmental Law Institute, which is such a great institution for environmental lawyers in this country. And it is a double pleasure to be here to talk about a subject that is near and dear to my heart—indoor air quality.

Prof. Albert Lin's article is really outstanding.[1] It makes a material contribution to the field in terms of surveying sources and pollutants, as well as the governmental mechanisms that are in place, or not in place, and the policy considerations. I am going to beg your indulgence for a moment just to share with you how it is I came to be involved in this field.

Back in the fall of 1981 when I was a second-year law student—at a school some people call the Vanderbilt of the North—I was looking for an interesting, groundbreaking topic to write about in a paper or potential law review article. I read a newspaper article about a symposium that had just been held at Amherst.[2] It was the second international symposium on indoor air pollution, health, and energy conservation. The subject caught my eye, because when we think about environmental matters, we think about smog, water pollution, and hazardous waste sites—but indoor pollution? The article mentioned a young professor at the Harvard School of Public Health named Jack Spengler. I mustered up my courage, and I called him to ask if he would be willing to talk to me.

I walked down to his office, and we talked for an hour about the conference. Spengler was doing research at the time on measuring exposures that people experience in homes and offices—common outdoor pollutants but also other substances. He asked if I would like to borrow the set of conference papers. I walked out of his office with two huge binders tucked under my arms—of course, this was before flash drives and compact discs.

Through reading the papers and talking to some of the authors, I found that indoor air was an area that the law really had not begun to address—and that it could be my paper topic. In 1982, I wrote the paper which was ultimately published—*Behind Closed Doors: Indoor Air Pollution and Government Policy*.[3] I give credit to my then-wife of two years who came up with the catchy title.

As a budding lawyer, I was, of course, thinking about law and thinking about the inherently limited authority of government agencies. I was interested not only in health effects, but also in the authority that existed to deal with these subjects. And I found that there was a serious vacuum and a lot of uncertainty and confusion about what authority agencies had, if any, to deal with indoor air pollution. I ended up concluding that we needed to do a lot more research into the substances and their health effects, and we needed to develop some consensus-based standards so that at least the public would have knowledge of the substances to which they are exposed and how the public might mitigate those exposures.

And, unlike most law review articles, this one seemed to get a reaction. I started getting phone calls, radio interviews, and TV interviews. I have since written at least a dozen other articles on indoor air quality, spoken at numerous conferences on the subject, and represented clients in indoor air quality-related matters. So, here we are 44 years later—the result of my reading a newspaper article.

I have three main points I will cover—(1) over the last 40 plus years, nothing much has changed in addressing indoor air quality; (2) the reasons why nothing much has changed; and (3) I will take a look at two agencies with arguably competing authority over indoor environments—the U.S. Environmental Protection Agency (EPA) v. Occupational, Safety, and Health Administration (OSHA) as an illustration of the complexities of regulating indoor air quality in commercial buildings.

Over the years, indoor air has had various public manifestations—issues that have splashed into the headlines momentarily. We had asbestos, urea-formaldehyde foam

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1. Albert Lin, *Indoor Air: The Forgotten Frontier of Environmental Law*, 85 Ohio St. L.J. 1291, 1316 (2025).
2. *International Symposium on Indoor Air Pollution, Health and Energy Conservation: Extended Summaries* (Harvard Univ. Oct. 13-16, 1981).
3. Laurence S. Kirsch, *Behind Closed Doors: Indoor Air Pollution and Government Policy*, 6 Harv. Env't L. Rev. 529 (1982).

insulation, radon, combustion sources, sick building syndrome, chemicals used indoors, mold, and most recently vapor intrusion. What I have found is that in other areas, regulatory agencies have generally tried to expand their authority, but not so much for indoor air—and this was true long before the current administration.

As Professor Lin mentioned, EPA has consistently interpreted the Clean Air Act to allow it to regulate only outdoor air. It defines in regulations "ambient air" as air external to buildings. And OSHA, which is eager to regulate some workplace exposures, has not wanted to touch indoor exposures in commercial as opposed to industrial settings. In general, over the years, not a whole lot has changed—the same issues are out there, the same exposures are present.

The agencies have virtually no more regulatory authority now than they had before, and they have not sought it. And I will say, on a personal level, my wife—who came up with the title *Behind Closed Doors*—is still my wife 46 years later, which is a good thing.

Of course, it is a mild overstatement to say nothing has changed. There is some additional federal statutory authority, especially with regard to research. And we have learned about some new risks that we didn't know about before—in particular, vapor intrusion, which is where you have contaminated water or soil with volatile chemicals under buildings such that the chemicals seep up into the buildings. We have the U.S. Green Building Council, which provides some very valuable services to industry and to the public, and we have some states that have been active in addressing indoor air quality. But, by and large, it is not inaccurate to say that not much has changed.

There are a number of reasons why: We have an increasing reluctance to regulate anything; these are not the normal sources of pollution that we are used to dealing with; the nature of some of the sources makes it difficult to address them; indoor exposures are highly variable, both in time and in space (if you measure the same place at different times, you will get radically different levels); and you have personal sources, such as people bringing pollutants into buildings all the time.

In addition, Professor Lin mentioned in his article what I would call the notion of "my home is my castle"—indoor air regulation, as he notes, could raise "serious worries about privacy and government intrusion."[4] Furthermore, we do not have the usual list of regulatory players we deal with—instead, we have Consumer Product Safety Commission, OSHA, ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers), and the U.S. Green Building Council. Fundamentally, I would suggest that the paucity of regulatory activity reflects a reluctance to accept that indoor air is part of the environment, because it is not outdoors.

As an illustration of the complications of addressing indoor air, I am going to focus for a minute on a topic Professor Lin mentioned in his article, which is the apparent weakness of OSHA standards. To lay the groundwork, the Occupational Safety and Health Act regulates health and safety in workplace environments.[5] But when it comes to vapor intrusion—the seepage of chemicals from underground sources into overlying buildings—that is an area in which EPA and the states have begun to flex their regulatory muscles.[6] They are looking at what exposures inside buildings result from the hazardous substances underground. But the legal authority question gets really interesting when you have indoor exposures in commercial spaces—you have the issue of OSHA versus EPA authority. And the issue is sharpened because EPA and OSHA standards are different—vastly different.

Let me give you an illustration of how dramatically the standards differ. For example, EPA's 2002 Draft VI Guidance Target Indoor Air Levels sets a residential target level based on 10^{-6} cancer risk of 0.022 micrograms per cubic meter for trichloroethylene (TCE),[7] a common environmental contaminant. In comparison, the OSHA permissible exposure limit (PEL) is 537,000 micrograms[8]—that is 537,000 versus 0.022—a 10 order-of-magnitude, or 10 million times, difference. And although there are more recent guidance documents, the standards have not really changed. As Professor Lin has noted, the OSHA standards are very old—the TCE PEL was from 1967 or almost 60 years old—and probably needs to be revised.

Here, is a hypothetical example: Two buildings each with 1,000 micrograms TCE per cubic meter. One is an industrial building and is 1/500th of the OSHA PEL. So, OSHA would tell you the people in that building are perfectly safe. You have a building across the street that is an office building—with the same 1,000 micrograms per cubic meter in the indoor air—and EPA would tell you that those concentrations are 500 times what people should be exposed to. But it is the same exposure. Is one building safe and one not? Of course, in residential buildings you have different populations, longer exposures, and so on, but here we have two commercial building, with occupational exposures. This is just one of the interesting problems and questions that rears its head in trying to deal with indoor exposures in commercial workplaces.

In any event, we have a world of interesting issues to deal with on indoor air quality—and not many of them have been dealt with yet. Thank you very much.

4. Lin, *supra* note 1, at 1316.

5. Occupational Safety and Health Act of 1970, 29 U.S.C. §§651-678.
6. Comprehensive Environmental Response, Compensation, and Liability Act, 42. U.S.C. §§9601-9675.
7. Mass.gov, *Trichloroethylene (TCE) in Indoor Air*, https://www.mass.gov/info-details/trichloroethylene-tce-in-indoor-air (last visited June 9, 2026).
8. Occupational Safety and Health Administration, *OSHA Occupational Chemical Database Trichloroethylene*, https://www.osha.gov/chemicaldata/684 (last visited June 9, 2026).

TECHNICAL STANDARDS FOR INDOOR AIR QUALITY IN STATE LAWS AND REGULATIONS

by Emily Porcari

Emily Porcari is the Manager of State and Local Government Affairs at ASHRAE.

Good afternoon and thank you for inviting me to participate. A quick disclaimer before I start—I am not a lawyer or a technical expert—my background is as a policy analyst. I am going to cover an overview of my organization, ASHRAE (the American Society of Heating, Refrigerating and Air-Conditioning Engineers), our Indoor Air Quality (IAQ) standards and guidelines, and state IAQ-related legislation.

ASHRAE is a nonprofit organization. We are a membership society of about 55,000 members worldwide in engineering, heating, ventilating, air conditioning, and refrigeration fields. ASHRAE is also a standards development organization. We create consensus-based technical standards, many of which are adopted directly by governments or into building codes. ASHRAE standards establish requirements in the areas of heating and cooling, indoor air quality, energy efficiency, water systems, high-performance buildings, safe refrigerant use, and other areas of the built environment.

What does ASHRAE do for policymakers? Our primary role in policy is as a source of technical expertise. Our members, who are experts in the subject areas that I just mentioned, provide technical review of proposed legislation or regulations and briefings and expert testimony on specific subjects.

In addition to research, we also have training courses and certifications for engineers and other professionals, trainings for government agencies, building code officials, and others.

I want to provide a brief overview of ASHRAE's public policy priorities, particularly the most relevant one for this conversation, which is promoting healthy buildings and reducing disease risk. ASHRAE's position is that supporting the health and well-being of building occupants is the most important feature of the indoor environment.

ASHRAE has several standards that are focused on IAQ or include an IAQ component. Some of these are broadly applicable to many different buildings. For example, Standard 62.1 on Ventilation for Acceptable Indoor Air Quality in Commercial Buildings is our baseline minimum standard for commercial, large multifamily, and other types of buildings. Others are more specific to building type, such as healthcare facilities. It is also important to mention that ASHRAE, especially over the past few years, has been shifting to a focus not just on IAQ, but on IEQ—indoor environmental quality. This is a broader, more holistic focus on human health in the built environment beyond just air quality.

This includes water quality, thermal comfort—temperature and humidity—and even things like lighting levels and acoustics that usually do not get much attention but are still an important part of indoor environments. For example, we have a standard for thermal comfort and thermal environmental conditions,[1] and we also have a standard for risk management for waterborne disease, such as Legionnaires' disease,[2] in building water systems.

I want to give a quick example of why this broader focus on environmental quality, not just air quality, is important. Legionnaires' disease is a respiratory illness. It is caused by bacteria that develop in water, but they are aerosolized and breathed in—they are not transmitted through drinking the water. This means that some of the symptoms of the disease, like coughing and shortness of breath, are similar to symptoms from airborne illnesses. This example shows that even when the means of infection are different—through water and plumbing systems rather than Heating, Ventilation, and Air Conditioning (HVAC) systems—the health effects can be just as significant as those from more commonly known airborne pollutants, especially for at-risk populations like children, the elderly, and those with exist-

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1. ANSI/ASHRAE Standard 55-2023, *Thermal Environmental Conditions for Human Occupancy* (Am. Soc'y of Heating, Refrigerating & Air-Conditioning Eng'rs 2023).
2. ANSI/ASHRAE Standard 188-2021, *Legionellosis: Risk Management for Building Water Systems* (Am. Soc'y of Heating, Refrigerating & Air-Conditioning Eng'rs 2021).

ing respiratory illnesses. These seemingly separate health issues are actually interrelated.

ASHRAE recently established a Center of Excellence for Indoor Environmental Quality.[3] This is meant to be a permanent, dedicated resource to create a roadmap for improving environmental quality and identifying gaps in data and research in the field. It's looking at where standards do not yet exist, and how existing standards can be integrated to work better together.

Additionally, ASHRAE has announced a new proposed standard, Standard 235P, which is a Standard for Indoor Environmental Quality in Buildings.[4] This will include multiple environmental domains—air, water, and other aspects of the indoor environment that affect occupant health and building performance. It is meant to complement ASHRAE's existing standards and enable consideration of all these different elements together.

I also want to mention without going into detail that ASHRAE has additional position documents and resources on a range of different aspects of IAQ.

Standard 62.1 is ASHRAE's foundational standard on Ventilation and Acceptable Indoor Air Quality.[5] It is a minimum standard and the one most often referenced in codes and regulations. I want to point out that the operations and maintenance section, which is meant to apply to existing buildings, is often not specifically referenced in jurisdictional requirements and is not fully or consistently implemented. Prof. Albert Lin alluded to this and to the need for ongoing maintenance to maintain building performance over time. This is a critical aspect of IAQ regulation that is often overlooked.

Briefly shifting to state legislation, which is part of what I track—since the beginning of the COVID-19 pandemic, there has been much legislation, policy, and guidance at the state and local levels addressing indoor air quality. Over the past few years, this has evolved from focusing on COVID mitigation utilizing federal funding, to focusing on establishing new state programs and state funding.

In particular, school indoor air quality—especially for K-12 schools—has become the primary focus for many new state-level requirements. ASHRAE members and staff are actively engaged in advocacy, outreach, and providing technical input on IAQ legislation. State legislation that was enacted last year includes Colorado[6] and Virginia[7] laws focused on schools. The Colorado law requires schools receiving certain infrastructure funding to meet baseline requirements for HVAC work, including ASHRAE Standard 62.1. Similarly, the Virginia law requires inspections of public school buildings every four years that are consistent with Standard 62.1. Legislation like this can help address the issue of maintaining IAQ standards over time and ensuring buildings continue to meet operational requirements.

In the current session, Rhode Island legislation was introduced which requires IAQ guidelines for schools and mandates inspections and evaluations of each school building.[8] One notable feature of this proposed legislation is that HVAC inspections are incorporated into an existing needs assessment already required every five years. This is an example of integrating IAQ requirements into existing statutory frameworks.

I will end there, and I look forward to the conversation.

3. Am. Soc'y of Heating, Refrigerating & Air-Conditioning Eng'rs, *Indoor Environmental Quality (IEQ) Resources*, https://www.ashrae.org/technical-resources/ieq-resources (last visited June 26, 2026).
4. Am. Soc'y of Heating, Refrigerating & Air-Conditioning Eng'rs, *BSR/ASHRAE Standard 235P, Standard for Indoor Environmental Quality (IEQ) in Buildings*, https://www.ashrae.org/technical-resources/standards-and-guidelines (last visited June 26, 2026).
5. ANSI/ASHRAE Standard 62.1-2025, Ventilation and Acceptable Indoor Air Quality (Am. Soc'y of Heating, Refrigerating & Air-Conditioning Eng'rs 2025).
6. H.B. 25-1245, 75th Gen. Assemb., Reg. Sess. (Colo. 2025).
7. H.B. 2618, Gen. Assemb., Reg. Sess. (Va. 2025).
8. S. 2873, Gen. Assemb., Reg. Sess. (R.I. 2026).

THE NEXT FRONTIER: ENSURING SAFE INDOOR AIR FOR ALL

by Michelle E. Thompson, M.P.H.

Michelle E. Thompson is a Public Health Industrial Hygienist at the Vermont Department of Health.

In October 2022, during the COVID-19 pandemic, I listened to the White House Summit on Improving Indoor Air Quality. In his opening remarks, Dr. Ashish Jha said something that has stayed with me years later. He reminded attendees that, many years ago, regularly getting sick from pathogens in drinking water was just simply part of the human experience. People died in large numbers from gastrointestinal pathogens, and it was just accepted. Over time, however, we learned that we could do something about this. People learned they could boil their water to reduce their risk. Policies were enacted and systematic engineering efforts were made to make water safe for people to consume. The pandemic has shown that indoor air quality (IAQ) is the next area where we can drive significant structural change. Dr. Jha closed by saying, "the single biggest structural change we can make as a society, is to do for indoor air what we have done for water quality."

In their article, *Indoor Air: The Forgotten Frontier of Environmental Law*, Prof. Albert Lin states that heightened attention during COVID-19, "nevertheless has failed to generate a meaningful regulatory response."[1] I agree, and it seems like momentum is actually being lost. To address this, there are some areas that policy and society could focus on to regain momentum and ensure safer indoor air for all to breathe.

I. The Case for a Layered Approach

Regulating IAQ is a difficult task. IAQ is composed of a complex mixture of chemicals. This mixture is dynamic and changes all the time. This poses a challenge for systemic change because one set of standards, requirements, or guidelines does not work for all situations.

Voluntary guidelines offer a starting point. They are typically the easiest to implement; however, they should not be the ultimate goal. In my experience, voluntary guidelines do not work equitably. The people and organizations with adequate knowledge and resources are able to implement voluntary guidelines, while those who may benefit most from the implementation of the same voluntary guidelines might not due to a lack of knowledge and resources. Regulations and standards are more difficult to implement but can drive change quickly. There are opportunities for regulation and standards for source removal and source control through avenues like building design standards, building codes, and operations and maintenance standards. This supports Professor Lin's proposal that federal, state, and local governments should systematically improve IAQ using a combination of voluntary guidelines, procedural regulations, and substantive standards.

This combined approach reminds me of the Swiss Cheese Model, a risk analysis tool in which there are layers of cheese slices, stacked side by side.[2] Each slice has holes of varying sizes, in different locations. The holes represent weaknesses in a system where risk or failures can occur. In the case of IAQ, the holes represent places where poor IAQ can cause harm. This model fits nicely with Professor Lin's sentiment that one single approach will not lead to adequate risk reduction. In short, a layered approach is needed.

It is also important to consider the hierarchy of controls, which ranks protection measures by effectiveness. To invoke systemic change, the most effective controls should be implemented first. From most effective to least effective, these controls are elimination, substitution, engineering controls, administrative controls, and personal protective equipment.[3] We cannot jump straight to wearing a mask to prevent exposure. First, the sources of indoor air pollution should be addressed. Some sources can be eliminated, for example by no longer burning candles indoors or by not using lead-based paint. Some sources can be substituted, for example by replacing a toxic cleaning product with a certified safer cleaner, like those certified by the U.S Environmental Protection Agency's (EPA's) Safer Choice.[4] When elimination and substitution (source removal) don't work, then source control measures can be used. Source removal includes engineering controls, like using a kitchen exhaust fan or designing building ventilation or filtration to meet American Society of Heating, Refrigerating, and

1. Albert C. Lin, *Indoor Air: The Forgotten Frontier of Environmental Law*, 85 Ohio St. L.J. 1291 (2024).

2. *See* Douglas A. Wiegmann et al., *Understanding the "Swiss Cheese Model" and Its Application to Patient Safety*, J. of Patient Safety, Mar. 2022.

3. *See* U.S. Occupational Safety & Health Admin., Identifying Hazard Control Options: The Hierarchy of Controls, https://www.osha.gov/sites/default/files/Hierarchy_of_Controls_02.01.23_form_508_2.pdf (last visited Apr. 4, 2026).

4. *See* U.S. Env't Prot. Agency, Safer Choice (2025), https://www.epa.gov/SaferChoice.

Air Conditioning Engineers standards. Less effective controls, like administrative controls (heating, ventilation, and air conditioning (HVAC)) equipment inspections, IAQ management plans, etc.) and personal protective equipment (masks), should be implemented last.

While there are challenges to systemically improving IAQ, there are pathways for doing so. Any effort should incorporate multiple policy options to adequately cover IAQ improvements in a variety of facility types and for various air pollutants.

II. Increasing Consumer Knowledge About IAQ and Behavioral Impacts

Implementing voluntary guidelines, procedural regulations, and substantive standards alone will not lead to the desired improvements. While reading this article, one thing I kept coming back to was the impact that individual knowledge and behavior can have on IAQ. At one point, Professor Lin states that, "homeowners may lack sufficient information and resources to make and implement informed decisions about IAQ." In my experience interacting with the public, most people lack the basic knowledge of how their behaviors impact the indoor air they breathe and how the air they breathe impacts their health. To illustrate this point, here are several examples of how individual knowledge and behavior impacts IAQ:

A school facilities manager knows that during the day, when more people occupy the school building, the ventilation rate needs to be increased. They also know that the HVAC system needs to be inspected and maintained to ensure it runs optimally. However, in that same school building, a teacher does not realize that placing boxes or textbooks on top of a supply vent blocks fresh air from coming into their classroom.

A person takes action to reduce their heating costs and improve their home's energy efficiency by weatherizing their home. The energy consultant they worked with shared how weatherization can help make a home more comfortable and reduce heating costs. The energy consultant may be aware that weatherization can worsen certain aspects of IAQ, like radon and mold. If they do not share this information during the weatherization project, the homeowner may not know that they should test their home for radon or that tightening a home often means additional ventilation is needed to prevent a buildup of humidity and mold growth.

A home earns Indoor AirPLUS certification that has been designed to meet Energy Star standards and includes specific design features for moisture control, safer construction materials, ventilation, and filtration.[5] The homeowner is thrilled to have such a healthy home! But once the keys are turned over, the homeowner does not know what maintenance they need to do to keep their certified home running as designed to maintain good IAQ.

In a commercial building, a person likes to use an essential oil diffuser in their office. They enjoy the smell and it relaxes them. They do not know that the chemicals in essential oils and fragrances can trigger asthma and cause other health impacts.[6] Because of wildfire smoke outside, the property manager set the HVAC setting to 100% recirculation mode to avoid bringing in smoky air. The essential oil chemicals are now being distributed throughout the building's air, meaning others are also breathing in those chemicals.

These examples illustrate that there is not just a need for guidelines, regulation, and standards, but for education on how behaviors impact IAQ and increased awareness of how IAQ impacts health. One way to increase knowledge and encourage behaviors that support good IAQ is to show people the effects of their actions in real time. To do this, we must measure IAQ.

III. Measuring IAQ Matters

Advances in technology are making tools like low-cost air sensors and monitors widely available to consumers. These monitors can help users identify when to take action to improve IAQ. While monitors can only measure what they are designed for and while—as Professor Lin points out, they vary widely in terms of accuracy, reliability and durability—they are still a tool that consumers can use to understand certain IAQ parameters like particulate matter, carbon dioxide, temperature and relative humidity.[7]

When looking at other countries' regulations, it is clear that measuring contaminants and sharing those measurements transparently is important. When you measure IAQ parameters, you can see what is working and what is not and you can adjust systems or behaviors as needed. At the individual level, IAQ measurements can be used as reference points to drive immediate change. For example, if a person is cooking and they see their particulate matter measurements increase, will it drive them to use their kitchen exhaust fan? If they do start using the kitchen exhaust fan, do particulate matter levels improve? In large or commercial buildings, there is value in IAQ monitoring too. Here are two examples showing the benefits of measuring IAQ in schools:

From March 2022 to December 2023, the Vermont Department of Health partnered with Efficiency Vermont to explore the impact that changes or upgrades to HVAC systems had on IAQ in schools. The program provided schools with their first opportunity to systematically measure IAQ metrics including carbon dioxide, particulate matter, relative humidity and temperature. Using clear reference points for the IAQ metrics, this data empowered schools to make informed decisions about managing their HVAC systems and improving IAQ. The feedback from

5. *See* U.S. Env't Prot. Agency, Indoor AirPlus (2025), https://www.epa.gov/IndoorAirPlus.

6. *See* Vt. Dep't of Health, Breathe Easy, Choose Fragrance Free (2025), https://www.HealthVermont.gov/sites/default/files/document/env-hs-breathe-easy-fragrance-free.pdf.

7. *See* U.S. Env't Prot. Agency, Low-Cost Air Pollution Monitors and Indoor Air Quality (2025), https://www.epa.gov/indoor-air-quality-iaq/low-cost-air-pollution-monitors-and-indoor-air-quality.

participants was overwhelmingly positive, with 86% of respondents expressing high satisfaction with the program, and 100% reporting high satisfaction with the customized reports provided. This suggests that schools found the program valuable and helped enhance their understanding and management of IAQ.[8]

Boston Public Schools (BPS) also measures IAQ parameters in school buildings. The sensors used by BPS report information in real-time on key measures of IAQ including carbon dioxide, carbon monoxide, particulate matter, relative humidity and temperature. This empowers school staff to make scientific and data-driven decisions to improve classroom IAQ and advocate for HVAC and other building investments to improve indoor environment quality. BPS has found that monitoring has helped improve IAQ and thermal comfort in its schools, enforce green cleaning and vehicle idling policies, and secure grant funding to expand their IAQ work.[9]

IV. Conclusion

The work of addressing IAQ at a systems level is ongoing and multi-layered. Professor Lin says, "the public health and productivity benefits of improved IAQ would likely far outweigh the investment costs in achieving clean indoor air." So, to start, a return on investment cost-analysis would help policymakers understand what the long-term cost savings might be if policies that support good IAQ are implemented.

Professor Lin also suggests that multiple approaches, rather than any single prescription, are needed. This reinforces the need for using frameworks like the Swiss Cheese Model and the hierarchy of controls to implement multiple controls and safeguards.

The impact of making people aware of how their behaviors impact IAQ and how IAQ impacts their health cannot be overemphasized. It is not sufficient for designers and builders to construct buildings and systems that meet governmental standards and regulations. Building operators must also understand how to operate and maintain those systems, and consumers have to understand how their behaviors impact the quality of the air they breathe.

An increase in consumer demand for buildings with good IAQ may lead companies to incorporate voluntary guidelines into their designs. Regulations and standards will force companies to address source removal and source control. Empowering people with knowledge of IAQ and real-time IAQ measurements in the buildings they occupy or frequent will increase awareness of the importance of good IAQ and show how individual behaviors impact IAQ. These measures, all working together, can lead us to a time and place where good IAQ is not just desirable, but it is expected. We expect to turn on a tap and have safe, clean drinking water. We should expect to walk into a building—a school, a home, a business, etc.—and breathe safe, clean air.

8. *See Indoor Air Quality in Vermont Schools*, Efficiency Vt. & Vt. Dep't of Health (2024), https://www.HealthVermont.gov/sites/default/files/document/env-hs-indoor-air-quality-schools.pdf.
9. *See Indoor Air Quality Sensor Dashboard*, Boston Public Schools, https://www.bostonpublicschools.org/students-families/respiratory-illness-protocols/air-quality/indoor-air-quality-sensor-dashboard (last visited Apr. 4, 2026).

ARTICLE

THE WATER DISTRICT AND THE STATE

by Dave Owen

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I. Introduction

In January 2020, local-government agencies across much of California submitted long-term plans for managing groundwater under the Sustainable Groundwater Management Act (SGMA).[1] Groundwater is precious in California, particularly in rural areas; it supplies 40% of the state's agricultural and urban water,[2] and many people have no other water source.[3]

Yet, many plans contemplated years of continued groundwater depletion.[4] One study predicted that over the life of the plans, thousands of wells would go dry, and between 46,000 and 127,000 people would lose their water supply.[5] Many of these people live in "disadvantaged unincorporated communities"—poor communities that occupy county land and receive few municipal services.[6] Although the state government rejected a few of those plans and revisions may follow,[7] the same governing bodies will draft and implement the next plans.[8]

How could this happen? There are many potential reasons, but a likely factor is the way California governs water. In California, as elsewhere in the West, water management is dominated by local special districts.[9] These districts are often controlled by large landowners, not just as a practical reality, but as a matter of law.[10] It should not be surprising if some of these districts are unresponsive to residents' concerns and to state policy goals. They are built to be that way.

California's experience reflects broader western patterns. Across the West, water districts hold extensive water rights and play central roles in governance,[11] often under legal frameworks that favor large landowners.[12] Yet, water districts generally receive limited scholarly and policy attention,[13] and litigation challenging landowner voting

Editors' Note: This Article is adapted from Dave Owen, *The Water District and the State,* 134 Yale L.J. 1 (2024), *and used with permission.*

1. *See generally* Tina Cannon Leahy, *Desperate Times Call for Sensible Measures: The Making of the California Sustainable Groundwater Management Act*, 9 Golden Gate U. Env't L.J. 5 (2015) (describing the SGMA's passage).
2. *See* Caitrin Chappelle et al., *Just the Facts: Groundwater in California*, Pub. Pol'y Inst. of Cal. (May 2017), https://www.soquelcreekwater.org/DocumentCenter/View/507/Just-the-Facts—Groundwater-in-California-PDF [https://perma.cc/4NMZ-6XM7].
3. *Groundwater*, Cal. Dep't Water Res., https://water.ca.gov/water-basics/groundwater [https://perma.cc/9MQC-WXMJ] ("[M]any communities are 100 percent reliant on groundwater for their water needs.").
4. *See* Darcy Bostic et al., *Thousands of Domestic and Public Water Supply Wells Face Failure Despite Groundwater Sustainability Reform in California's Central Valley*, 13 Sci. Reps. art. no. 14797, at 2-3 (2023); Debra Perrone et al., *Stakeholder Integration Predicts Better Outcomes From Groundwater Sustainability Policy*, 14 Nature Commc'ns art. no. 3793, at 8 (2023) ("60% of agricultural wells, 63% of domestic wells and 91% of groundwater-dependent ecosystems in California's regulated basins are not protected from losing access to groundwater based on each Sustainability Plan's stated minimum thresholds.").
5. *Groundwater Management and Safe Drinking Water in the San Joaquin Valley: Analysis of Critically Over-Drafted Basins' Groundwater Sustainability Plans*, Water Found. 3 (June 2020), https://waterfdn.org/wp-content/uploads/2020/06/Groundwater-Management-and-SafeDrinking-Water-in-the-San-Joaquin-Valley-Brief-6-2020.pdf [https://perma.cc/3NKAP5BU]; *see* Darcy Bostic, *At Risk: Public Supply Well Vulnerability Under California's Sustainable Groundwater Management Act*, PAC. INST. 1-2 (June 2021), https://pacinst.org/wp-content/uploads/2021/06/PI_EvaluatingWellVulnerability_June_2021.pdf [https://perma.cc/EEP5-68YL] (finding that the plans would allow major impacts to public water-supply wells).
6. *See* Bostic et al., *supra* note 4, at 6-8; Cal. Gov't Code §56033.5 (West 2024) (defining "[d]isadvantaged unincorporated community").
7. *See* Alistair Bland, *State Rejects Local Plans for Protecting San Joaquin Valley Groundwater*, CalMatters (Mar. 2, 2023), https://calmatters.org/environment/2023/03/california-groundwater-valley-wells [https://perma.cc/85BQ-6DHN].
8. *See, e.g.*, Jesse Vad & Lois Henry, *State Rejects Six Valley Groundwater Plans, but Westlands Is Approved*, GV Wire (Mar. 3, 2023), https://gvwire.com/2023/03/03/state-rejects-six-valley-groundwater-plans-but-westlands-is-approved [https://perma.cc/ES62-9BW4] ("The Tulare Lake plan also, apparently, allows an upper zone in the aquifer to be 'depleted' with no mention of how groundwater agencies would repair or replace the attendant dry wells, according to the DWR evaluation.").
9. *See* John D. Leshy, *Irrigation Districts in a Changing West—An Overview*, 1982 Ariz. St. L.J. 345, 347 ("Such districts distribute . . . about one-half of all water used in the West").
10. *See, e.g.*, Salyer Land Co. v. Tulare Lake Basin Water Storage Dist., 410 U.S. 719, 725 (1973) ("[O]nly landowners are permitted to vote in water storage district general elections, and votes in those elections are apportioned according to the assessed valuation of the land.").
11. *See* Barton H. Thompson Jr., *Institutional Perspectives on Water Policy and Markets*, 81 Calif. L. Rev. 671, 686-89 (1993) (describing the importance of western water districts).
12. *See, e.g.*, Ariz. Rev. Stat. Ann. §48-2917(A)(1) (2024) (prohibiting voting unless one is a "holder of title . . . to land in the district"); Or. Rev. Stat. §545.002(3) (2023) (defining "elector" as the "owner or a vendee under a contract of purchase of land situated within the district and subject to the charges or assessments of the district").
13. *See* Heather K. Gerken, *Foreword: Federalism All the Way Down*, 124 Harv. L. Rev. 4, 27 (2010) ("[C]ities are the all but exclusive focus of localism"); Leshy, *supra* note 9, at 346 ("[S]pecial districts have proliferated in recent decades with scarcely a serious debate."). A notable exception is Megan Mullin, Governing the Tap: Special District Governance and the New Local Politics of Water (2009).

has largely failed.[14] Because districts exist by state law, however, state legislatures can change the rules.[15]

This Article argues that state governments should play more active roles and that reformers should emphasize legislation.[16] It advocates several specific reforms. One set of reforms focuses on elections. It includes extending voting rights, promoting increased election-related transparency, and limiting the tasks undertaken and privileges received by districts that lack democratic governance structures. A second set of reforms focuses on boundary rationalization. Third, states should develop procedures and standards for taking water district operations under state control.

II. Water Districts

Special districts—single-purpose local-government entities—are the most abundant and the least understood government entities in the United States.[17] Water districts are a subspecies of special districts. The phrase "water district" can refer to a variety of institutions, but in this Article, it encompasses stand-alone government entities that hold rights to obtain and distribute water. Many of these districts operate independently of city and county governments and with only modest levels of state oversight. They decide when to form, what areas to include, and when to disband. By design, water districts are specialized entities with focused interests, small controlling groups, and relatively stable revenue streams.

The laws creating these districts vary, yet several features tend to recur. First, formation and boundary-setting occur through landowner-driven initiatives. Water districts form through a multistep process that begins with a petition to a local court or county board.[18] In some states, the court or board can approve the petition and authorize the district[19]; in others, the process proceeds to an election.[20]

Second, landowners often have dominance—de jure as well as de facto—over district governance. In many districts, only landowners can vote,[21] and votes are allocated on the basis of landownership.[22] Consequently, a relatively small number of landowners can effectively control a district, even if that district is nominally a public agency.[23]

Third, water districts are legally powerful and enjoy a range of governmental powers, including the ability to levy taxes, collect fees, and use eminent domain to acquire land and associated water rights.[24]

III. Problems With Water Districts

This Part explores reasons for concerns about water district operations and governance, focusing on undemocratic entities pursuing classically governmental tasks, boundary problems, and open opposition to important state policy goals.

A. *Democracy Deficits*

The laws governing many water districts magnify elite advantages. Democracy rests on accountability, which requires the ability to vote.[25] But, in every western state, landowner voting is common. If only large landowners have meaningful shares of votes, accountability does not exist for many residents. Unless they own land—and many, including large numbers of renters, do not—the residents whose wells will go dry are legally prohibited from serving on the boards of many of the water districts that regulate groundwater use.[26] Likewise, even if those residents are citizens and registered voters eligible to vote in

14. *See* Salyer Land Co. v. Tulare Lake Basin Water Storage Dist., 410 U.S. 719 (1973); Ball v. James, 451 U.S. 355 (1981).
15. Special districts thus are different from states, which have sovereignty, and municipalities, some of which have home-rule powers. *See* Gerken, *supra* note 13.
16. Other commentators have made compelling arguments that some water district governance arrangements violate federal and state equal-protection clauses and should be subject to challenge. *See* Louise Nelson Dyble, *Aquifers and Democracy: Enforcing Voter Equal Protection to Save California's Imperiled Groundwater and Redeem Local Government*, 105 Calif. L. Rev. 1471, 1486-1508 (2017). I agree with Louise Nelson Dyble's arguments but think legislatures, with their ability to craft more nuanced reforms, are more promising—and that litigation and legislation could be complementary approaches.
17. *See* Nadav Shoked, *Quasi-Cities*, 93 B.U. L. Rev. 1971, 1977 (2013) ("[T]he number of special districts almost equals that of counties, cities, and towns combined.").
18. *See, e.g.*, Ariz. Rev. Stat. Ann. §§48-2903 to -2905 (2024) (establishing procedures for the creation of irrigation districts); Or. Rev. Stat. §545.025 (2023) ("The petition must be signed by a majority of the owners of land or 50 owners of land within the exterior boundaries of the proposed district."); Idaho Code §43-102 (2024); Mont. Code Ann. §85-7-101 (2023).
19. *See, e.g.*, Mont. Code Ann. §§85-7-104 to -105 (2023) (calling for court action on petitions); Idaho Code §43-108 (2024) (calling for an election after board review of the petition).
20. Nev. Rev. Stat. §539.043-.045 (2023).
21. *See, e.g.*, Cal. Water Code §41000 (West 2024) ("Only the holders of title to land are entitled to vote at a general election."); Cal. Water Code App. §33-6(a) (West 2024) (establishing landowner-weighted voting for the Palo Verde Irrigation District).
22. *See, e.g.*, Cal. Water Code §41001 (West 2024) ("Each voter may vote in each precinct in which any of the land owned by him is situated and may cast one vote for each one hundred dollars ($100), or fraction thereof, worth of his land, exclusive of improvements, minerals, and mineral rights therein, in the precinct.").
23. *See* Norris Hundley Jr., The Great Thirst: Californians and Water, A History 241 (rev. ed. 2001); Tejon Ranch Co., Annual Report (Form 10-K) 20 (Mar. 8, 2016), https://www.sec.gov/Archives/edgar/data/96869/000009686916000013/trc-2015123110k.htm [https://perma.cc/J5CZ-Q7E8] (referring to "[t]he Tejon-Castac Water District, or TCWD, a local water district serving only our land and land we have sold in TRCC [Tejon Ranch Commerce Center]"). Norris Hundley Jr.'s assessment of the consequences of landowner dominance is stark: "Thus did the family farm and local democracy fade from the California countryside." Hundley, *infra*.
24. *See, e.g.*, Hidalgo Cnty. Water Improvement Dist. No. 3 v. Hidalgo Cnty. Irrigation Dist. No. 1, 669 S.W.3d 178, 181-82 (Tex. 2023) (describing a water district's eminent-domain proceeding against an irrigation district); Riverside Irrigation Dist. v. Lamont, 572 P.2d 151, 152 (Colo. 1977) ("Irrigation districts have the statutory right, under certain circumstances, to exercise the power of eminent domain.") (citing Colo. Rev. Stat. §38-2-101 (2024)).
25. *See, e.g.*, Jacob E. Gersen & Matthew C. Stephenson, *Over-Accountability*, 6 J. Legal Analysis 185, 189 (2014) (linking voting and accountability). *But see* Nicholas O. Stephanopoulos, *Accountability Claims in Constitutional Law*, 112 NW. U. L. Rev. 989, 994-95 (2018) (describing voters' ignorance of elected officials' performance).
26. *See* Cal. Water Code §21100(a) (West 2024) ("Each director . . . shall be a voter and a landowner in the district"). *But see* Choudhry v. Free, 552 P.2d 438, 441-44 (Cal. 1976) (holding this limitation unconstitutional, but only for one irrigation district).

other local elections, many of them cannot participate in water district elections.[27]

The classic defense is that water districts are more like companies than governments. But the analogy has never fit well. Water districts get benefits that private companies do not, including eminent-domain authority, preferential access to bonds, and preferential tax status.[28]

In addition to enjoying privileges that are typically governmental, water districts often take on functions—like groundwater regulation—that extend beyond delivering surface water to farmers. A particularly compelling example comes from California's recent implementation of SGMA. California enacted SGMA in 2014, during one of the worst droughts in state history.[29] The law's goal was to reverse California's decades-long practice of pumping more water out of its aquifers than natural recharge put in.[30] Rather than giving state agencies sole responsibility for groundwater regulation, the statute called for local agencies—called groundwater sustainability agencies (GSAs)—to form and then to develop and implement groundwater sustainability plans.[31] The statute also left agency formation largely to local discretion; the state did not decide where agencies would form, who would control agency governance, or what agency boundaries would be.[32] Many formed GSAs within their existing service territories, sometimes in combination with other districts or government entities and sometimes independently.[33]

In California's San Joaquin Valley—the state's largest agricultural area and the area facing the worst groundwater problems—most of the land area now falls within the territories of GSAs formed partly or even entirely by water districts. Consequently, water districts are now the primary groundwater-use regulators in large areas where groundwater is a crucially important—for some people, indispensable—public resource and where decades of wrenching decisions will need to be made about groundwater allocation and use.[34]

B. Boundaries

Additional problems arise when local governing units choose their own boundaries. A governing unit may seek to exclude areas that will be more expensive to serve,[35] such as poorer areas whose infrastructure is in worse shape. The result is that many poor communities, often populated primarily by people of color, have less access to water supply than their neighbors.[36] Or, for less pernicious reasons, it may just wind up with a shape that has little correspondence to aquifers or watersheds. Such irregular boundaries create coordination problems, and absent consolidated governance, water managers will have incentives to extract water from other jurisdictions.[37]

C. Policy Conflict

Situations in which local water districts are at odds with state policy goals seem certain to recur and likely to expand across the West.[38] When most water districts formed in the late 19th and early to mid-20th centuries, district interests and the aims of water law were closely aligned.[39] More recently, however, the goals of state water policy have evolved toward environmental protection,[40] economically efficient water allocations,[41] and social equity.

In an increasingly urbanized, water-short, and politically diverse West, tensions between state goals and water

27. *See, e.g.*, Cal. Water Code §34027 (West 2024) ("'Voter' means a person who is a holder of title."); Cal. Water Code §35003 (West 2024) ("Each voter shall have one vote for each dollar's worth of land to which he or she holds title.").
28. *See* Ball v. James, 451 U.S. 355, 378 (1981) (White, J., dissenting) (discussing eminent domain, bonds, and taxation). There are partial exceptions to these generalizations. Utilities often have eminent-domain authority, *see* Alexandra B. Klass, *Takings and Transmission*, 91 N.C. L. Rev. 1079, 1101-03 (2013), but they are subject to rate regulation. Nonprofit corporations also have preferential tax status. But I am not aware of other privately controlled entities that hold as many different traditionally (if not exclusively) governmental powers as water districts.
29. *See* Leahy, *supra* note 1, at 34-39.
30. *See* Dave Owen, *Cooperative Subfederalism*, 9 U.C. Irvine L. Rev. 177 (2018).
31. Cal. Water Code §10723 (West 2024) (allowing the creation of "groundwater sustainability agencies" (GSAs)); Cal. Water Code §§10727-10728.4 (West 2024) (discussing groundwater sustainability plans).
32. *See* Cal. Water Code §§10723-10724 (West 2024). Section 10723 does identify a list of specific entities that will serve as groundwater sustainability agencies, but that list only covers a small portion of the state's groundwater basins. *See id.* §10723(c)(1).
33. *See generally* Esther Conrad et al., *To Consolidate or Coordinate? Status of the Formation of Groundwater Sustainability Agencies in California*, Stan. Water in the W. and Martin Gould Ctr. for Conflict Resol. and Ctr. for Collaborative Pol'y 1 (Dec. 2016), https://water-inthewest.stanford.edu/sites/default/files/GSA-Formation-Report_1.pdf [https://perma.cc/D9W3-682R] (showing the types of entities that had taken steps to form GSAs). In a few areas, special legislation authorized the inclusion of private companies in GSA governing boards. *See, e.g.*, Cal. Water Code App. §143-501 (West 2024) (stating that the board of directors for the North Fork Kings Groundwater Sustainability Agency will include representatives from several private companies).
34. *See* Maurice Hall, *Farms, the Environment, and the Future of Water*, CalMatters (Sept. 12, 2019), https://calmatters.org/commentary/2019/09/sustainable-groundwater [https://perma.cc/HWN4-GB72] ("In some areas, [SGMA implementation] will mean cutting long-term water use by 30% to 50%.").
35. *See* Richard Briffault, *Our Localism: Part I—The Structure of Local Government Law*, 90 Colum. L. Rev. 1, 19-22 (1990).
36. *See* Jonathan K. London et al., *Disadvantaged Unincorporated Communities and the Struggle for Water Justice in California*, 14 Water Alts. 520, 540 (2021); Laura Bliss, *Why California's Poorest Towns Still Can't Connect to Water*, Bloomberg CityLab (Oct. 8, 2015, 3:14 PM EDT), https://www.bloomberg.com/news/articles/2015-10-08/the-drought-forces-water-system-consolidation-in-california-s-central-valley [https://perma.cc/23PT-5WLR].
37. *See* Matthew E. Kahn et al., *Water Pollution Progress at Borders: The Role of Changes in China's Political Promotion Incentives*, 7 Am. Econ. J. 223, 225 (2015) ("Upstream regions often locate polluting enterprises close to borders so that pollution is carried downstream.").
38. I was unable to find similar evidence of recurring legal battles between local water districts and state authorities in other western states, and the informal consensus view among my water-law colleagues is that other western states do not stand up to their water districts—at least not yet.
39. *See* Schodde v. Twin Falls Land & Water Co., 224 U.S. 107, 124-25 (1912) ("[T]he largest duty and the greatest use must be had from every inch of water, in the interest of agriculture and home building").
40. *See generally* David M. Gillilan & Thomas C. Brown, Instream Flow Protection: Seeking a Balance in Western Water Use (1997) (describing instream flow protections across western states).
41. *See generally* Jedediah Brewer et al., *Transferring Water in the American West: 1987-2005*, 40 U. Mich. J.L. Reform 1021 (2007) (describing the reasons for and emergence of water transfers).

district priorities seem likely to arise with increasing frequency.[42] Utah's Great Salt Lake provides an alarming example. Partly because of water districts' water diversions, the lake is shrinking, with potential ripple effects on water supplies, air pollution, and the snowpacks.[43] As reluctant as the state may be to assert greater control over water use,[44] it has no real choice. And, in a drying West, Utah's challenge, though particularly acute, will not be unique.

States generally have not tried to resolve their tensions with water districts by assuming direct control of districts' operations. Doing so would be constitutional; water districts are creatures of state statutory law.[45] But statutes setting forth criteria and procedures for state management do not exist. What could be a powerful mechanism for water-policy reform instead remains unused.

IV. Reforming Water Districts

This Part proposes three sets of water district reforms. The first set focuses on governance and transparency. The second set focuses on boundaries. The third involves giving states backstop authority to take over water district functions. These proposals all focus on legislative action and could be adopted selectively and incrementally.

A. Voting

Many water districts use voting systems designed to limit public participation, including landowner-weighted voting systems, restrictions on nonlandowner service on boards, and off-cycle voting. These problematic voting systems were created by state legislation, and that state legislation could change.

1. One-Person, One-Vote Requirements

States could enact legislation requiring one-person, one-vote governance and could repeal legislation requiring members of water district boards to be landowners. Both changes would be controversial, but neither would be complex. Models for both already exist. In California, for example, most irrigation districts already have one-person, one-vote structures,[46] as do county water districts.[47] That these entities have existed for decades shows that landowner-weighted voting is not inherently necessary.

2. Limiting Powers of Nonrepresentative Districts

States could prohibit entities with nonrepresentative voting from governmental benefits like the ability to regulate groundwater, receive grants, or enjoy governmental tort immunity for non-irrigation functions.[48] Similarly, states could specify that nonrepresentative agencies offering services beyond irrigation supply must be subject to the same price-control regulatory structures as private utilities.[49] The basic idea would be to make democratic functioning a prerequisite for governmental benefits.

3. Election Consolidation

Consolidating local elections with state and federal elections can dramatically increase participation, particularly among voters who are younger, non-white, and less wealthy—in other words, among many of the same voters who are already frozen out of water district governance.[50]

B. Boundaries

Water district governance forms a crazy quilt pattern of service areas. That pattern has arisen largely because state statutes leave boundary setting to local discretion.[51] The result is boundaries that align poorly with the geography of present-day resource management challenges. New legislation could help.

1. State-Directed Boundary Revision

Through direct legislation or empowering administrative agencies, states could redraw their water-governance map by reordering the boundaries, removing enclaves, or compelling mergers of multiple districts to create larger-scale entities.[52]

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42. *See* Thomas C. Brown et al., *Adaptation to Future Water Shortages in the United States Caused by Population Growth and Climate Change*, 7 Earth's Future 219, 225-31 (2019) (predicting increased water shortages).
43. *Id.*
44. *See* Mark Olalde, *Why the Second-Driest State Rejects Water Conservation*, ProPublica (Dec. 16, 2021, 6:00 AM EST), https://www.propublica.org/article/why-the-second-driest-state-rejects-water-conservation [https://perma.cc/F9R7-KKGG] (describing how the water districts serving urban Utah are thwarting badly needed reforms). As Mark Olalde's reporting shows, Utah's reluctance to curb water use is not limited to agricultural users. *Id.*
45. *See Principles of Home Rule for the 21st Century*, Nat'l League of Cities 29 (2020), https://www.nlc.org/wp-content/uploads/2020/02/Home-Rule-Principles-ReportWEB-2-1.pdf [https://perma.cc/34GE-68XF] (distinguishing home-rule entities).
46. Cal. Water Code §20527 (West 2024).
47. *Id.* §30021.
48. *See generally* Dyble, *supra* note 16 (arguing for similar reforms, though through litigation rather than legislation).
49. *See* Leshy, *supra* note 9, at 356 (observing that districts' "governmental status accords them a freedom from regulation by state regulatory agencies to which ordinary business entities exercising similar monopoly power have traditionally been subject").
50. *See* Zoltan L. Hajnal et al., *Who Votes: City Election Timing and Voter Composition*, 116 Am. Pol. Sci. Rev. 374, 374 (2022) ("Every published study on election timing and turnout shows that using concurrent elections is the single most important change that local governments can undertake to increase turnout.").
51. *See* Jared Eigerman, *California Counties: Second-Rate Localities or Ready-Made Regional Governments?*, 26 Hastings Const. L.Q. 621, 652-53 (2000) (describing and critiquing local agency-formation commissions).
52. California has already begun doing this with drinking-water systems, though on a very limited basis. *See* Ryan J. Mahoney, *The State Water Resource Control Board's Mandatory Consolidation Authority: Recommendations for Modification and Improvemen*t, 50 U. Pac. L. Rev. 33, 34-55 (2018) (describing California's consolidation legislation).

2. Regional Authorities

States could order that districts be folded into other types of governing entities. For example, rather than empowering a hodgepodge of districts—only some of them democratically governed—to oversee a shared aquifer, the state might enact legislation creating a regional groundwater authority. Nebraska, for example, has done this on a statewide basis.[53] Or, alternatively, states might consolidate water governance in districts that operate as subdivisions of county governments. For instance, California's Santa Clara Valley Water Agency holds unified control over rural areas, suburbs, and Silicon Valley cities.[54] Some degree of fragmentation is always inevitable, but that degree could be much lower.

C. Direct State Management

For truly recalcitrant water districts, takeover should also be an option. Though this might seem like a dramatic change, the basic idea is not new. On rare occasions, states do this with municipal governments in financial distress.[55]

State management could be structured in several ways. The takeover might be partial or complete. For a partial takeover, the state could place representatives on the district board—possibly also adding staff—while leaving the basic structure of the district in place.[56] For a complete takeover, the state could dissolve the district and substitute its own personnel, or it could leave the district in place but substitute state decisionmakers—either permanently or for a temporary period.[57]

Takeovers should be rare and probably would be. Still, the possibility of takeovers might spur districts to bring management into closer alignment with state policy goals or at least make that management more effective. Actual takeovers could give states a greater ability to implement conservation programs, deliver water to disadvantaged communities, and pursue other state policy goals. And, importantly, state takeovers might be combined with other mechanisms like boundary rationalization; for example, a state could create new agencies with broader geographic coverage and include state representatives on the governing boards.

V. Conclusion

Water management has never been simple, and growing populations, warming temperatures, and continued resource depletion will almost certainly make the challenges harder.[58] Western state legislatures can enact reforms that modernize water districts by eliminating undemocratic governance systems, rationalizing boundaries, and facilitating state intervention and interaction. None of this will be easy—the traditional power structures remain deeply entrenched—but it is legally possible. And the reforms described in this Article offer concrete steps toward more functional and productive relationships between water districts and states.

53. *See About NRDs*, Neb.'s Nat. Res. Dists., https://www.nrdnet.org/nrds/about-nrds [https://perma.cc/X2A5-TV8X]; Christina M. Hoffman & Sandra Zellmer, *Assessing Institutional Ability to Support Adaptive, Integrated Water Resources Management*, 91 Neb. L. Rev. 805, 806-42 (2013) (describing and evaluating Nebraska's natural resource districts).
54. *See District Overview*, Santa Clara Valley Water Dist. 2-1 (2016), https://www.valleywater.org/sites/default/files/1.%202016-17%20District%20Overview.pdf [https://perma.cc/XM3T-DAW9] ("The water district's unique multi-purposes enable it to use a comprehensive regional approach to water resources management and environmental protection that would not be possible if these services were fragmented among several agencies.").
55. *See generally* Michelle Wilde Anderson, *Democratic Dissolution: Radical Experimentation in State Takeovers of Local Governments*, 39 Fordham Urb. L.J. 577, 581-82 (2012) (describing and criticizing state preemption of local democracy).
56. For a discussion of the merits of such joint arrangements, though in the federal-state context, see Dave Owen & Hannah J. Wiseman, *Coequal Federalism and Federal-State Agencies*, 55 Ga. L. Rev. 287, 307-30 (2020).
57. This somewhat describes the current situation in Jackson, Mississippi, though in Jackson the takeover is overseen by a federal court. *See* Ross Reily, *Jackson Water System Handed to the "Elon Musk of the Water Utility Industry,"* Miss. Clarion Ledger (Nov. 30, 2022, 8:33 PM CT), https://www.clarionledger.com/story/news/2022/12/01/jackson-water-system-called-utility-industry-elon-musk/69688444007 [https://perma.cc/JLC6-JC79].
58. *See generally id.* (forecasting approaching challenges in water management).

COMMENT

EQUITY AND GOVERNANCE

by Noa Bruhis

Noa Bruhis is a Manager at the Environmental Defense Fund.

I am Noa Bruhis and, as you may have heard in my bio, I am a recovering engineer who wandered into and fell in love with the social sciences—but I do gravitate toward technical solutions. Accordingly, this is a little out of my comfort zone, and I am excited to explore this article with the panelists and with Prof. Dave Owen.[1]

There is a lot in your presentation, Professor Owen, that is very easy for me to agree with. The time is right to rethink groundwater governance, and I will add that most of my work is on a groundwater accounting platform, which is like a mobile bank account for groundwater. Agencies can look at a screen and see transactions. How much water do we have? How much are we spending? It has been piloted in California, so I too have a California-centric framework for my thinking right now—although I live in Arizona.

We are finally getting enough experience with the Sustainable Groundwater Management Act (SGMA) to see how those systems operate in practice.[2] Last year, I was at a SGMA Implementation Summit, and the opening speaker said: "I'm going to my son's fifth-grade graduation this weekend and it occurred to me he's the same age as SGMA." So, we are looking at an elementary school act here that is about to move into middle school—and we are thinking about what happens now as it starts to get its teeth and starts to see some impacts. All to say that the time is right to think about SGMA in California. How is it going? Are we doing it right?

My main reaction to the article and Professor Owen's consolidated thoughts presented here is that democracy is important—and it is not the same thing as equity or equitable decisionmaking. If we are not careful, we could be exacerbating inequities in our striving for democracy.

To consider equity and environmental justice, we think about many different dimensions. There are four common types, but there are others. The first one is "procedural justice." The article and the thoughts Professor Owen shared today really consider who has a voice in these decisionmaking processes, and who has a seat in the room when decisions are being made. Another is "distributive justice"—who bears the burdens and who benefits from the decisions. And is it the same people who are making the decisions who benefit and also feel the harms—or are there people feeling harms who do not get the benefits? The article and talk today address that too.

Another is "recognition justice," which is about valuing diversity. There are many different kinds of expertise and, in a lot of these decisionmaking spaces, technocratic authority rules. If you have a technical background and can show a chart or map or offer some kind of appeal to logic or technical expertise, often that gets valued over lived experiences—over sometimes thousands of years of generations of knowledge.

The next one is "restorative justice," which is righting past wrongs. The point is not actually to dive into any of them today. It is just to illustrate that there are multiple dimensions that exist and multiple ways that we can exacerbate or alleviate harm.

As I said, there is lots I agree with in the article. Water district roles have expanded through SGMA, and certainly the time is ripe to evaluate whether that expansion is appropriate and whether there are modifications that should be made. I agree that decisionmaking power from an environmental justice perspective is poorly distributed. There are cases of elite capture for sure. There is representation that can be limited as far as who can serve on boards and such—and historically marginalized communities continue to be marginalized in many cases. I am just scratching my head that in this century, in this country, there are people living without water.

There are some tensions I want to highlight too. One is about state oversight. The article alluded to this, but states can also favor historically favored groups. The same pitfalls that befall water districts can certainly befall state agencies, and Professor Owen talked about that in his introduction. They can mess up just as much as the rest of us. I think we need to be thinking about not just *moving* power imbalances, but constraining them and addressing them head-on.

Something that is hard to ignore is that in California democrats have a supermajority in both houses, and many areas that are covered by water districts have Republican representatives. If we move to state control strictly, regardless of my own political alignment, democratically speaking that would not provide good representation of many of the people living in those districts.

Editors' Note: Noa Bruhis' Comment is based on an edited transcription of her remarks at the Environmental Law and Policy Annual Review conference. A recording of the conference is available here: https://www.eli.org/events/2026-environmental-law-and-policy-annual-review-elpar-conference.

1. Dave Owen, *The Water District and the State,* 134 Yale L.J. 1 (2025).
2. Cal. Dep't of Water Res., *Sustainable Groundwater Management Act (SGMA)*, https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management (last visited July 20, 2026).

Some recommendations in the article have been tested in California. This notion of fragmentation—it is a messy map in the Wild West—it is like this circus of carefully coordinated chaos. But regarding that fragmentation, there are mechanisms to address it in SGMA. Within a subbasin, my understanding is that these fragmented agencies and districts need to agree on a plan to submit to the state and if any one of those agencies rejects that collective plan then the state can take over. We have not seen that happen yet—but SGMA's just a kid, so who knows, there is time.

Another tension is that the article focuses a lot on governing boards for these districts, but a lot of decisions happen in other rooms besides the formal ones. A lot of decisions are made that lead up to what gets to be voted upon. There are advisory groups and technical meetings and committees where these consequential decisions happen upstream of the boards. Understanding where influence occurs can lead to more meaningful reforms and interventions. In some cases, less formal interventions are wanted and, in some cases, more formal—but there is a lot of room for improvement in a lot of spaces and not just the formal ones.

Furthermore, there are some unintended outcomes that may happen from some of these recommendations. Stricter governance might push districts to restructure as private entities which are more opaque. Also, under SGMA, the state can usurp control, but we have seen cases where just the threat of state intervention leads people to disengage. At the landowner and small community level, they step back from the agency processes and local governance.

Lastly, the path forward is not necessarily about choosing between state control or local control. Any recommendation should be put through this very fancy equation where equitable outcomes are the sum of accountability, capacity, and alignment. We should be strengthening accountability mechanisms at all levels—accountability to those forms of justice I referenced earlier. We should be investing in the capacity of communities to engage meaningfully. There can be any number of limitations that can prevent engagement of communities. We should be aligning decisionmaking authority and impacts. Thank you.

A REAL-WORLD PERSPECTIVE ON WESTERN WATER GOVERNANCE

by James Eklund

James Eklund is a Partner at Taft Law.

Thanks for the opportunity to give my thoughts on what is a terrific article.[1] It is clear-eyed about a part of western water governance that most people, even in our circles, do not fully appreciate—that is the quiet dominance of water districts in this space. I agree with the core thesis of the article but, as a rancher, I bring a practical reality to the work I do. I want to start with the moment we are in, because this discussion is especially timely.

This week—the day before yesterday—Denver Water declared a Stage 1 mandatory watering restriction for the first time in its history.[2] When it rains here in the District of Columbia, it drops off the map in terms of the potential severity of the issue. But, trust me, it is very dry in the western part of the country. Snowpack across the Rockies is tracking at levels we haven't seen in the paleo record since roughly 1200 in the Common Era. Lake Powell and Lake Mead are hovering just above critical thresholds—Lake Powell within striking distance of minimum power pool by September.[3] And the Colorado River operating regime expires at the end of this year with the states still unable to agree on what comes next.[4]

So, when we talk about governance, we are actually talking about whether the system holds or fails. As John F. Kennedy said: "The time to repair the roof is when the sun is shining."[5] And the sun is definitely shining; we are well past that point.

Against that backdrop, Prof. Dave Owen's diagnosis is right. We have a governance structure that is often undemocratic, it is geographically outdated, and it can frustrate state policy objectives. His call for stronger state engagement is important, especially in a system where states are the sovereign signatories to interstate compacts that bind their water users. But I want to push on the solution set. Because from where I sit in Colorado, inside a prior appropriation system operating under nine interstate compacts, the problem is not just governance design—it is governance plus implementation under extreme stress.

I am going to make five points. Point one: districts are flawed but also indispensable. They are implementation platforms. They are the entities that deliver water, operate infrastructure, manage return flows, and increasingly are being asked to implement conservation because the vast majority of water-consumptive use in the West is in agriculture—80 to 90% of it. Here's the tension: the very features that we are critiquing here—narrow constituencies, landowner dominance, embedded incentives—are the exact features that make these entities capable of acting in the first place. It is a bit of a paradox. They can coordinate, they can move quickly, they can actually turn their systems. So, I would be careful about a frame that treats districts primarily as obstacles. In much of the West, they are the only institutions that can actually execute change, given they are a product of control that most western states—Colorado specifically—have elected to devolve to the local level. These are local-control states. This has been our political choice.

This leads to the second point. We do not just have a governance problem; we have an implementation gap. And that gap is widened. We can pass laws, we can set targets, we can reject plans, but when it comes time to actually reduce consumptive use—which is the name of the game (all these interstate compacts are consumptive-use compacts)—fallow land, and reoperate systems, the question is always: Who is going to do the work? Even where states push hard, we still see plans that allow depletion in dry wells. That is not just a governance failure; that is a failure to align the institutions, incentives, and execution. Even with stronger state leadership—I definitely agree we need that—the work will still be carried out at the ground level by the districts or institutions that look very much like what these districts look like.

Editors' Note: James Eklund's Comment is based on an edited transcription of his remarks at the Environmental Law and Policy Annual Review conference. A recording of the conference is available here: https://www.eli.org/events/2026-environmental-law-and-policy-annual-review-elpar-conference.

1. Dave Owen, *The Water District and the State*, 134 Yale L.J. 1 (2025).
2. Denver Water, *Denver Board of Water Commissioners Declares Stage 1 Drought, Implements Mandatory Watering Restrictions*, https://www.denverwater.org/tap/denver-board-water-commissioners-declares-stage-1-drought-implements-mandatory-watering (last visited Aug. 6, 2026).
3. Lake Powell Chronicle, *Lake Powell Facing Critical Thresholds Amid Record Warmth and Diminished Runoff*, https://lakepowellchronicle.com/stories/lake-powell-facing-critical-thresholds-amid-record-warmth-and-diminished-runoff,104296 (last visited Aug. 6, 2026).
4. U.S. Dep't of the Interior, *Post-2026 Colorado River Operations, Bureau of Reclamation*, https://www.usbr.gov/ColoradoRiverBasin/post2026/index.html (last visited Aug. 6, 2026).
5. John F. Kennedy, State of the Union Address (Jan. 11, 1962), https://www.historycentral.com/JFK/Speeches/State62.html.

Point three, on the role of the states: Professor Owen is right that states have more authority than they often use. In the Colorado River Basin, they are sovereigns under the compacts. Colorado alone is party to nine of these compacts. But compacts do two things: they empower the states who are signatory to them, and they force coordination. In practice, states rely on districts as implementation arms, political buffers, and shock absorbers when their systems are under strain. You don't displace that with legislation; you have to work through it. Maybe it is the [cowboy] hat, but I am a big Lyndon Baines Johnson fan and he said: "There are no problems which we cannot solve together, and there are very few which any of us can settle by [ourselves]."[6] So, we have got to work together on these compacts, and it is pretty clear that the governance structure, at least around the Colorado River compact, is failing in front of us.

My fourth point is what I think is the missing piece. We are trying to solve a market problem with governance tools alone. Water in the West is one of the most economically distorted resources. It is incumbent on water providers to artificially suppress the value of the water so that they don't have to charge their ratepayers very much for it. They keep it that way as long as they possibly can. This is starting to rub up against supply and demand—the raw economics of any commodity that is subject to this kind of stress. Its value is administratively constrained, politically suppressed, and disconnected from scarcity. When you suppress the value of a scarce resource, you do not eliminate the market; you lose complete control of it. Economic forces don't just disappear because you want them to. They show up somewhere else in resistance and hoarding and underinvestment—and in the failure of conservation to materialize when you need it. It is whether we shape them or they shape outcomes for us. Right now, districts are rationally defending revenue, they are rationally holding supply, and the system is rationally resisting conservation.

If we want different outcomes—and we have to have different outcomes in order to save some of these systems like the Colorado River—we have to change the economic incentives. That means paying for conserved water, valuing scarcity honestly, and creating mechanisms that allow water to move without collapsing the institutions that manage it. If we don't, no amount of governance reform will produce real conservation.

My fifth and final point: We can no longer afford to treat non-tributary groundwater as something to dismiss. I understand the challenges that California has faced in the Central Valley with subsidence. In places like the Denver Basin, which underlies Colorado Springs on the Front Range to Fort Collins in the north part of the Front Range, the non-tributary groundwater is a practical backstop. It is the difference between a functioning system and emergency conditions. Is it finite? Are we mining it? Yes, we are. But in a system that is as tight as it is going to be in a couple of weeks when we turn water on to irrigate, we do not have the luxury of dismissing supply. We need to think about groundwater and really all sources as part of a portfolio for resilience. I agree with Professor Owen that groundwater management requires state—or in the case of aquifers like the High Plains or the Ogallala—multi-state governance.

Where does that leave us? Not with a choice between the state and districts. We need to align authority: states setting enforceable guardrails, districts doing the work on the ground, and providing incentives so conservation actually happens. We are not debating a theoretical, abstract concept here. We are managing proximity to complete system failure in the Colorado River, relied on by 40 million people and the fifth largest economy in the world. As Winston Churchill said: "The era of procrastination is coming to its close. In its place, we are entering a period of consequences."[7] That period is definitely here. The question is whether we are able to align governance, implementation, and economics quickly enough to matter because, if we don't, the system will rebalance itself and it won't do it on our terms.

6. Lyndon B. Johnson, *The President's News Conference at the LBJ Ranch*, The American Presidency Project, https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-the-lbj-ranch-1 (last visited Aug. 6, 2026).

7. Winston Churchill, *Consequences*, International Churchill Society, https://winstonchurchill.org/resources/quotes/consequences/ (last visited Aug. 6, 2026).

COMMENT

WESTERN WATER GOVERNANCE: STATE PRIMACY WITHOUT STATE TAKEOVER

by J.D. Strong

J.D. Strong is the Executive Director of the Western States Water Council.

In former lives, James Eklund [the prior speaker] and I represented Colorado and Oklahoma on the Western States Water Council, which I now lead as executive director. He hit on a lot of the key points that I think our states would want me to hit on as well about Prof. Dave Owen's article.[1]

Our organization represents 17 western states, and its members include senior officials from western state water agencies, including California's State Water Resources Control Board. As you can imagine, there is quite a bit of diversity in how our folks think (e.g., whether you are in California versus Oklahoma). In fact, when they hired me to be executive director, the California representative had been serving 10 years earlier when I was on the Council. I kept thinking: How many times did I offend her with my Oklahoma perspective? It really was a concern of mine because we do things so differently.

Common themes for our organization relevant to this topic include that the states are the primary sovereigns responsible for water allocation, administration, and management within their borders. The Clean Water Act (CWA) creates an important federal-state regulatory framework, but it also recognizes and preserves important state authority over water allocation and management.[2] I may be a little biased as a former director of a state water agency in Oklahoma, and now I represent 17 of them—but I think it is very much the case.

I may get fired before I get home for saying this, but states are not always the perfect solution to these problems either. When it comes to this particular issue, the local districts play an incredibly important, vital role. The conundrum here is that as those districts have expanded responsibility—from just delivering water from point A to point B to taking on broader public and regulatory responsibilities—it has become more important for the states to engage in the governance structure. There are also examples—Flint, Michigan, and others—that remind us total state control is not necessarily the answer either.

Putting my Oklahoma hat back on—and I did not bring any of my cowboy hats with me on this trip because I am in and out fast, and it's hard to mess with them on an airplane—I would say the more arduously you argue for state takeover and control of local water management decisions, the more quickly you may find yourself defending against arguments for federal takeover and control based on a lot of the same arguments. And that is not where any of the states would want to go, including California—so we have got to be cautious.

Professor Owen is candid about the limits of his own argument, including California's uniqueness. I was going to emphasize, as others have, that California is unique. Even the California folks that are on my board would say the same—they brag about the fact that they are unique. What is going on in California is an interesting topic, and this is a very thought-provoking article that does expose some real issues and stressors. But it is important to remember that we have a large number of states across the West that have great relationships with their local water districts, including within California, and find them to be invaluable in their ability to do things that the states simply cannot do. We have got to keep that in mind.

There are no easy solutions. I heard the comments earlier about the "circus out west" and how maps, depending on what resource you map, can look pretty chaotic. But the fact of the matter is that it's messy. Democracy is messy. It is fun to say that sitting right here in one of the cities in the world that has some of the messiest of all democracy!

I do agree with the main concerns identified, including that limited or landowner-based voting and board eligibility can be problematic, especially when roles are broadened. And boundaries don't necessarily match hydrologic boundaries. There are a few exceptions—the Red River forms much of Oklahoma's southern border with Texas. But that does not necessarily mean political boundaries

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1. Dave Owen, *The Water District and the State,* 134 Yale L.J. 1 (2025).
2. Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§1251-1387.

never work. And there is always tension in states between districts and statewide policy goals.

There is no doubt that governance matters. When these local entities exercise broader and broader public powers, states cannot be hands off—state involvement becomes extremely important. It is also fair to ask whether existing voting structures, in particular, are transparent enough, representative enough, and fit for purpose.

Even though California's Sustainable Groundwater Management Act (SGMA) was discussed as an example of some of the governance challenges, it is also an example of the state and its legislature taking action, which is the focal point and the big suggestion in the article.[3]

I love the analogy that SGMA is in elementary school. As the husband of a first-grade teacher, I appreciate the analogy that this Act is in its infancy. A lot of times people expect progress to happen overnight. But when it comes to very important topics and issues—and a state that has been around for a lot longer than Oklahoma—it is important to note that things evolve slowly over time. And that is typically a good thing, because you don't want overreach or overreaction.

There are no quick solutions. To Eklund's point, we are in some pretty dire situations throughout the West. While it is raining here in the District of Columbia this morning, people here don't appreciate that much of the West remains remarkably dry. I would add that I think the East Coast had more snow dumped on it this year than a lot of the western states, including the high mountainous areas. I have tried and failed to go snow skiing in Salt Lake City several times this year when I travel to our headquarters office. It is incredibly dire. With looming deadlines on the Colorado River and continued difficulty reaching agreement, in some cases we may have missed the opportunity to fix the roof while the sun's shining.

But it is important to remember the West is diverse. I can give you plenty of examples of when we gather our 17-state governing board around the table—and start talking about controversial topics like Waters of the United States or Section 401 certifications—that you see that diversity come out live and in person.[4] [5] Throw the Colorado River on the table and, whether you are in Wyoming versus Arizona, you have some pretty interesting energy in the room. It just underscores the fact that there are no one-size-fits-all solutions, because every state is different. Even within states, you have differences. California is important, but every western state has its own legal frameworks, district types, and water challenges. Better governance does not automatically mean more centralized governance.

I would reiterate from the Western States Water Council perspective that state primacy is fundamental, and there is a role here for the state. And I agree reform should happen at the state level through state law and state policy.

Another major point of the article is that litigation isn't solving any of these problems. I know I'm in a room full of attorneys when I say that and, although I was born J.D., I did not go to law school. But when you watch state legislatures, they are oftentimes as dysfunctional as what happens down the street at our nation's Capitol. So, I think there is plenty of job security for the attorneys in the room, because it is not going to be solved perfectly even by state legislators. Unfortunately, there will still be continuing litigation, and many parties do not get serious about compromise until they are on the courthouse steps—because that is when a lot of deals tend to get cut.

I'll wrap up by saying the future of western water governance is not old-style, hands-off localism—like there was for my ancestors who settled Oklahoma five generations ago—and it is not a blanket state takeover either. The future is strong state leadership, better alignment, and durable institutions that are capable of meeting modern western water challenges.

3. CA Water Code §§10720, et seq.; Cal. Dep't of Water Res., *Sustainable Groundwater Management Act (SGMA)*, https://water.ca.gov/programs/groundwater-management/sgma-groundwater-management (last visited July 20, 2026).

4. U.S. Env't Prot. Agency, *Waters of the United States*, https://www.epa.gov/wotus (last visited July 20, 2026).

5. U.S. Env't Prot. Agency, *Overview of CWA Section 401 Certification*, https://www.epa.gov/cwa-401/overview-cwa-section-401-certification (last updated May 19, 2026).

ARTICLE

THE CLEANEST WATER AND THE DUMBEST KIDS: DO SMALL WATER SYSTEMS COMPLY WITH THE SAFE DRINKING WATER ACT?

by James Salzman and Ana Mackay Peltzer

James Salzman is the Donald Bren Distinguished Professor of Environmental Law with joint appointments at the UCLA School of Law and at the Bren School of Environmental Science & Management at UC Santa Barbara. Ana Mackay Peltzer is a recent graduate from the University of California, Los Angeles School of Law.

I. Introduction

When students are first introduced to the Safe Drinking Water Act of 1974 (SDWA),[1] two things often stand out. The first is that the SDWA is technically complex. The second is the huge number of water systems that are regulated. There are over *150,000* public water systems (PWSs) scattered throughout the country.[2] The vast majority of these PWSs are very small.[3] About 80% of PWSs serve under 500 people.

Smaller systems have limited capacity, both in terms of financial and human resources, to ensure compliance. This scarcity requires tough trade offs. As one official from Lewiston, Maine, memorably argued during the debate over the 1996 SDWA amendments, in order to comply with stricter drinking water standards, "[w]e will have the cleanest water in the state and the dumbest kids."[4] In this risk-risk trade, forcing small communities to devote significant resources to treating drinking water would divert funds from arguably more important needs.

Given the complexity of the SDWA, the roughly 100 contaminants that must be tracked and treated, and the limited capacity of small PWSs, widespread noncompliance seems an obvious concern. Despite the obvious implications of noncompliance by small PWSs on human health and well-being, there has been surprisingly little research on the topic—none in law reviews.

How widespread is small PWS noncompliance? Which types of violations are most common and most persistent? How do income, location, and demographics correlate with noncompliance? These questions matter because one cannot meaningfully design or assess law and policy without a clear understanding of the problem.

II. Public Water Systems Across the United States

The SDWA regulates a daunting range of PWSs—over 152,000. A mere 0.2% of total PWSs are large systems, while 430 PWSs serve over 100,000 people and provide water to almost 44% of the nation. By contrast, roughly 97% of systems serve fewer than 10,000 people—about 21% of the population. This distribution is similar at the state level. California has roughly 2,900 community water systems (CWSs)—86% serve fewer than 10,000 people, 77% serve fewer than 3,000 people, and 1,500 systems serve fewer than 100 customer connections.[5]

The vast majority of PWSs are small yet must comply with a highly technical statute. The SDWA requires the U.S. Environmental Protection Agency (EPA) to assess the risk posed by contaminants and their likelihood to occur in PWSs. The Agency may establish maximum contaminant

Editors' Note: This Article is adapted from James Salzman & Ana Mackay Peltzer, *The Cleanest Water and the Dumbest Kids: Do Small Water Systems Comply With the Safe Drinking Water Act?*, 44 Stan. Env't L.J. 276 (2025), *and used with permission.*

1. 42 U.S.C. §§300f to 300j-26, ELR Stat. SDWA §§1401-1465.
2. *Providing Safe Drinking Water in America: National Public Water Systems Compliance Report*, U.S. EPA, https://www.epa.gov/compliance/providing-safe-drinking-water-america-national-public-water-systems-compliance-report (last visited Jan. 29, 2025) [hereinafter EPA *Compliance Report*].
3. A PWS is a water system that serves at least 15 connections or an average of 25 people for at least 60 days per year. A community water system (CWS) is a PWS that serves the same population year-round. *Information About Public Water Systems*, U.S. EPA, https://www.epa.gov/dwreginfo/information-about-public-water-systems (last visited Jan. 30, 2025).
4. 141 Cong. Rec. S1316 (daily ed. Nov. 19, 1995) (statement of Sen. Cohen, cosponsor of the bill).
5. Caitrin Chappelle & Lori Pottinger, *Recession Safety Net Needed for State's Small Water Systems*, Pub. Pol'y Inst. of Cal. (Oct. 6, 2020), https://www.ppic.org/blog/recession-safety-net-needed-for-states-small-water-systems/.

level goals—the highest concentration of the contaminant in water that allows an adequate margin of safety. Guided by the mandate that the standard "maximizes health risk reduction benefits at a cost that is justified by the benefits," EPA then sets a maximum contaminant level (MCL). States can increase the stringency of MCLs to even stricter standards. MCLs have been set for roughly 100 contaminants.

Under "primacy," EPA delegates primary implementation and enforcement authority to states. Thus, EPA and states face a challenge. How can they ensure that roughly 147,000 systems comply with the technical and demanding SDWA statute?

III. Empirical Research on Small PWS Noncompliance: What Do We Know?

Very few studies assessing compliance of small PWSs easily provide "apples-to-apples" comparisons. Studies vary by focus on different contaminants, geographic area, time period, data availability, and omission of key variables.[6]

A. Persistence of Violations

To prioritize SDWA enforcement responses, EPA assigns points to a water system based on "seriousness and duration" of the violation.[7] EPA designates a PWS as an enforcement priority when it reaches 11 or more total points.[8] In 2022, the agency reported that 94% of enforcement priority systems were serving 3,300 or fewer customers.[9] A 2016 EPA Office of the Inspector General study found 90% of small systems in severe violation of SDWA health regulations did not receive a timely formal enforcement action, 33% received none at all, and few faced escalating sanctions.[10] Of the small utilities in the study, 86% remained out of compliance more than three years later.[11]

B. Health-Based Violations

Results are less consistent for whether small PWSs are more likely to have health-based violations than large PWSs. Madeline Kane found that small systems were responsible for over 80% of health-based SDWA violations from 2016 to 2019.[12] In Lisa Harvell's 2017 national study, nearly 26% of water systems serving fewer than 500 customers had violations, compared to 17% serving more than 100,000 customers.[13] By contrast, studies of Pennsylvania and California found that size did not have a significant relationship with health-based violations.[14] Jeff Oxenford and Joy Barrett found small systems serving fewer than 500 customers had "basically the same probability" of a total coliform MCL violation as large systems serving up to 100,000 customers.[15] In over 900,000 samples collected and reported under the Unregulated Contaminants Monitoring Rule Data Summary of 2018 to 2020, the percentage of priority unregulated contaminant exceedances by small systems was proportional with their overall representation in the dataset (approximately 9%).[16]

Overall, there is no consensus among studies examining system size and health-based violations. Comparisons are difficult to make because researchers focus on different contaminants, across different geographic areas, and over different time periods.[17]

C. Monitoring & Reporting

Monitoring and reporting SDWA violations (MR violations) present a long-standing challenge for PWSs across all sizes.[18] A 2009 U.S. Government Accountability Office audit reported 26% of health-based violations and 84% of monitoring violations were not accurately reported or reported at all.[19]

MR violations are especially prevalent among small systems. In 1994, EPA found 18% of CWSs reported erroneous data, compared to 70% of small water systems.[20] Kane noted small systems generate 300 times more MR violations per customer than larger systems.[21]

As system sizes decreased, the number of MR violations dramatically increased. Oxenford found a similar percent-

6. Sarah Acquah & Maura Allaire, *Disparities in Drinking Water Compliance: Evidence From California*, 25 Water Pol'y 69, 73 (2023), https://doi.org/10.2166/wp.2023.068 [hereinafter Acquah & Allaire, *Evidence From California*].
7. EPA *Compliance Report*, *supra* note 2.
8. *Id.*
9. *Id.*
10. Madeline Kane, *Federalism's Blind Spots: The Crisis of Small Drinking Water Systems*, 50 ELR 10310, 10314 (Apr. 2020).
11. *Id.*
12. Kane, *supra* note 10.
13. Lisa Harvell, *Small Water Systems Face Big Financial Challenges*, Water Fin. & Mgmt. (Oct. 25, 2017), https://waterfm.com/small-water-systems-face-big-financial-challenges/.
14. The Pennsylvania study found the only tested variable with a significant relationship to health-based violations was a system sourced by groundwater. Zoe Statman-Weil et al., *Disparities in Community Water System Compliance With the Safe Drinking Water Act*, 121 Applied Geography, June 20, 2020, at 7, https://doi.org/10.1016/j.apgeog.2020.102264. The California study further controlled for income, race, and source water. Maura Allaire & Sarah Acquah, *Disparities in Drinking Water Compliance: Implications for Incorporating Equity Into Regulatory Practices*, 4 AWWA Water Sci., Mar.-Apr. 2022, https://doi.org/10.1002/aws2.1274 [hereinafter Allaire & Acquah, *Implications*].
15. Jeff L. Oxenford & Joy M. Barrett, *Understanding Small Water System Violations and Deficiencies*, 108 J. AWWA 35, Mar. 2016, https://doi.org/10.5942/jawwa.2016.108.0040.
16. *Id.*
17. Three studies found the Total Coliform Rule (TCR) to be among the most violated rules. Scott J. Rubin, *Evaluating Violations of Drinking Water Regulations*, 105 AWWA 3 (2013), https://doi.org/10.5942/jawwa.2013.105.0024, was a nationwide CWS study for fiscal year 2011; Oxenford and Barrett (2016) was a nationwide PWS study of fiscal year 2013; and Maura Allaire et al., *National Trends in Drinking Water Quality Violations*, 115 Proc. Nat'l Acad. Sci. 2078 (2018) [hereinafter Allaire et al., *National Trends*], was a nationwide CWS study from 2000-2015. At a national level, Scott Rubin's study of fiscal year 2011 and Oxenford and Barrett's of fiscal year 2013 both found excessive levels of arsenic and disinfection byproducts (DBPs) to be among the most common health-based violations. Studies cited in Cristina E. Marcillo & Leigh-Anne H. Krometis, *Small Towns, Big Challenges: Does Rurality Influence Safe Drinking Water Act Compliance?*, 1 AWWA Water Sci. 2 (2019).
18. Kane, *supra* note 10, at 10312.
19. Statman-Weil et al., *supra* note 14 at 10.
20. Kane, *supra* note 10, at 10310-11.
21. Kristin Dobbin et al., *When Deccentralization Fails: Governance and Inequity in California's Drinking Water System*, W. Pol. Sci. Ass'n 5 (2019).

age of systems (3 to 4%) had total coliform health-based violations up to 100,000 customers, but the percentage of systems with Total Chloroform Rule (TCR) MR violations increased as system size declined and was highest for those serving fewer than 500 customers.[22] Inadequate capacity makes monitoring, enforcement, and policy development difficult, while intentional underreporting presents an additional concern.

D. Disadvantaged Communities & Race

Water utilities are not required to report service population demographics, making it challenging to study the relationship between drinking water quality and socioeconomic and demographic characteristics.[23] Researchers have used proxies such as zip codes, home ownership, education, and insurance rates to assess systems' demographics and socioeconomics.[24]

The Natural Resources Defense Council (NRDC) found that increased violations, time in noncompliance, and contamination were correlated with a county's proportion of racial minorities, low-income individuals, and non-native English speakers.[25] Maura Allaire and Sarah Acquah's 2021 study of California water systems analyzed violation rates for disadvantaged communities (DAC), severely disadvantaged communities (SDAC), and racial minorities, finding that—on average—the rate of health-based violations was twice as high for small systems serving DAC or minority communities compared to larger systems.[26] DACs were 1.77% more likely to have water quality violations and SDACs were almost twice as likely (3.44%) have water quality violations.[27] Violation rates were 4% higher for DACs, 5.2% higher for African-American communities, and 3.5% higher for Latino communities served by small systems.[28] Allaire's 2023 study found DAC and SDAC systems disproportionately serve communities of color in California, indicating that minority and income variables overlap.[29]

Tribal communities also often struggle with increased drinking water violations and less rigorous inspections.[30] A study by Otakuye Conroy-Ben and Rain Richard found that violation rates in tribal systems were six times higher than the national average.[31] Tribal water systems accounted for 3.9% of the total in Allaire's (2023) study, but disproportionately 10.7% of violations.[32]

E. Rural Communities

Research shows a relationship between water system compliance and rural versus urban areas. Both Allaire et al.'s national 2018 study and Zoe Statman et al.'s study of Pennsylvania water systems from 2012 to 2016 found rural water systems were likely to have more total and health-based violations than urban water systems. Statman et al. found rural CWSs likely have more total violations overall.[33]

Allaire's study found that rural location was a vulnerability factor for becoming a noncompliance hotspot due to higher recurring violation rates.[34] The study suggested lower housing density among rural systems and less frequent water flows through systems can lead to older "water age," enabling contaminants to form.[35]

F. Key Findings

For small PWSs, noncompliance appears strongly correlated with monitoring and reporting violations and persistence of violations. The relationship between rural location or tribal service population and small-system noncompliance is less certain because studies compare noncompliance among systems without specifically separating systems by size. Since many tribal and rural systems also tend to be small systems, one can infer a correlation with size. Research results are mixed on the correlation between system size and health-based violations.

22. The following percentage of systems at each service population range had TCR MR violations: 11% of systems with service populations fewer than 500; 7% of systems with service population 501 to 3,300; 4% of systems with service population 3,301 to 10,000; and 3% of systems with service population over 10,000. Oxenford & Barrett, *supra* note 15, at 35.
23. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 71.
24. Dennis C. Cory & Tauhidur Rahman, *Environmental Justice and Enforcement of the Safe Drinking Water Act: The Arizona Arsenic Experience*, 68 Ecological Econ. 1825, 1835 (2009), https://doi.org/10.1016/j.ecolecon.2008.12.010; Yolanda J. McDonald & Nicole E. Jones, *Drinking Water Violations and Environmental Justice in the United States, 2011-2015*, 108 Am. J. Pub. Health 1401 (2018), https://doi.org/10.2105/AJPH.2018.304621; Carolina L. Balazs et al., *Environmental Justice Implications of Arsenic Contamination in California's San Joaquin Valley: A Cross-Sectional, Cluster-Design Examining Exposure and Compliance in Community Drinking Water Systems*, 11 Env't Health 2 (2012).
25. Kristi Pullen Fedinick et al., *Watered Down Justice*, Nat. Res. Def. Council (Sept. 2019), https://www.nrdc.org/sites/default/files/watered-down-justice-report.pdf.
26. Researchers used the California State Water Resources Control Board definition of DAC as having median household income below 80% of the statewide value and SDAC as having less than 60% of the statewide value. Racial minority communities were identified as those with service populations consisting of a higher percentage of racial minority customers than the California statewide average. Allaire & Acquah, *Implications*, *supra* note 14, at 6, 10.
27. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 69, 81.
28. *Id.*
29. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 80-81.
30. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 73; *Enforcement and Compliance Annual Results for Fiscal Year 2023: Drinking Water*, U.S. EPA, https://www.epa.gov/enforcement/enforcement-and-compliance-annual-results-fiscal-year-2023-drinking-water (last visited Jan. 30, 2025).
31. Otakuye Conroy-Ben & Rain Richard, *Disparities in Water Quality in Indian Country*, 163 J. Contemp. Water Rsch. & Educ. 31 (Apr. 2018), https://doi.org/10.1111/j.1936-704X.2018.03268.x (cited in Acquah & Allaire, *Evidence From California*, *supra* note 6, at 73).
32. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 79.
33. Statman et al.'s study on Pennsylvania water systems from 2012 to 2016 found a rural system had 10 to 13 more total SDWA violations than an urban CWS. Statman-Weil et al., *supra* note 14, at 11.
34. Allaire et al., *National Trends*, *supra* note 17.
35. *Id.* at 2082.

IV. Factors Contributing to Small Water System Noncompliance

Research consistently finds small systems face greater obstacles due to technical, managerial,[36] and financial[37] (TMF) limitations.

A. Financial Capacity

Lack of financial resources is the most obvious reason small systems face compliance challenges. Small systems have seven times the unmet infrastructure needs of larger systems but, on average, spend only 7% of their budget on infrastructure.[38] Nearly half of water utilities in certain states do not charge customers high enough rates to break even, and about 30% of systems have revenue outpaced by operating expenses.[39] A proposed rate increase is usually confronted with political pressure, customer complaints, and higher nonpayment rates in systems with low-income customer bases.[40] This prevents systems from reaching an "optimal rate" that covers operation costs and enables the water system to pursue infrastructure improvement.[41]

EPA evaluates affordability of compliance for small systems using the national median household income (MHI)—if the household water bill exceeds 2.5% of the MHI, the regulation is deemed unaffordable.[42] This is a flawed indicator given income inequality in the United States.[43] In the history of the SDWA, EPA has almost never found a new drinking water regulation unaffordable.[44]

Funding is available from government sources, and while this can support necessary infrastructure investment, it generally does not cover ongoing operating and administrative costs. Small systems have fewer staff dedicated to operating and managing the system.

Lack of financial capacity also influences enforcement options. In 2019, an NRDC study found chronic noncompliance was not resolved by enforcement for small systems and those serving economically marginalized communities.[45] While fines typically serve as incentives to comply, these systems often cannot afford to pay or address the issue behind the noncompliance.[46]

B. Inability to Access Assistance Programs

EPA and state governments have made dedicated funding available.[47] However, researchers find that many small systems remain unable to access these assistance programs. Many studies note that systems must demonstrate sufficient TMF capacity to access state revolving funds.[48] This creates a flawed cycle where "communities that lack resources lack TMF; without TMF, funding is harder to attain; without funding, TMF cannot be developed."[49] States can use a portion of their federal funding to subsidize loan principal and interest, but this applies only to systems able to repay the funds.[50] Other funding programs have limitations such as ceilings or matching-fund requirements.[51] Private investors often have more stringent funding terms, which small systems also cannot meet.[52]

C. Fragmentation and Economies of Scale

Water supply in the United States remains much more localized than other, more consolidated utilities.[53] Fragmentation undermines compliance capacity because larger systems can take advantage of economies of scale and spread increased costs more effectively across their customer base than systems with a small service population.[54] The cost of drinking water can be almost four times higher per household for a small system than for a large system.[55] According to a 1999 EPA study, small systems with fewer than 3,300 customers tended to have three times higher infrastructure funding needs per customer.[56] EPA found the long-run average cost curves tend to flatten as a population served reaches approximately 5,000 customers, meaning the much higher costs per household burden the smallest systems.[57]

36. Technical and managerial: Nathaniel Logar et al., *Ensuring Safe Drinking Water in Los Angeles County's Small Water Systems*, 32 Tul. Env't L.J. 205, 206, 211, 214 (2019); Balazs & Ray, *infra* note 47, at 607; Acquah & Allaire, *Evidence From California*, *supra* note 6, at 70; Balazs et al., *supra* note 24, at 9; Allaire et al., *National Trends*, *supra* note 17, at 2082; Allaire & Acquah, *Implications*, *supra* note 14, at 5; Harvell, *supra* note 13.
37. Financial: Logar et al., *supra* note 36, at 206, 211; Kane, *supra* note 10, at 5-6; Balazs & Ray, *infra* note 47, at 607; Allaire & Acquah, *Implications*, *supra* note 14, at 3-4; Acquah & Allaire, *Evidence From California*, *supra* note 6, at 70, 77; Balazs et al., *supra* note 24, at 9; Allaire et al., *National Trends*, *supra* note 17, at 2082; Cory & Rahman, *supra* note 24, at 1827, n.13; Harvell, *supra* note 13.
38. Kane, *supra* note 10, at 10315.
39. *Id.*; Logar et al., *supra* note 36, at 217.
40. Kane, *supra* note 10, at 10315; Harvell, *supra* note 13.
41. Harvell, *supra* note 13.
42. Allaire & Acquah, *Implications*, *supra* note 14, at 3.
43. *Id.*
44. *Id.*; *see also* Statman-Weil et al., *supra* note 14, at 10. The smaller service population often found with rural systems makes it difficult for those CWSs to generate sufficient revenue for proper treatment technology, management, and maintenance.
45. Kane, *supra* note 10, at 10314-15.
46. *Id.*
47. Carolina L. Balazs & Isha Ray, *The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure*, 104 Am. J. Pub. Health 603, 607 (2014).
48. *Id.*; Balazs et al., *supra* note 24, at 10; Kane, *supra* note 10, at 10312; Marcillo & Krometis, *supra* note 17, at 2.
49. Balazs & Ray, *supra* note 47, at 607.
50. Kane, *supra* note 10, at 10312.
51. Nat'l Drinking Water Advisory Council, Recommendations of the National Drinking Water Advisory Council to U.S. EPA on Its National Small Systems Affordability Criteria 44 (2003).
52. Kane, *supra* note 10, at 10316.
53. EPA *Compliance Report*, *supra* note 2; Allaire & Acquah, *Implications*, *supra* note 14, at 4.
54. Allaire & Acquah, *Implications*, *supra* note 14, at 3.
55. Cory & Rahman, *supra* note 24, at 1827, n.12.
56. The study projected costs for systems with fewer than 3,300 customers compared to systems with more than 3,300 customers—the cost for small systems was $3,300 per customer and only $790 per customer for larger systems. Logar et al., *supra* note 36, at 216-17, n.49.
57. Nat'l Drinking Water Advisory Council, *supra* note 51, at 11.

D. Impact of Location

Large systems can take advantage of economies of scale and are often in urban locations that provide greater access to resources, parts, expertise, and the presence of wholesale suppliers, contributing to lower per-customer rates.[58] Small systems have a "narrower rate base" to finance operations and initiatives. Larger systems tend to have more commercial and industrial customers.[59] Customers served by small systems with small rate bases often pay high rates but have reduced access to rate assistance programs because their communities lack the income diversity that could subsidize community members who need them.[60] Larger systems are more likely to provide rate assistance to low-income customers.[61]

The socioeconomic status of residents directly impacts water system TMF capacity because it affects the system's ability to raise funds through loans.[62] Small systems generally do not have the higher credit ratings of larger systems or the same ability to attract government assistance.[63] Creditworthiness is impacted by the number of customers and their wealth—both of which tend to be smaller for small or DAC systems, negatively impacting their ability to borrow.[64]

E. Technical and Managerial Capacity

Even if a small system can obtain funds necessary to acquire and install technology, it must overcome often limited technical and managerial capacity to sustain operations.[65] Financial assistance is often limited to infrastructure improvements and does not extend to other vital expenses, such as salaries to attract and retain skilled personnel.[66] High turnover rates are prevalent among small and rural systems, which are unable to pay competitive wages.[67] Systems with service populations under 500 people usually have only part-time personnel, and operators often have limited educational backgrounds.[68]

F. Reliance on Groundwater

Small systems rely more frequently on groundwater and lack access to alternative water sources, particularly in dry climates.[69] As a result, they can face more water quality issues and higher treatment costs than larger systems.[70]

Small systems tend to have less diversity of existing water sources and fewer alternative water sources, partially due to their often-smaller geographic bounds.[71] This reduces a small system's ability to drill new wells in far enough locations to reach uncontaminated water and avoid additional violations.[72]

V. Policies to Address Small System Noncompliance

State and local governments have employed several strategies to solve the problem: funding, variances, and consolidation. Some also champion the benefits of water system privatization.

A. Funding

The Drinking Water State Revolving Fund (DWSRF) is the primary federal financial assistance program. EPA is authorized to make grants to states to fund state revolving loan funds for water systems with an annual 20% state matching requirement.[73] States then typically grant PWSs subsidized loans for expenses EPA has determined will promote SDWA compliance or further the act's health objectives.[74] States determine which projects to support through DWSRF, but EPA is authorized to set aside up to 2% of the DWSRF appropriation (with a maximum of $15 million) for small and medium systems.[75] The SDWA requires states make at least 15% of their annual loan assistance allotment available for systems serving 10,000 individuals or fewer.[76]

There have also been smaller directed funding initiatives. In the 1986 SDWA amendments, EPA authorized $10 million in technical assistance to help small systems achieve and maintain compliance.[77] The 1996 amendments included capital for grants conditioned on the development of small-system TMF capability.[78] Recent statutory amendments focused on improving small-system compliance and capacity, providing grants to states, water systems, and nonprofits for specific project funding, technology development, emergency appropriations, and technical assistance.[79]

Some states have also established separate funding mechanisms for small water systems, such as California's Safe and Affordable Drinking Water Fund.[80] While

58. Kyle S. Onda & Meenu Tewari, *Water Systems in California: Ownership, Geography, and Affordability*, 72 Utils. Pol'y, Oct. 2021, at 7, https://doi.org/10.1016/j.jup.2021.101279.
59. Nat'l Drinking Water Advisory Council, *supra* note 51, at 33.
60. Under state law, public water systems are not required to provide rate assistance. Large investor-owned utilities must provide rate assistance, and privately owned systems have the option to provide assistance or not. Logar et al., *supra* note 36, at 216.
61. *Id.*
62. Balazs et al., *supra* note 24, at 9.
63. Allaire et al., *National Trends*, *supra* note 17, at 2082.
64. Allaire & Acquah, *Implications*, *supra* note 14, at 4.
65. Elena H. Humphreys, Cong. Rsch. Serv., R47315, Small Water Systems: Selected Safe Drinking Water Act (SDWA) Provisions (2022), at cover page.
66. Acquah & Allaire, *Evidence From California*, *supra* note 6, at 2071.
67. Logar et al., *supra* note 36, at 214-15.
68. Nat'l Drinking Water Advisory Council, *supra* note 51, at 49.
69. Logar et al., *supra* note 36, at 206, 218, 220, 223.
70. *Id.* at 206, 218, 220, 223.
71. *Id.* at 218.
72. *Id.*
73. 42 U.S.C. §1452; Humphreys, *supra* note 65, at 5-6.
74. Humphreys, *supra* note 65, at 6.
75. *Id.*
76. *Id.*
77. William E. Cox, *Evolution of the Safe Drinking Water Act: A Search for Effective Quality Assurance Strategies and Workable Concepts of Federalism*, 21 Wm. & Mary Env't & Pol'y Rev. 69, 71 (2017); 42 U.S.C. §300j-1(g).
78. Cox, *supra* note 77, at 78; 42 U.S.C. §300j-12(a)(3)(A)(i).
79. Humphreys, *supra* note 65, at 11-12.
80. *Safe and Affordable Funding for Equity and Resilience*, Cal. State Water Res. Control Bd. (updated Dec. 24, 2024), https://www.waterboards.

increased funding is critical, it cannot solve the problems of small-system noncompliance because of the structural challenges that over 100,000 small PWSs face.

B. Variances

The SDWA provides the possibility of variance technologies and exceptions for small water systems that face significant MCL compliance challenges.[81]

Variances exist for CWSs with service populations of 3,300 or fewer that allow implementation of variance technology where the system is otherwise unable to comply due to cost, water conditions, lack of alternative water sources, and inability to restructure or consolidate.[82] These exemptions are intended only to provide temporary relief from SDWA standards.[83] In the 1986 SDWA amendments, EPA expanded eligibility to enable systems with fewer than 150 connections to satisfy monitoring requirements for unregulated contaminants by either submitting samples or allowing the opportunity for sampling.[84] The 1996 amendments included time extensions and additional variance technologies.[85]

Temporary exemptions in the form of time extensions for compliance can also be granted to small systems unable to comply with an MCL due to "compelling factors," including cost.[86] The SDWA enables states to grant PWSs a temporary exemption up to three years if it would not pose an unreasonable risk to public health, and systems serving 3,300 or fewer are permitted a maximum exemption of nine years.[87] [88] Our research found no EPA records on the number of variances and exemptions granted, so it is difficult to assess how often these provisions are used. We were told anecdotally that very few variances are issued.

C. Consolidation

Consolidation of water systems has gained attention as another potential solution to small-system noncompliance. Under the SDWA, consolidation can take the form of physical or management consolidation, transfer of ownership, or a contractual agreement with another PWS.[89] EPA and states can require consolidation assessment in certain instances of noncompliance, and enforcement action against the system cannot commence for two years if the consolidation plan is approved.[90]

Consolidation is often controversial. Smaller systems may oppose losing control and jobs due to increased efficiency. Moreover, larger systems are often hesitant to absorb a smaller system facing compliance and financial challenges.[91] Regionalization presents a less extreme version of consolidation—where system operations are not merged but certain management and technical expertise or resources are shared.[92]

The results of consolidation have been mixed. Alabama's noncompliance rate significantly decreased after consolidation.[93] The results have been less positive in other states, such as Mississippi.[94]

California has aggressively pursued consolidation, providing financial incentives for larger water systems and technical assistance. Aaryaman Singhal and Kristin Dobbin found that most consolidations in California were in very close proximity, that the systems involved were very small (a median population of just 120), and that low-resource communities consolidated at half the rate of more-resourced communities.[95] The research concluded "consolidation is not a viable solution for all struggling systems. Given that most consolidations occur between systems less than one mile apart, there is ongoing need to invest in other solutions for the many systems without close neighbors."[96]

D. Privatization

Privatization of water systems has long been a controversial topic. Advocacy groups have denounced privatization, arguing that it "often backfires, leaving communities with higher water bills, worse service, job losses, and little control to fix these problems."[97]

Advocates point out that private actors have greater access to capital for upgrades and infrastructure investments than public systems that must rely on bond measures and rate increases. Private companies are also more likely to focus on consumer satisfaction. Brent Fewell observes that "Most private companies perform compliance audits to look for and fix noncompliance before an enforcement matter is brought. There is no such culture with public systems."[98]

ca.gov/water_issues/programs/grants_loans/sustainable_water_solutions/safer.html.

81. Cox, *supra* note 77, at 83.
82. *Id.* at 84.
83. *Id.*; 42 U.S.C. §300g-4(e)(9; 42 U.S.C. §300g-4(e)(3).
84. Cox, *supra* note 77, at 74; 42 U.S.C.A. §300j-4(a)(7) (Supp. IV 1986).
85. Cox, *supra* note 77, at 78; 42 U.S.C.A. §300j-12(a)(3)(A)(i) (West Supp. 1996).
86. 42 U.S.C. §300g-5(a)(1).
87. Humphreys, *supra* note 65, at 11.
88. *Id.* at 11.
89. *Id.* at 10.
90. *Id.*; 42 U.S.C. §300g-3(h)(2).
91. Logar et al., *supra* note 36, at 230.
92. Kane, *supra* note 10, at 10317.
93. Only 10% of Alabama's public water systems had violations, compared to the 34% national average. Only 2% of Alabama's public water systems had health-based violations, compared to the 8% national average. *Id.*
94. Logar et al., *supra* note 36, at 231; Kane, *supra* note 10, at 10317.
95. Aaryaman Singhal & Kristin Dobbin, *Trends in California Water Systems Consolidation* (Dec. 2023), https://drive.google.com/file/d/1Xo7wQmmP0CFAEKpao4LHdza95LOdV4gO/view.
96. *Id.*
97. *Water Privatization: Facts and Figures*, Food & Water Watch (Aug. 2, 2015), https://www.foodandwaterwatch.org/2015/08/02/water-privatization-facts-and-figures/.
98. E-mail from Brent Fewell (May 19, 2025).

There has been extensive research on the effects of privatization on rates.[99] Food & Water Watch reports that, "for the typical household, privately owned water utility service costs 59% more than public water service."[100] Other researchers suggest a more complicated landscape. Manuel Teodoro found that "while privately owned utilities tend to charge more for water relative to relevant minimum wages in the area, this difference did not translate into water bills constituting higher shares of the incomes of the lowest-income quintile of households in their service areas."[101]

The impact of privatization on compliance has been less studied. National studies have found that privately owned systems are actually more likely to be in compliance than public systems.[102] The main explanations are a lack of funding and the hesitancy of government actors to sue other government actors. Findings are varied at the state level: a Connecticut study found more violations in public systems, while a Virginia study found the opposite.[103] Importantly, we have not found any studies examining the impact of privatization on compliance, *particularly for small systems*.

VI. Conclusion

Three findings stand out. The first is that there is good reason to expect higher noncompliance rates in smaller systems, and we should expect these to continue. The second is that much remains to be learned about which factors are the most important determinants driving noncompliance. The third is that, to date, policies have not solved the problem.

These issues are ever more important today because of the recent addition of MCL standards for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), the first new standards for over 20 years.[104] These standards must be implemented by PWSs starting in 2029.

The testimony quoted at the outset of this article—that communities must choose between the "cleanest water" and the "dumbest kids"[105]—highlights the real concern whether small PWSs will actually be in compliance with the polyfluoroalkyl substances (PFAS) standards. Whether small systems do, or even can, provide the drinking water quality that our nation's laws demand remains an open and critical question.

99. *See, e.g.*, Patrick T. Greiner, *Social Drivers of Water Utility Privatization in the United States: An Examination of the Presence of Variegated Neoliberal Strategies in the Water Utility Sector*, 81 Rural Socio. 387 (Sept. 2016) https://doi.org/10.1111/ruso.12099; Alex Loftus et al. *The Political Economy of Water Infrastructure: An Introduction to Financialization*, 6 Wiley Interdisciplinary Rev.: Water 1326 (Jan./Feb. 2019), https://doi.org/10.1002/wat2.1326.
100. *Water Privatization: Facts and Figures*, *supra* note 97.
101. Manuel P. Teodoro, *Water and Sewer Affordability in the United States*, 1 AWWA Water Sci. 1129 (Mar./Apr. 2019), https://doi.org/10.1002/aws2.1129.
102. David M. Konisky & Manuel P. Teodoro, *When Governments Regulate Governments*, 60 Am. J. Pol. Sci. 559 (July 2016), https://doi.org/10.1111/ajps.12221; Allaire et al., *National Trends*, *supra* note 17.
103. Christine J. Kirchhoff et al., *Understanding and Improving Enforcement and Compliance With Drinking Water Standards*, 33 Water Res. Mgmt. 1647 (Jan. 2019); Marcillo & Krometis, *supra* note 17.
104. *See Per- and Polyfluoroalkyl Substances (PFAS)*, U.S. Env't Prot. Agency, https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas (last visited Jan. 28, 2026).
105. *See* 141 Cong. Rec. S1316 (daily ed. Nov. 19, 1995) (statement of Sen. Cohen, cosponsor of the bill).

OVERCOMING UNREASONABLY BURDENSOME RESTRICTIONS ON THE USE OF FARMLAND FOR SOLAR GENERATION

by Matthew Eisenson

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In towns and counties across the United States, local governments have adopted severe and unreasonably burdensome restrictions on the use of farmland for utility-scale solar energy facilities. These restrictions are preventing solar development on millions of acres of land and impeding the energy transition. Existing state law is sufficient to overcome local restrictions in many states, but additional reform may be required in others. This Article describes strategies for overcoming local restrictions under existing law and sets out a menu of options: (1) pursuing relief under existing law through state statutes that preempt or limit local restrictions or through alternative strategies such as claims alleging exclusionary zoning; and (2) advancing state and federal legal reforms—including new and amended state laws (e.g., on preemption, zoning, right-to-farm), new state or federal measures (e.g., on identification of solar development sites, promotion of agrivoltaics), and federal action to limit state and local restrictions.

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SPINNING OFF CARBON: CORPORATE RESTRUCTURING IN A CLIMATE BANKRUPT WORLD

by Tracy D. Hester

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As corporations with carbon-intensive operations face accelerating liability claims and operational dangers due to climate change, their transitions to a low-carbon future will inevitably seek to minimize or sidestep many of those risks. [. . .] Emerging corporate tactics to handle these front-end climate risks have multiplied, including the growing use of environmental, social, and governance performance metrics, enhanced climate disclosures and self-reporting, and adoption of alternative corporate forms that allow business managers to consider non-financial benefits and risks when making decisions. [. . .] Understanding how carbon-intensive corporations will limit or shed their existing climate vulnerabilities is vital to effective climate policy and environmental protection. This Article begins to untangle this often overlooked, but important, aspect of the legal response to climate change.

Carbon-intensive businesses have already begun to turn to familiar strategies that can control or discharge their carbon risks from climate change. This bottom-up approach to allocating climate liability could risk conflicting and inconsistent outcomes, denuding of assets otherwise potentially available to answer climate liability claims, and a murky lack of transparency. It also threatens to worsen environmental injustices to vulnerable populations and could create a new class of "carbon zombie" corporations that function as vestigial vessels to contain carbon risks without a strong business model or future operational prospects. Solutions to this tangled challenge will likely require action on multiple levels, including shifts in corporate accounting norms toward greater transparency about risks during carbon spinoffs and climate bankruptcy proceedings, expanded statutory public policy exceptions to limited corporate liability (such as doctrines for fraudulent transfers), and explicitly accounting for climate liability in corporate spinoffs and bankruptcies in ways that address environmental justice concerns and inequities.

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STATE TRUST LAND REVENUE DIVERSIFICATION THROUGH CONSERVATION

by Temple Stoellinger, Travis Brammer, Bryan Leonard, Shawn Regan, and Jonathan Wood

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Western states oversee tens of millions of acres of state trust lands granted to them by the federal government more than a century ago to fund public education and other public services. Traditionally, these lands have been leased for energy development, timber harvesting, livestock grazing, and other consumptive uses to generate income for the trust's beneficiaries. However, evolving markets and societal values present both novel opportunities and challenges for state trust land managers. This Article finds that states are not only permitted but obligated to consider revenue generation through conservation or other nonconsumptive uses to meet their enduring trust responsibilities. This finding is not a reinterpretation of state trust land mandates to make preservation and biodiversity a top-down priority, but instead, an opportunity to leverage bottom-up interest in conservation use of state lands to generate additional and more diversified income. The Article then describes the obstacles that often hinder conservation use of state trust lands and examines practical considerations for integrating conservation uses into existing trust land management frameworks, offering insights into the future of state trust land management.

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