2016

Drinking Water Protection and Agricultural Exceptionalism

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Providing safe drinking water is a basic responsibility of government. In the United States, local water utilities shoulder much of this burden, but federal drinking water law sets these utilities up to fail. The primary problem arises in the context of nonpoint source pollution, where federal drinking water law favors end-of-line clean up by water utilities over pollution prevention by farmers and other nonpoint source polluters. This system is both inefficient and unfair.

Although the Safe Drinking Water Act requires local utilities to provide safe water, it gives them few tools to engage in water pollution prevention and instead emphasizes water filtration and treatment. At the same time, the Clean Water Act, which regulates water pollution, broadly exempts much agricultural water contamination and other nonpoint source pollution from its strict permitting requirements. As a result of the interaction of these two statutes, water utilities are often the first line of defense against agricultural water contamination's many human health harms. Allocating cleanup responsibility to water utilities rather than to polluters is inefficient because it prioritizes end-of-line clean up even where pollution prevention would be less expensive. It also fails to account for the ancillary benefits of pollution prevention, including, among other things, protection of aquatic habitats. This allocation of responsibility is inequitable not only because it has a disparate impact on low-income and minority communities, but also because it disadvantages communities whose drinking water sources are adjacent to farms relative to those whose drinking water sources are adjacent to polluters that are subject to the Clean Water Act's permitting requirements. For the former set of communities, legal mechanisms to shift either costs or cleanup responsibility to farmers are extremely limited. To address these concerns, this Article calls for a suite of legal reforms that would shift the default from end of line cleanup to pollution prevention by empowering water utilities to

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* Assistant Professor, Elisabeth Haub School of Law at Pace University. I am grateful to Jim Salzman, Ann Carlson, Jason Czarnezki, J.B. Ruhl, Jim Chen, Ricky Revesz, Mike Vandenburgh, Robin Kundis Craig, David Takacs, Lisa Heinzerling, Victor Flatt, Jill Horwitz, Katrina Wyman, and Bruce Huber for their feedback on early drafts. Thanks also to the participants in Columbia Law School's Sabin Colloquium on Innovative Environmental Law Scholarship, the University of Washington Junior Environmental Scholars Workshop, and the Vermont Law School Colloquium on Environmental Scholarship. And finally thanks to Alyssa Rosen, Justin Teruya, and Rosemarie Hebner for excellent research assistance.

adequately protect their source waters and by revoking the special status of farms in environmental law.

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I. INTRODUCTION

The drinking water in Des Moines, Iowa just barely meets federal nitrate standards.[1] According to the city's 2016 Consumer Confidence Report, "[h]igh nitrate levels in drinking water can cause blue baby syndrome," and consumers caring for infants "should ask for advice from [their] healthcare provider[s]."[2] To meet the federal standard, the city uses a variety of techniques, including water blending and an expensive ion exchange treatment process.[3] In March 2015, the Des Moines Board of Water Works filed suit against thirteen nearby agricultural drainage districts, claiming that their field drainage practices contribute to the dangerous levels of nitrate contamination in the city's sources of drinking water.[4] In its complaint, the Board explains that it has spent millions to protect the public from poisoning, and that, if left unabated, ongoing contamination could ultimately cost the city hundreds of millions.[5]

Across the United States, agricultural pollution threatens air, water, and natural resources, yet it remains the least environmentally regulated industry. Despite over forty years of extensive federal regulation of water pollution, agricultural waste, most of which enters water as "nonpoint source pollution," remains a significant threat to safe drinking water and aquatic ecosystems.[6] Climate change will only exacerbate this threat, particularly in areas with

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[1] DES MOINES WATER WORKS, 2016 CONSUMER CONFIDENCE REPORT, http://www.dmww.com/upl/documents/library/2016ccr.pdf [https://perma.cc/9T9W-749K] (showing nitrate levels at some treatment plants as much as 9.4 parts per million; the federal standard is 10 parts per million).

[2] *Id.*; *see also infra* notes 89–99 and accompanying text (describing nitrate-related health problems and the scope of nitrate contamination in U.S. drinking water supplies).

[3] DES MOINES WATER WORKS, *supra* note 1.

[4] Complaint ¶ 1, Bd. of Water Works Trs. v. Sac Cty. Bd. of Supervisors, No. 5:15-cv-04020 (N.D. Iowa Mar. 16, 2015) [hereinafter Bd. of Water Works Complaint].

[5] Between 1995 and 2005, the Board spent about $3.5 million to operate the nitrate removal facility, which it built for $4.1 million in 1992. *Id.* ¶¶ 94–96. The Board estimates that if pollution continues unabated it will need to spend between $76 million and $183.5 million before 2020 to upgrade and increase the system's capacity. *Id.* ¶ 106 (noting that any operation and maintenance expenses will be in addition to that capital cost).

[6] Robin Kundis Craig, *Local or National? The Increasing Federalization of Nonpoint Source Pollution Regulation*, 15 J. ENVTL. L. & LITIG. 179, 181 (2000) (noting growing recognition that nonpoint source pollution is a national problem and the only major water pollution problem left to solve). Nonpoint source pollution is water pollution that does not come from a "discernible, confined and discrete conveyance." Clean Water Act, 33 U.S.C. § 1362(14) (2012) (defining "point source"). Nonpoint source contamination—specifically, salt runoff from roads—was one of the underlying causes of the Flint, Michigan water crisis. Tafline Layline, *How Michigan's Flint River Came to Poison a City*, GUARDIAN (Jan. 18, 2016), https://www.theguardian.com/environment/2016/jan/18/michigan-flint-river-epa-lead-contamination-mdeq-pollutants-water-safety-health [https://perma.cc/SS3H-NGKD]. Salt contributed to corrosion in the city's pipes. *Id.*

increased rainfall and higher water temperatures.[7] The Clean Water Act's failure to address these harms is well-documented.[8] The Act provides no federally enforceable mechanism for mitigating most nonpoint source pollution. Many have proposed solutions including radical amendments of the statute itself, aggressive state action to fill the gap, and expansion of green payment programs, which pay farmers to change their practices to reduce water contamination.[9]

The Clean Water Act also operates in a complex of federal and state water laws pursuing multiple goals, including public health and safety. In particular, the Clean Water Act's failure to address agricultural water pollution must be understood as a backdrop to a companion federal statute: the Safe Drinking Water Act (SDWA).[10] The SDWA requires the Environmental Protection Agency (EPA) to set drinking water standards for harmful contaminants, and it requires that public water utilities meet those standards either through water filtration and treatment or through source water protection.[11] The threat to urban and rural residential drinking water supplies exemplifies the collision between agriculture and the environment.[12]

The SDWA is widely attacked, particularly by local government officials, as an unfunded mandate imposing excessive, and often unjustified, costs on local governments.[13] Critics argue that its uniform and risk-averse

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[7] Robert W. Adler, *Agriculture and Water Quality: A Climate-Integrated Perspective*, 37 VT. L. REV. 847, 875 (2013) (explaining that higher water temperatures have lower levels of dissolved oxygen and may accumulate increased concentrations of nutrients and thus more algal blooms). Areas with increased rainfall and more intense storms may have more intense runoff. *Id.*

[8] *See, e.g.*, J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 298–304 (2000). *See generally* Douglas R. Williams, *When Voluntary, Incentive-Based Controls Fail: Structuring a Regulatory Response to Agricultural Nonpoint Source Water Pollution*, 9 WASH. U. J.L. & POL'Y 21 (2002).

[9] Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 ENVTL. L. 973, 1088–106 (1995); Terence J. Centner, *Nutrient Pollution from Land Applications of Manure: Discerning a Remedy for Pollution*, 21 STAN. L. & POL'Y REV. 213, 218 (2010); John R. Nolon, *In Praise of Parochialism: The Advent of Local Environmental Law*, 26 HARV. ENVTL. L. REV. 365, 413–16 (2002); J.B. Ruhl & James Salzman, *Climate Change, Dead Zones, and Massive Problems in the Administrative State: A Guide for Whittling Away*, 98 CALIF. L. REV. 59, 110 (2010); Ruhl, *supra* note 8, at 298–304; David Zaring, Note, *Agriculture, Nonpoint Source Pollution, and Regulatory Control: The Clean Water Act's Bleak Present and Future*, 20 HARV. ENVTL. L. REV. 515, 524–25 (1996).

[10] 42 U.S.C. §§ 300f to 300j-26 (2012).

[11] *Id.* § 300g-1 (mandating that the EPA set national drinking water standards); *id.* § 300g-2 (delegating primary enforcement authority to the states). Public water utilities are utilities that provide water to at least twenty-five people or have at least fifteen service connections. *Id.* § 300f(4). The statutory requirements thus do not apply to wells or to very small drinking water systems.

[12] *See infra* Part II.B (describing the environmental and human health consequences of agricultural water pollution).

[13] David L. Markell, *The Role of Local Governments in Environmental Regulation: Shoring Up Our Federal System*, 44 SYRACUSE L. REV. 885, 898–900 (1993) (describing

requirements reflect the need to devolve authority to states to engage in more location-specific standard setting.[14] Proponents argue that the cost and complexity of risk assessment combined with the need to provide uniformly clean water to all justifies federal intervention.[15]

This debate, which focuses on the SDWA in isolation from the Clean Water Act, misses the SDWA's central flaw: that its design ignores extreme variation in the Clean Water Act's pollution prevention obligations. Although the Clean Water Act includes nonpoint source pollution programs and the SDWA includes sourcewater protection programs, neither statute mandates pollution prevention.[16] Accordingly, taken together, the Clean Water Act and the SDWA assign primary responsibility for nonpoint source contamination of drinking water to water utilities. Water utilities have extremely limited capacity to prevent contamination of drinking source water. With few options at their disposal to mitigate threats to source water, most devote extensive resources to water purification, which itself is an imperfect tool to protect the public health.[17]

The primary claim of this Article is that the failure to regulate nonpoint source pollution creates a default in favor of end-of-line purification over pollution prevention at the source. This default results in an inefficient and inequitable assignment of pollution abatement costs and responsibility. This Article calls for a shift in the default from end-of-line cleanup to pollution prevention.

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concern that the SDWA fails to prioritize among various risks); Jeffrey Marks, *The Role of Federal Environmental Mandates in Intergovernmental Relations*, 20 ENVIRONS ENVTL. L. & POL'Y J. 17, 23 (1996) (observing that many local officials have called for increased local flexibility in standard setting and explaining that tension arises when federal financial support does not keep up with rising compliance costs); Rena I. Steinzor, *Unfunded Environmental Mandates and the "New (New) Federalism": Devolution, Revolution, or Reform?*, 81 MINN. L. REV. 97, 202 (1996) (arguing that the SDWA regulations do not allow adequate tailoring to local conditions or adequate assessment of compliance feasibility); Scott D. Laufenberg, Note, *The Struggle of Cities to Implement the Safe Drinking Water Act in the Context of Intergovernmental Relations*, 3 DRAKE J. AGRIC. L. 495, 499–500 (1998) (observing that the SDWA can be extremely burdensome for municipalities adjacent to agricultural communities).

[14] *See, e.g.*, Steinzor, *supra* note 13, at 171. The 1996 amendments responded to these concerns by allowing water systems to seek variances and exemptions under certain circumstances. *See infra* note 224 (describing those amendments).

[15] *See, e.g.*, Steinzor, *supra* note 13, at 140, 171–73 (noting that cities and counties identify the SDWA as one of the most expensive federal mandates, but expressing concern that "unrestricted devolution of fundamental regulatory decisions to the local level" could result in massive inequality in the availability of safe drinking water).

[16] *See, e.g.*, Adler, *supra* note 7, at 855–56 (noting that while there are some watershed specific success stories, the overall picture is bleak); *see also* Clean Water Act, 33 U.S.C. § 1342(b) (2012); SDWA, 42 U.S.C. § 300g-2. See *infra* Part II.C for an outline of the relevant provisions of both statutes.

[17] *See infra* Parts I.A, I.D (describing practices of water utilities).

The allocation of responsibility for clean up is inefficient for two reasons. First, in some cases, it is less costly to control the source than it is to filter or treat at centralized water distribution facilities, particularly where increased contamination necessitates building entirely new treatment facilities.[18] But, as implemented, the SDWA assigns primary responsibility for the provision of clean water to municipal and regional water utilities that often have little or no control over drinking water sources. In other words, water utilities, which build and maintain water delivery infrastructure, are responsible for ensuring that water delivered to users meets federal standards. But for many of these utilities, sources of water contamination are beyond their jurisdiction. Imagine, for instance, a municipal water utility that draws its water from a river only a small portion of which lies within the boundaries of that municipality. In most instances, neither the utility nor the municipality itself has authority to control upstream land uses that threaten the river's purity.[19] For many municipalities and water utilities, the transaction costs to take control of source water are simply too high.[20] These transaction costs may include, among others, difficulty identifying sources, lack of political will at the state level to develop nonpoint source pollution controls, lack of will among polluters to engage in negotiation, or lack of expertise at the public water utility about source control options.[21]

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[18] *See, e.g.*, Mark D. Hoffer, *The New York City Watershed Memorandum of Agreement: Forging a Partnership to Protect Water Quality*, 18 U. BALT. J. ENVTL. L. 17, 27 (2010); Stephanie Perez, Note and Comment, *New York City's Drinking Water—Champagne or Beer?*, 12 PACE ENVTL. L. REV. 859, 863–64 (1995).

[19] The 1996 amendments to the SDWA acknowledged the importance of source water protection and created a mechanism for water utilities to engage in source control as an alternative to filtration and treatment. Safe Drinking Water Act Amendments of 1996 (SDWAA), Pub. L. No. 104-182, 110 Stat. 1613 (codified as amended in scattered sections of 42 U.S.C.). Filtration avoidance is available where the utility demonstrates adequate ownership or control over the source watershed: "The public water system must demonstrate through ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the source water." 40 C.F.R. § 141.71(b)(2)(iii) (2015). Filtration avoidance is also a possibility where a utility relies on water from "uninhabited, undeveloped watersheds in consolidated ownership, and having control over access to, and activities in, those watersheds." 42 U.S.C. § 300g-1(b)(7)(C)(v).

[20] *See infra* Part II.D (identifying costs); *infra* Part III.A.2 (discussing equity concerns related to shifting pollution to costs to water utilities).

[21] Even New York City, one of the best examples of a large urban water system that has successfully protected its source waters and does not filter most of its water, would likely not be able to achieve the level of source control it now enjoys had it not taken significant steps to obtain that control over a century ago. *See About Watershed Protection*, N.Y.C. ENVTL. PROTECTION, http://www.nyc.gov/html/dep/html/watershed_protection/about.shtml [https://perma.cc/ZQ5X-BMTR] (discussing New York City's current watershed protection program); *New York City Water Supply*, N.Y. ST. DEP'T ENVTL. CONSERVATION, http://www.dec.ny.gov/lands/25599.html [https://perma.cc/9DDZ-5HBU] (same). In the late nineteenth century, the city annexed and protected large swaths of land for watershed protection at a time when there was widespread support for this kind of aggressive step to

Second, the ancillary benefits of prevention at the source—beyond safer drinking water—also sway this cost-benefit analysis. Prevention at the source protects aquatic ecosystems, creating benefits for biodiversity, the recreation industry, the fishing industry, and for agriculture itself where pollution affects sources of irrigation water.[22] Agricultural nonpoint source pollution generates numerous environmental and human health costs. The SDWA mitigates only one of those costs.[23]

Allocation of cleanup cost and responsibility to water utilities also generates equity concerns. The costs of agricultural pollution abatement, and, in particular, of resulting unclean drinking water, can fall disproportionately on poor and minority communities.[24] Many low-income families, particularly in rural areas, ultimately pay far more for water than what the EPA has deemed to be an affordable amount. Further, purification costs fall disproportionately on users in small water systems, which are often in low-income rural areas.[25]

In addition to being unfair, the cost assignment is also arbitrary in that the extent to which a water utility provides the first line of defense or merely end-of-line finishing cleanup depends on the nature of the pollution source.[26] Those within the direct ambit of agricultural water pollution must take on this extra cost; utilities outside that ambit need not. This concern is a more specific variation of the general concern that the SDWA imposes uniform standards on utilities facing highly variable compliance costs.[27]

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protect the city's economic competitiveness, and with little resistance from the surrounding territories. *See generally* MATTHEW GANDY, CONCRETE AND CLAY: REWORKING NATURE IN NEW YORK CITY 18–23 (2003) (retelling the history of New York City's water infrastructure and the political context that made its development possible). Given changed political circumstances, this model would be difficult, if not impossible, to replicate today.

[22] *See* MARC O. RIBAUDO ET AL., U.S. DEP'T OF AGRIC., AER-782, ECONOMICS OF WATER QUALITY PROTECTION FROM NONPOINT SOURCES: THEORY AND PRACTICE 3–25 (Nov. 1999), http://www.ers.usda.gov/media/1385896/aer782.pdf [https://perma.cc/78FZ-3SLC].

[23] *See infra* Part III.A.1.

[24] *See infra* Part III.A.2.

[25] *See infra* Part III.A.2.

[26] Of course, other factors affect the scope of cleanup necessary to meet SDWA standards. A utility whose source water has many point sources may face a larger burden than one with fewer, even if all those sources are complying with their Clean Water Act obligations. Likewise, a utility that relies heavily on groundwater, which is generally not directly policed under the Clean Water Act, may face similar problems, particularly in regions with fracking. *See infra* notes 139–41 and accompanying text (discussing SDWA treatment of underground injection); *see also* JAMES SALZMAN, DRINKING WATER 127–31 (2013) (describing the threat of fracking).

[27] In the context of the SDWA, proponents of less uniform regulations believe that the statute imposes costly obligations whether or not they are relevant to different regions. Steinzor, *supra* note 13, at 140. Some also believe that localities should have the leeway to opt for lower safety standards if that is their preference. *Id.* at 202–03. Indeed, this is a standard critique of many types of uniform federal regulations. *See, e.g.*, NICOLE V. CRAIN

What is different and particularly troublesome here is that the variation stems from underlying disparate application of the polluter pays principle. Because a large category of polluters are not responsible for the costs of the water pollution they cause, a subset of water utilities are saddled with extra costs.[28] Ratepayers ultimately bear the burden of this arbitrary allocation of costs.[29] Although there is some federal and state financial assistance, a substantial portion of increased compliance costs fall to water users.[30]

Of the nearly ninety pollutants for which the EPA sets SDWA standards, at least twenty-four enter waterways through agricultural nonpoint source pollution.[31] The list includes pesticides, herbicides, nitrates, and microbial contaminants from animal waste.[32] Without upstream source controls, water utilities must engage in burdensome cleanup in order to meet SDWA

& W. MARK CRAIN, SMALL BUS. ADMIN., THE IMPACT OF REGULATORY COSTS ON SMALL FIRMS 7 (Sept. 2010), https://www.sba.gov/sites/default/files/advocacy/The%20Impact%20of%20Regulatory%20Costs%20on%20Small%20Firms%20(Full)_0.pdf [https://perma.cc/Y46E-2NRL] (discussing the disproportionate distribution of federal regulatory costs among different firm sizes).

[28] The same concern exists for all categories of unregulated nonpoint source pollution. I focus on this context because agricultural nonpoint source pollution remains one of the single most significant threats to water in this country. A deep dive into its particular consequences for drinking water sharpens existing challenges to the regulatory scheme that exempts it. Further, agricultural water pollution merits special attention because of the comprehensive nature of agriculture's regulatory exemptions. *See infra* Part II.C (describing how those exemptions function in the water context).

[29] Cost uniformity is not an express goal of either the Clean Water Act or SDWA. But, to the extent that water is a necessity and ratepayers cover water purification costs, significant disparities in cost can raise equity concerns.

[30] *See infra* Part II.A (identifying water utility funding sources); *see also, e.g.*, *Funding Sources*, U.S. ENVTL. PROTECTION AGENCY, http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/funding.cfm [https://perma.cc/AG9S-PHE2] (last updated Mar. 6, 2012). Rate increases also depend on the size of a water district. A 1990s EPA study on water utility financial capacity revealed that for large systems, compliance required increasing average annual rates by about $3 per household; for smaller systems, the average increase was $145. Steinzor, *supra* note 13, at 208–09.

[31] U.S. ENVTL. PROT. AGENCY, EPA 816-F-09-004, NATIONAL PRIMARY DRINKING WATER REGULATIONS (May 2009), https://www.epa.gov/sites/production/files/2016-06/documents/npwdr_complete_table.pdf [https://perma.cc/56SK-P8RL]. The twenty-four pollutants are those identified by the EPA as entering drinking water from agricultural-related runoff. *See id.* The Environmental Working Group (EWG) identifies a total of ninety-seven agricultural-related contaminants in drinking water. *National Drinking Water Database: Drinking Water Pollution Has Many Sources*, ENVTL. WORKING GROUP (Dec. 2009), http://www.ewg.org/tap-water/sourcesofwaterpollution.php [https://perma.cc/WBK6-RXJZ]. Of these, thirty-five are regulated. *Id.* For those thirty-five, EWG found that 127 million people had been exposed to levels exceeding EPA guidelines. *Id.*; *see also* Ronald Munger et al., *Intrauterine Growth Retardation in Iowa Communities with Herbicide-Contaminated Drinking Water Supplies*, 105 ENVTL. HEALTH PERSP. 308, 310 (1997) (discussing pesticide contamination in humans).

[32] *See* U.S. ENVTL. PROT. AGENCY, *supra* note 31.

standards.[33] Nonpoint source pollution remains the most serious threat to water.[34] A focus on its threat to drinking water in particular provides additional support to calls for more robust regulation[35] and for a dismantling of agricultural exceptionalism—the notion that farms merit special regulatory treatment.[36]

The dynamic between the SDWA and the Clean Water Act highlights the need for a systems approach to thinking about environmental regulation of the food system.[37] Water is an environmental system in a physical space. It feeds farms (as irrigation water), it collects their pollution (from irrigation and stormwater runoff), and it feeds municipalities (as drinking water). This system crosses political jurisdictions. A regulatory system that creates antagonism across jurisdictions makes this physical system more difficult to manage.[38]

In the long run, particularly if predictions are correct that climate change will exacerbate the risk of drinking water contamination from agricultural pollutants, the dynamic described in the preceding paragraphs could serve as

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[33] For instance, following a cryptosporidium outbreak in 1993, Milwaukee Water Works invested $89 million for capital improvements to its water filtration systems. Don Behm, *Milwaukee Marks 20 Years Since Cryptosporidium Outbreak: City Water Remains Free of Parasite, Frequent Testing Shows*, MILWAUKEE J. SENTINEL (Apr. 6, 2013), http://www.jsonline.com/news/milwaukee/milwaukee-marks-20-years-since-cryptosporidium-outbreak-099dio5-201783191.html [https://perma.cc/24E9-KNAU]; *see also supra* notes 28–31 and accompanying text (discussing the potential for water utilities to engage in source control); *infra* Part II.D (discussing costs of agricultural pollution of drinking water supplies).

[34] According to the most recent National Water Quality Inventory, agriculture is the leading cause of contamination of rivers and streams, affecting 40% of impaired river and stream miles. OFFICE OF WETLANDS, OCEANS & WATERSHEDS, U.S. ENVTL. PROT. AGENCY, A NATIONAL EVALUATION OF THE CLEAN WATER ACT SECTION 319 PROGRAM 5, 11 (Nov. 2011), https://www.epa.gov/sites/production/files/2015-09/documents/319evaluation.pdf [https://perma.cc/2XWV-AFYZ].

[35] *See supra* notes 8–9 and accompanying text. Of course, much agricultural contamination ends up in waters that are not drinking source waters. The arguments this Article offers for more robust regulation of farm pollution do not apply in those contexts.

[36] *See infra* Part II.C and note 114 (describing agricultural exceptionalism in context of federal water quality law); *infra* note 191 and accompanying text (defining agricultural exceptionalism in more detail); *infra* Part III.B (considering when it is appropriate to allocate a farm's pollution control costs to water utilities).

[37] *See, e.g.*, Jody Freeman & Daniel A. Farber, *Modular Environmental Regulation*, 54 DUKE L.J. 795, 795–96 (2005) (calling for "a high degree of flexible coordination across government agencies as well as between public agencies and private actors" to allow for creative and bigger-picture problem solving).

[38] Many scholars have recognized the mismatch between environmental systems and political systems and have considered how political systems should approach environmental regulation in light of both this fact and the fact that environmental systems themselves are extraordinarily complex. *See, e.g.*, J.B. Ruhl, *Thinking of Environmental Law as a Complex Adaptive System: How to Clean Up the Environment by Making a Mess of Environmental Law*, 34 HOUS. L. REV. 933, 981–82 (1997).

an important catalyst for change.[39] As filtration and treatment costs rise for municipalities, water utilities and the state agencies overseeing them will continue to seek alternate approaches, including using litigation to reallocate mitigation costs from municipal ratepayers to farmers.[40] They may also put pressure on state governments to develop more comprehensive nonpoint source pollution regulatory programs. Public support for such efforts may also increase in response to high salience contamination events. In Iowa, for instance, 60% of residents support the Des Moines Water Works lawsuit.[41] In other words, this type of extremely costly and public pollution in urban areas creates a constituency for environmental regulation of agriculture that may not have existed before.

Access to safe drinking water is nearly ubiquitous in this country. Efficient (as in welfare maximizing) and equitable preservation of this resource requires reconciliation of the various statutory schemes that govern the resource and the various political jurisdictions that manage it. Reforms to the Clean Water Act itself could go a long way toward solving this problem. A more comprehensive solution would also shift the SDWA away from its technocratic emphasis on end-of-line filtration and treatment and toward a systems management approach.

Part II provides an overview of the relationship between modern agriculture and the public water supply, describing both water contamination costs and the statutory background governing agricultural water pollution. It argues that through their interaction, the SDWA and Clean Water Act allocate nonpoint source pollution cleanup costs to water utilities, and it describes how utilities pay these costs. Part III argues that this legal structure misallocates water pollution cleanup responsibility and costs, putting too much burden on water utilities and ratepayers. It explores a range of arguments in favor of reallocating this burden. It also argues that the scheme's preference for end-of-line cleanup over pollution mitigation is misguided regardless of where the costs fall. Part IV considers various solutions for making source-water protection the norm rather than the alternative. It first considers existing litigation options and concludes that these mechanisms are inadequate because, while they can provide relief in certain narrow circumstances, they offer only a piecemeal approach. It then also considers various potential legal reforms. A final Part briefly concludes.

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[39] *See* Adler, *supra* note 7, at 875 (describing the potential effects of climate change on drinking water).

[40] *See infra* Part IV.A (exploring options utilities might use under current law to shift costs and cleanup obligations to farmers).

[41] Donelle Eller, *Iowans Support Water Lawsuit, but Split on Who Should Pay*, DES MOINES REG. (Feb. 27, 2016), http://www.desmoinesregister.com/story/money/agriculture/2016/02/27/iowa-poll-iowans-support-water-lawsuit-but-split-who-should-pay/80938460/ [https://perma.cc/K74Q-ZGAB] (reporting on a poll surveying support for the lawsuit and finding high levels of support in urban areas, as high as 65%, and finding that even in rural areas support, at 49%, exceeded disapproval, at 42%).

II. AGRICULTURE AND DRINKING WATER: THE PHYSICAL CONNECTION

Drinking water faces numerous threats. Common contaminants include perchlorate (rocket fuel), arsenic from mining and other industrial processes, trihalomethanes and halocetic acids, both by-products of water chlorination, and lead from aging pipes and faucets.[42] Agricultural nonpoint source pollution contains a variety of additional contaminants that threaten public health and increase the costs of safe water delivery across the country.[43] Although all of these pollutants pose serious risk, this Article focuses solely on the latter, considering the interaction between safe drinking water regulation and agricultural regulation.[44]

This Part begins with a brief overview of water utilities, their general practices and their sources of income. It then describes current nonpoint source pollution drinking water risks, highlighting the dependency of residential and urban areas on their rural hinterlands. Against a backdrop of agriculture's environmental regulatory vacuum, this pollution poses significant costs for ecosystems, drinking water systems, ratepayers, and, ultimately, taxpayers.

A. *Water Utilities: Economics and Practices*

The SDWA's requirements apply to public water utilities, which are utilities (both publicly and privately owned) that provide at least fifteen service connections or serve at least twenty-five people.[45] According to the Congressional Research Service, there are approximately 152,700 such water systems.[46] These systems fall into three categories: community water systems, which serve the same residents year round; non-transient non-community water systems, which include schools, factories, and other institutions that have their own water supplies and serve the same individuals for more than six months but not year round; and transient non-community water systems,

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[42] ERIK OLSON, NAT. RES. DEF. COUNCIL, WHAT'S ON TAP? GRADING DRINKING WATER IN U.S. CITIES 44–67 (June 2003), http://www.nrdc.org/water/drinking/uscities/pdf/whatsontap.pdf [https://perma.cc/92ZY-7TA4].

[43] *Id.*

[44] *See supra* note 28 (explaining this choice).

[45] 42 U.S.C. § 300f(4) (2012). Although there are some privately owned or privately managed water systems, the majority are public. OLSON, *supra* note 42, at 6. Water law scholar Tony Arnold has argued that privatization of water systems, as one aspect of privatization of water resources, threatens both the human right to water and national security. Craig Anthony (Tony) Arnold, *Water Privatization Trends in the United States: Human Rights, National Security, and Public Stewardship*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 785, 789 (2009) (calling for legislation to limit private control and to develop "comprehensive principles of public stewardship of water resources to support human life and national security").

[46] MARY TIEMANN, CONG. RESEARCH SERV., RL31243, SAFE DRINKING WATER ACT (SDWA): A SUMMARY OF THE ACT AND ITS MAJOR REQUIREMENTS 3 (2014).

which provide water to transitory customers.[47] Campgrounds and gas stations fall into this last category.[48]

The vast majority of these water systems are extremely small. Of the 51,350 community water systems, 82% serve fewer than 3,300 people.[49] Likewise, of the 101,400 non-community water systems (including both the transient and non-transient systems), about 95,700 serve fewer than 500 people.[50] Nevertheless, most Americans receive water from a small subset of large regional and urban water systems. Eight percent of community water systems serve over 10,000 people, and, in total, provide water to about 246 million Americans.[51]

How do these water systems, particularly the smaller ones, pay for compliance? Water utilities have four main tools to cover capital and operating costs: (1) user fees, (2) other local funding sources, (3) debt and equity, and (4) grants and loans from state and federal agencies.

According to the 2002 Government Accountability Office Study, about 39% of drinking water utilities cover costs of providing service through user fees alone, and 71% cover operating costs through a combination of user fees and other local fees.[52] Local fees include, among others, property taxes, sales to other utilities, and hook up and connection fees.[53] Looking only at operation and maintenance costs, about 85% of drinking water utilities cover their costs through user fees alone, and including other local funding, the number reaches 93%.[54]

Many water utilities also turn to federal and state funding sources, which include both loans and grants. The SDWA itself authorizes funding to both states and public water systems.[55] The Drinking Water State Revolving Fund

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[47] *Id.*

[48] *Id.*

[49] *Id.*

[50] *Id.*

[51] *Id.*

[52] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-02-764, WATER INFRASTRUCTURE: INFORMATION ON FINANCING, CAPITAL PLANNING, AND PRIVATIZATION 2, 6 (2002). Costs of providing service include both annual operating costs and capital costs. *Id.* at 21. This report also found that utility size (measured as size of population served) had no bearing on whether or not the utility was able to cover costs through user fees and other local revenue sources. *Id.* at 24. The report did find, however, that publicly owned drinking water utilities were less likely than privately owned utilities to cover costs. *Id.* (finding that that 38% of public utilities cover costs and 56% of private utilities cover costs).

[53] *Id.* at 23.

[54] *Id.* at 27.

[55] State agencies with primacy are also eligible for federal grant funding to support development and implementation of state drinking water regulations, monitoring, reporting, and enforcement. 42 U.S.C. § 300j-2(a) (2012). Federal funding covers about 35% of federal water program implementation costs; this includes the costs states incur developing regulations and enforcing those regulations, but not the costs incurred by local utilities to provide water and comply with state and federal regulation. U.S. ENVTL. PROT.

provides grants for infrastructure improvements, and emphasizes support for small and disadvantaged communities.[56] Grant recipients include nonprofit organizations, tribal governments, states, municipalities, state institutions of higher learning, interstate organizations, and special water districts.[57] States are allowed to set aside a maximum of 31% of their grants "to develop and implement programs that encourage better drinking water systems operation to ensure a safer supply of water for the public," and about half of that money can be spent on "activities devoted to protecting drinking water sources from contamination."[58] States use these funds for purchasing easements around drinking water sources and conducting source water delineations and assessments.[59]

States also receive support from the Clean Water State Revolving Fund, which was authorized by the 1987 Clean Water Act amendments and serves primarily to assist communities with developing adequate wastewater treatment.[60] As of 1991, eighteen states were using some portion of this federal funding to address nonpoint source pollution.[61] For fiscal year 1998, $96.3 million was spent on nonpoint source pollution.[62]

The majority of funding is local.[63] Costs are borne by water users.[64] But state and federal funding tools help offset costs, particularly for smaller utilities.[65] Where a water system does not encompass an entire watershed, these fundraising tools may reduce the incentive for utilities to engage in source water protection unless they can collaborate successfully with

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AGENCY, EPA 816-F-04-038, DRINKING WATER COSTS & FEDERAL FUNDING (June 2004), http://www.nesc.wvu.edu/WVWSET/resources/File_04_DWFSFN36.pdf [https://perma.cc/7D6N-8BU7].

[56] U.S. ENVTL. PROT. AGENCY, *supra* note 55.

[57] *See Grant Awards Database*, U.S. ENVTL. PROTECTION AGENCY, http://yosemite.epa.gov/oarm/igms_egf.nsf/allgrantsnarrow?SearchView&Query=SDWA&SearchOrder=1&SearchMax=&SearchWV=false&SearchFuzzy=false&Start=1&Count=500 [https://perma.cc/5CT4-842B] (last updated Aug. 10, 2016) (categorizing by grant number, recipient, project title, recipient type, and cumulative award amount). Over 70% of grants go directly to states, which in turn loan or grant money to water utilities and provide matching funds. *Id.*

[58] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO/RCED-99-45, WATER QUALITY: FEDERAL ROLE IN ADDRESSING—AND CONTRIBUTING TO—NONPOINT SOURCE POLLUTION 31 (1999). When this report was written, the EPA's stated goal was to increase the percentage of Revolving Fund money spent on nonpoint source pollution to 10%. *Id.* at 29.

[59] In fiscal years 1994 to 1998, $111.8 million was obligated to these activities. *Id.* at 27–31.

[60] *Id.* at 28.

[61] *Id.* at 29.

[62] *Id.* (in 1999 dollars).

[63] On average, states and localities contribute 65% of the funding and the federal government contributes the remaining 35%. U.S. ENVTL. PROT. AGENCY, *supra* note 55.

[64] *See id.*

[65] *See id.*

neighboring utilities to share the cost. Limited funding also incentivizes utilities to prioritize immediate compliance over long-term planning.

B. *Agricultural Pollution in Drinking Water*

Agricultural pollution regularly contaminates drinking water sources in both rural and urban areas. In California, for instance, agricultural contaminants are responsible for about three-quarters of all water impairment.[66] Nationally, precise data is lacking, but according to the U.S. Geological Survey, "71 percent of U.S. cropland (nearly 300 million acres) is located in watersheds where the concentration of at least one of four common surface–water contaminants (nitrate, phosphorous, fecal coliform bacteria, and suspended sediment) exceeded criteria for supporting water-based recreation activities."[67] Agricultural pollutants—including pesticides, manure, synthetic fertilizer, antibiotics, and particulate matter—enter water sources through a variety of pathways. The three most significant are surface water runoff, ground water infiltration, and atmospheric deposition.[68] Through each of these mechanisms, contaminants can travel great distances. For instance, manure runoff in the upper Mississippi River basin, coming from farms in Wisconsin and Minnesota, can end up in the Gulf of Mexico, well over a thousand miles away.[69] One study estimated that as much as 15% of the nitrogen fertilizer and 3% of the pesticides applied to cropland throughout the Mississippi River Basin end up in the Gulf.[70] Contaminants pollute both surface water—the source of about 63% of drinking water—and groundwater.[71] The analysis in

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[66] ERIC OLSON, NAT. RES. DEF. COUNCIL, WHAT'S ON TAP? GRADING DRINKING WATER IN U.S. CITIES (EARLY RELEASE CALIFORNIA EDITION) 51 (Oct. 2002), http://www.nrdc.org/water/drinking/uscities/pdf/whatsontap_ca.pdf [https://perma.cc/MT3U-4L4G].

[67] RIBAUDO ET AL., *supra* note 22, at iv.

[68] *Id.* at 7 (discussing how groundwater infiltration can result either by run-in of chemicals directly to groundwater from sinkholes, porous bedrock, or poorly constructed wells, or by leaching, whereby percolating rain or irrigation water carries pollutants through soil).

[69] *See, e.g.*, JON DEVINE, MARK DORFMAN & KIRSTEN SINCLAIR ROSSELOT, NAT. RES. DEF. COUNCIL, MISSING PROTECTION: POLLUTING THE MISSISSIPPI RIVER BASIN'S SMALL STREAMS AND WETLANDS 4 (Oct. 2008), https://www.nrdc.org/sites/default/files/msriver.pdf [https://perma.cc/H8SY-GGQY].

[70] RIBAUDO ET AL., *supra* note 22, at 6.

[71] In 1999, 114 million people (out of a total population of 306 million) received drinking water from a public water system relying on groundwater. Erika K. Wallender et al., *Contributing Factors to Disease Outbreaks Associated with Untreated Groundwater*, 52 GROUND WATER 886, 886 (2014). Note, however, that the percentage of water drinkers relying on surface water is actually slightly lower as this calculation excludes the 15.8 million wells, not governed by the SDWA, that each serve one to five households. *Id.* Seventy-seven percent of community water systems rely on groundwater. TIEMANN, *supra* note 46, at 3.

this Article focuses primarily on the former, except to the extent that groundwater has a close hydrologic connection to surface water.[72]

Fertilizers, including both synthetic fertilizers and manure, pose serious problems for drinking water when they collect in off-farm waterways such as lakes. Overabundance of fertilizers, known as eutrophication, can generate algal blooms, which in turn lead to hypoxia, the depletion of subsurface oxygen.[73] Without oxygen, aquatic life below algal blooms cannot survive, thus hypoxia creates often-massive aquatic dead zones.[74] In 2015, the dead zone in the Gulf of Mexico, which collects runoff from the entire Missouri and Mississippi River basins, was larger than the states of Connecticut and Rhode Island combined.[75] Loss of aquatic life affects biodiversity and has collateral consequences for commercial and recreational fishing.[76] Eutrophication is often also associated with increased turbidity and surface plant accumulation, which both might reduce a body of water's recreational value.[77]

Eutrophication also poses a significant threat to drinking water. Certain species of algae, cyanobacteria or blue-green algae, can produce a variety of toxins that can affect respiratory, digestive, nervous, and cutaneous systems.[78] Acute symptoms range from headaches, fever, muscle and joint pain, stomach cramps, vomiting, and diarrhea.[79] More severe effects may include liver failure, seizures, and respiratory arrest.[80] When eutrophication occurs in

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[72] For instance, in the Des Moines case, the plaintiffs claim that their surface water drinking water supply is contaminated by groundwater. Bd. of Water Works Complaint, *supra* note 4, ¶¶ 4, 9.

[73] DAVID K. MUELLER & DENNIS R. HELSEL, U.S. DEP'T OF THE INTERIOR, U.S. GEOLOGICAL SURVEY, CIRCULAR 1136, NUTRIENTS IN THE NATION'S WATERS—TOO MUCH OF A GOOD THING? 2 (1996), http://pubs.usgs.gov/circ/1996/1136/report.pdf [https://perma.cc/F8ZA-BQFW]. As algae decomposes it absorbs oxygen. *Id.*

[74] *Id.*

[75] *2015 Gulf of Mexico Dead Zone 'Above Average,'* NOAA (Aug. 4, 2015), http://www.noaanews.noaa.gov/stories2015/080415-gulf-of-mexico-dead-zone-above-average.html [https://perma.cc/R7BB-VCMA].

[76] *Id.*

[77] *See generally* 3 U.N. Env't Programme-Int'l Env't Tech. Ctr. & Int'l Lake Env't Comm. Found., Lakes and Reservoirs: Water Quality: The Impact of Eutrophication 4 (2001), http://www.ilec.or.jp/en/wp/wp-content/uploads/2013/03/Vol.3.pdf [https://perma.cc/3S83-G9FX].

[78] REG'L OFFICE FOR EUR., WORLD HEALTH ORG., EUTROPHICATION AND HEALTH (2002), http://ec.europa.eu/environment/water/water-nitrates/pdf/eutrophication.pdf [https://perma.cc/Z2WF-4JYU]. Cyanobacteria are primarily hepatotoxins (affecting the liver), anatoxins (primarily neurotoxins), and cylindrospermopsins (also hepatotoxins). *Cyanobacteria/Cyanotoxins*, U.S. ENVTL. PROTECTION AGENCY, http://www2.epa.gov/nutrient-policy-data/cyanobacteriacyanotoxins [https://perma.cc/8DRW-MQ4D] (last updated June 29, 2016).

[79] OFFICE OF WATER, U.S. ENVTL. PROT. AGENCY, EPA 810F11001, CYANOBACTERIA AND CYANOTOXINS: INFORMATION FOR DRINKING WATER SYSTEMS (Sept. 2014), https://www.epa.gov/sites/production/files/201408/documents/cyanobacteria_factsheet.pdf [https://perma.cc/6UM4-CEA9].

[80] *Id.*

drinking water sources, these contaminants can enter the systems at levels exceeding the treatment and filtration capacities of water utilities. For instance, on August 2, 2014, the Ohio Environmental Protection Agency issued a do not drink warning for the City of Toledo, when an algal bloom occurred directly on top of the city's drinking water intake in Lake Erie, contaminating the Ohio city's tap water with the cyanobacteria microcystin,[81] a toxin that can cause diarrhea, vomiting, and abnormal liver function.[82] High levels of agricultural fertilizers and animal waste caused the algal bloom.[83] Compounding the public health problem, microcystin cannot be eliminated by boiling, so for three days, Toledo residents drank only bottled water.[84]

Despite the threat of cyanotoxins, the EPA has not set drinking water standards for these contaminants. Instead, the Agency includes them on its "Candidate Contaminant List," an inventory of contaminants that are known to occur in U.S. waters and may pose a threat to drinking water.[85] The EPA publishes recommendations for testing for, treating, and filtering cyanotoxins.[86] Because there are no national drinking water standards, national level data on cyanotoxin outbreaks is spotty, but a recent study of a two-year period in New York, Ohio, and Washington found eleven outbreaks and sixty-one illnesses resulting from freshwater lake algal-blooms.[87] A number of states have established their own cyanotoxin standards.[88]

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[81] Codi Kozacek, *Seven Ohio Drinking Water Sources Don't Meet State Water Quality Standards for Toxic Algae*, CIRCLE BLUE (Aug. 25, 2014), http://www.circleofblue.org/waternews/2014/world/seven-ohio-drinking-water-sources-dont-meet-state-water-quality-standards-toxic-algae/ [https://perma.cc/3VEA-PVU4].

[82] *See supra* notes 78–79 and accompanying text.

[83] Kozacek, *supra* note 81.

[84] Tom Philpott, *The Big-Ag-Fueled Algae Bloom that Won't Leave Toledo's Water Supply Alone*, MOTHER JONES (Aug. 5, 2015), http://www.motherjones.com/tom-philpott/2015/08/giant-toxic-algae-bloom-haunts-toledo [https://perma.cc/4N7G-ZZQU]. In public emergencies such as this, bottled water is sometimes provided free of charge from government agencies and nonprofits, but residents often end up paying for bottled water themselves, and this water can cost from 240 to 10,000 times more than tap water per gallon. OLSON, *supra* note 42, at 11.

[85] OFFICE OF WATER, *supra* note 79. The EPA's failure to set cyanotoxin standards provides fodder for the common charge that the biggest failing of the SDWA is not compliance but rather lax standards. *See, e.g.*, OLSON, *supra* note 42, at vii.

[86] The EPA also maintains health advisories for cyanotoxins, recommending safe levels at or below 0.3 micrograms per liter for microcystins and 0.7 micrograms per liter for cylindrospermopsin for children less than six, and levels of 1.6 micrograms per liters and 3.0 micrograms per liter for older children and adults respectively. OFFICE OF WATER, U.S. ENVTL. PROT. AGENCY, EPA 820F15003, 2015 DRINKING WATER HEALTH ADVISORIES FOR TWO CYANOBACTERIAL TOXINS (June 2015), http://www.epa.gov/sites/production/files/2015-06/documents/cyanotoxins-fact_sheet-2015.pdf [https://perma.cc/RRE9-Z2PE].

[87] Timothy G. Otten & Hans W. Pearl, *Health Effects of Toxic Cyanobacteria in U.S. Drinking and Recreational Waters: Our Current Understanding and Proposed Direction*, 2 CURRENT ENVTL. HEALTH REP. 75, 76 (2015) (citing E.D. Hillborn et al., *Algal Bloom-*

An ingredient common in both synthetic fertilizers and manure, nitrates pose particular concern to drinking water.[89] The EPA-established nitrate maximum contaminant level is ten milligrams per liter, which is the standard requisite to protect infants against methemeoloinemia, also known as "blue baby syndrome."[90] The disorder is most common among infants and can be fatal.[91] It reduces the ability of blood to carry oxygen; the lack of oxygen may lead to bluish-colored skin.[92] Other symptoms may include difficulty breathing, hypotension, developmental delays, and below-average weight gain.[93] Children may also experience ill effects from consuming nitrate-contaminated water.[94] They are at a higher risk of developing respiratory tract infections and goiter.[95] Nitrate contamination also poses a risk for pregnant women.[96]

Nitrate-contaminated drinking water is common in intensive agricultural areas. For instance, in the San Joaquin Valley in Central California between 2005 and 2008, ninety-two drinking water systems had nitrate levels exceeding EPA standards.[97] Nationally, reported violations of EPA standards

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Associated Disease Outbreaks Among Users of Freshwater Lakes—United States, 2009-2010, 63 MORBIDITY & MORTALITY WKLY. REP. 11 (2014)).

[88] In 2014, the Association of State Drinking Water Administrators conducted a survey finding that seven states had drinking water advisory thresholds for cyanotxins, five states had response programs, four states had draft policies, and eight states were considering drafting policies. ASS'N OF STATE DRINKING WATER ADM'RS, DRINKING WATER HARMFUL ALGAL BLOOM (HAB) SURVEY: SUMMARY OF RESPONSES (COLLECTED IN APRIL 2014) 2, 7 (Aug. 2014), http://www.epa.gov/sites/production/files/2014-09/documents/asdwa_drinking_water_hab_survey_summary.pdf [https://perma.cc/6PZC-C59S]; *see also* H. Kenneth Hudnell et al., *United States of America: Historical Review and Current Policy Addressing Cyanobacteria*, *in* CURRENT APPROACHES TO CYANOTOXIN RISK ASSESSMENT, RISK MANAGEMENT AND REGULATIONS IN DIFFERENT COUNTRIES 137, 141–44 (Ingrid Chorus ed., 2012), http://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/4390.pdf [https://perma.cc/27YW-SULT].

[89] OLSON, *supra* note 66, at 52 (explaining that nitrate contamination follows both from direct application of fertilizers and from concentrated animal feeding operations).

[90] ELI MOORE & EYAL MATALON, PAC. INST., THE HUMAN COSTS OF NITRATE-CONTAMINATED DRINKING WATER IN THE SAN JOAQUIN VALLEY 9, 12 (Mar. 2011), http://www.pacinst.org/wp-content/uploads/sites/21/2013/02/nitrate_contamination3.pdf [https://perma.cc/XVS9-VCGH].

[91] *Water Sanitation Health: Water-Related Diseases*, WORLD HEALTH ORG., http://www.who.int/water_sanitation_health/diseases/methaemoglob/en/ [https://perma.cc/GW7J-6GMQ].

[92] *Id.*

[93] PHYSICIANS FOR SOC. RESPONSIBILITY, DRINKING WATER FACT SHEET #9: NITRATE, http://www.psr.org/assets/pdfs/nitrate.pdf [https://perma.cc/E4YY-3CZJ].

[94] *Id.*

[95] *Id.*

[96] *Id.*

[97] MOORE & MATALON, *supra* note 90, at 9.

have ranged between 517 and 1,163 per year (between 1998 and 2008).[98] According to the U.S. Geological Survey, nitrate contamination in groundwater is highest in areas of well-drained soils and intensive cultivation of row crops, such as corn, cotton, or vegetables, and contamination in surface water is highest in areas downstream of agricultural or urban areas.[99]

Manure, which is a common source of excessive nitrates and other nutrients,[100] is also a risk factor for microbial pathogens such as cryptosporidium.[101] Cryptosporidium can cause severe diarrhea, nausea, abdominal cramps, and fever and poses particular risks for those with weakened immune systems, including children, the elderly, and those living with HIV/AIDS.[102] There is no known antibiotic or other medical treatment that can kill this organism, and it is known to survive both boiling and dousing with pure chlorine.[103] In 1993, an outbreak in Milwaukee, Wisconsin killed about 100 people.[104] Cryptosporidium is found in 80% of U.S. surface waters tested, but because of poor testing technology, no negative tests can be treated as definitive.[105]

Pharmaceuticals used in animal agriculture also threaten the drinking water supply. Between 25% and 75% of antibiotics fed to farm animals are excreted unchanged and enter waterways through groundwater contamination, overflow of waste lagoons into surface water, and over-application of manure as fertilizer in farm fields.[106] The abundance of low levels of antibiotics can contribute to proliferance of antibiotic-resistant strains of bacteria.[107] Steroids are used in animal agriculture to promote muscle growth, and the most commonly used steroid is trebolone acetate, a male sex hormone mimic.[108]

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[98] STATE-EPA NUTRIENT INNOVATIONS TASK GRP., AN URGENT CALL TO ACTION: REPORT OF THE STATE-EPA NUTRIENT INNOVATIONS TASK GROUP 3 (Aug. 2009), http://www.epa.gov/sites/production/files/documents/nitgreport.pdf [https://perma.cc/73GE-HY8P]. The total number of people affected per year ranged from 200,000 to 1.9 million. *Id.*

[99] MUELLER & HELSEL, *supra* note 73, at 1.

[100] OLSON, *supra* note 42, at 52–53.

[101] *Id.* at 44.

[102] *Id.*

[103] *Id.*

[104] *Id.* at 44–45.

[105] *Id.* at 45.

[106] MAE WU ET AL., NAT. RES. DEF. COUNCIL, DOSED WITHOUT PRESCRIPTION: PREVENTING PHARMACEUTICAL CONTAMINATION OF OUR NATION'S DRINKING WATER 32 (Dec. 2009), https://www.nrdc.org/sites/default/files/hea_10012001a.pdf [https://perma.cc/2GEZ-V57K]. Antibiotics are used both for growth promotion and for disease prevention. DENNIS P. FINNEGAN ET AL., U.S. DEP'T OF THE INTERIOR, SCIENTIFIC INVESTIGATIONS REPORT 2010–5083, OCCURRENCE OF ANTIBIOTIC COMPOUNDS IN SOURCE WATER AND FINISHED DRINKING WATER FROM THE UPPER SCIOTO RIVER BASIN, OHIO, 2005–6, at 2 (2010), http://pubs.usgs.gov/sir/2010/5083/pdf/sir2010-5083.pdf [https://perma.cc/FK6W-GN6B].

[107] MAE WU ET AL., *supra* note 106, at 5.

[108] *Id.*

Exposure to this hormone, even at very low levels, can interfere with human sex hormone levels and "with other hormonal systems including the thyroid gland, which is critical for proper growth and development of the brain during fetal growth, infancy, and childhood."[109]

Finally, agricultural pesticides, many of which are regulated under SDWA, also contaminate drinking water. The Natural Resources Defense Council estimates that about one million Americans per year are exposed, through their drinking water, to the commonly used herbicide atrazine.[110] Atrazine is widely used for corn, and it enters drinking water sources both through agricultural runoff and through rain.[111] Atrazine is a carcinogen and an endocrine disrupter.[112] It is found in drinking water throughout the Mississippi River basin and in other corn growing regions and is also a contaminant of "some concern" in Philadelphia, Pennsylvania and New Orleans, Louisiana.[113]

C. *Clean Up Responsibility*

Farms are not subject to the primary mechanisms of the Clean Water Act. Indeed, as thoroughly documented by J.B. Ruhl, farms are subject to very little traditional environmental regulation.[114] In most instances, farms are under no

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[109] *Id.* Agriculture is, of course, one of many sources of pharmaceuticals in drinking water. *See generally* WORLD HEALTH ORG., WHO/HSE/WSH/11.05, PHARMACEUTICALS IN DRINKING-WATER (2011), http://www.who.int/water_sanitation_health/publications/2011/pharmaceuticals_20110601.pdf [https://perma.cc/WTZ9-2U5Y] (describing the problem more generally).

[110] OLSON, *supra* note 42, at vi (basing estimates on a review of state drinking water disclosure documents).

[111] *Id.* at 55. Atrazine volatilizes and enters the atmosphere, and then is redeposited by rain. *Id.*

[112] *Id.* ("According to the EPA, short-term human exposure to atrazine may cause prostate cancer; congestion of the heart, lungs, and kidneys; low blood pressure; muscle spasms; weight loss; and damage to the adrenal glands.").

[113] *Id.*

[114] *See* Ruhl, *supra* note 8, at 298–304 (surveying environmental law as applied to agriculture and finding exemptions in the Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Cleanup and Liability Act, and the Environmental Protection and Community Right to Know Act). *See generally* Mary Jane Angelo, *The Federal Insecticide, Fungicide, and Rodenticide Act*, *in* FOOD, AGRICULTURE, AND ENVIRONMENTAL LAW 129 (Mary Jane Angelo, Jason J. Czarnezki & William S. Eubanks II eds., 2013) (describing shortfalls of the Federal Insecticide, Fungicide, and Rodenticide Act in reigning in excessive pesticide use); Teresa B. Clemmer, *Agriculture and the Clean Air Act*, *in* FOOD, AGRICULTURE, AND ENVIRONMENTAL LAW, *supra*, at 163 (describing applicability of the Clean Air Act to agriculture and observing that even where the statute does apply, state and federal regulators have been reluctant to enforce it). Many commentators attribute these carve outs to the phenomenon of "agricultural exceptionalism," under which farms are given special treatment in the law to protect the family farmer and to ensure availability of low cost food. *See* Jim Chen & Edward S. Adams, *Feudalism Unmodified: Discourses on Farms and Firms*, 45 DRAKE L. REV. 361,

obligation to mitigate environmental externalities.[115] Instead, the costs of a farm's environmental harms are borne either by the general population or by future generations. Costs are borne indirectly by, among others, the health care system.[116]

In the case of drinking water contamination, however, cleanup responsibility and costs are expressly allocated, under federal law, to public water utilities.[117] Once the EPA has set a national standard for a particular pollutant, public water utilities then bear an enforceable obligation to engage in end-of-line clean up, eliminating the contaminant before it reaches the tap. The interplay of the SDWA, which imposes this obligation, and the CWA, which releases farmers from an enforceable federal obligation to prevent pollution at the source, allocates responsibility for one of the major costs of agricultural water pollution to water utilities, and thus to ratepayers. It establishes a norm for end-of-line cleanup as opposed to mitigation at the source.

1. *The Safe Drinking Water Act*

The SDWA, originally passed in 1974,[118] requires the EPA to set safe drinking water standards for regulated contaminants.[119] The statute first requires the EPA to determine which contaminants should be regulated. In making this determination, the EPA considers the potential adverse effects of the contaminant on human health, the frequency of contamination in public drinking water systems, and the potential for regulation to meaningfully reduce public health risks.[120] Once the EPA decides to regulate a particular contaminant, it sets a Maximum Contaminant Level Goal; a "maximum contaminant level goal established under this subsection shall be set at the level at which no known or anticipated adverse effects on the health of persons

372–76 (1997) (cataloguing the wide range of laws designed to "protect the family farm"). Note, however, the inherent tension between protecting farmers and ensuring low cost food.

115 *See* Ruhl, *supra* note 8, at 267–68, 268 n.6.

116 *E.g.*, *id.* at 284 ("[M]ore than 14 million Americans drink public water obtained from river sources that contain herbicides, and millions more ingest pesticides in drinking water obtained from groundwater sources." (footnote omitted)).

117 *See infra* Part II.C.1.

118 Safe Drinking Water Act of 1974 (SDWA), Pub. L. No. 93-523, 88 Stat. 1160 (codified as amended in scattered sections of 42 U.S.C.).

119 42 U.S.C. § 300g-1 (2012) (establishing requirements for national drinking water regulations).

120 *Id.* § 300g-1(b)(1)(A). The EPA is also required to maintain a contaminant candidate list of unregulated contaminants that may require standards. *See id.* § 300g-1(b)(1)(B) (requiring that the EPA "publish a list of contaminants which, at the time of publication, are not subject to any proposed or promulgated national primary drinking water regulation, which are known or anticipated to occur in public water systems, and which may require regulation").

occur and which allows an adequate margin of safety."[121] Relying on that goal level, it then sets a Maximum Contaminant Level, which takes into account technical feasibility and is set as close to the goal level as is achievable given the best available technology.[122]

The statute then directs the EPA to delegate administration of the drinking water standards to states. All states except Wyoming have accepted that delegation and have primacy over SDWA enforcement.[123] States must establish standards at least as stringent as EPA requirements but are free to establish stricter requirements.[124]

Ultimately, the primary responsibility for ensuring safe drinking water lies with public water utilities, which are charged with upholding the federal standards, including the maximum contaminant levels, implementing treatment, filtration, and testing protocols, and complying with public disclosure requirements. The disclosure requirements, added to the law in 1996, require that all water systems notify consumers within twenty-four hours of any violations with potential health consequences.[125] In addition, community water systems must send all ratepayers an annual "consumer confidence report" identifying contaminants found in the system.[126]

Although the statute considers the possibility of source water protection as an alternative to or in addition to treatment and filtration, there are no requirements to engage in source water protection.[127] SDWA source water protection programs include two general programs governing source water—filtration avoidance and source assessment—and a suite of programs aimed specifically at protecting groundwater.

The filtration avoidance program allows water utilities with adequate source water control to forego standard water filtration technology

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[121] *Id.* § 300g-1(b)(4)(A).

[122] *Id.* § 300g-1(b)(4)(B). In some circumstances, where measurement is technically difficult, the EPA mandates a particular treatment technique rather than a maximum contaminant level. *Id.* § 300g-1(b)(7)(A).

[123] *See* U.S. ENVTL. PROT. AGENCY, EPA 816-F-04-030, UNDERSTANDING THE SAFE DRINKING WATER ACT (June 2004), http://www.epa.gov/sites/production/files/2015-04/documents/epa816f04030.pdf [https://perma.cc/T9LA-RT6J]. The District of Columbia also does not have primacy. *Id.*

[124] 40 C.F.R. § 142.10(a) (2015) (requiring that the state has adopted "drinking water regulations which are no less stringent than the national primary drinking water regulations").

[125] 42 U.S.C. § 300g-3(c)(2)(C)(i).

[126] *Id.* § 300g-3(c)(4)(A). These reports must include known contaminants, water sources, known pollutant sources, and details of any violations. 40 C.F.R. § 141.153. States must then prepare annual reports on compliance in public water systems and make summaries available to the EPA and the public. *See id.* § 141.155; *see also* 42 U.S.C. § 300g-3(c)(3)(A). The EPA prepares annual national compliance reports. *Id.* § 300g-3(c)(3)(B).

[127] *See* 42 U.S.C. § 300j-12(g)(2)(B).

requirements.[128] Any water utility that draws from surface water must implement filtration technology unless these standards are met.[129] To participate, water systems must demonstrate comprehensive control over source watersheds either through direct ownership of the land or equivalent control.[130] Water systems must also demonstrate, through testing, that drinking water meets federal standards without filtration.[131]

The SDWA Amendments of 1996 added the important mandate that states engage in source assessment, mapping source water protection areas, inventorying potential sources of contamination, determining susceptibility to contamination, and publishing survey results.[132] Although the resulting data is a valuable tool for implementing source water protection, SDWA itself does not require that states put any protection into place. In a short brochure on this program, the EPA explains that, "While source water protection was not specifically mandated by SDWA, US EPA and its partners encourage states, tribes, and communities to use the information from source water assessments to protect the delineated source water protection areas from identified pollution sources of major concern."[133]

The SDWA groundwater protection programs include sole source aquifer protection, underground injection control, and wellhead protection. The sole source aquifer protection program protects source waters in areas where there are few or no alternative sources and use of an alternative source would be extremely costly.[134] Once an aquifer receives this designation, the EPA undertakes mandatory review of any proposed project receiving federal funding that might endanger the water source.[135] As the EPA itself acknowledges, the designation of a sole source aquifer by no means constitutes "a comprehensive ground water protection program. Protection of ground water resources can best be achieved through an integrated and coordinated combination of federal, state, and local efforts."[136] EPA goes on to encourage

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[128] *See, e.g.*, N.Y. STATE DEP'T OF HEALTH, NEW YORK CITY FILTRATION AVOIDANCE DETERMINATION 1 (May 2014), https://www.health.ny.gov/environmental/water/drinking/nycfad/docs/final_revised_2007_fad_may_2014.pdf [https://perma.cc/4ZMC-9YW3].

[129] 40 C.F.R. § 141.70(b).

[130] 42 U.S.C. § 300g-1(b)(7)(C) (directing EPA to establish criteria for when filtration will be required).

[131] *See* N.Y. STATE DEP'T OF HEALTH, *supra* note 128, at 1.

[132] *See generally* Safe Drinking Water Act Amendments of 1996 (SDWAA), Pub. L. No. 104-182, 110 Stat. 1613 (codified as amended in scattered sections of 42. U.S.C.).

[133] U.S. ENVTL. PROT. AGENCY, EPA 816-F-04-032, PROTECTING DRINKING WATER SOURCES (June 2004), https://nepis.epa.gov/Exe/ZyPDF.cgi/3000667S.PDF?Dockey=3000667S.PDF [https://perma.cc/DC44-8ZSY].

[134] 42 U.S.C. § 300h-3(a)(1).

[135] *Id.* § 300h-3(e).

[136] *Sole Source Aquifer Project Review*, U.S. ENVTL. PROTECTION AGENCY, https://www.epa.gov/dwssa/sole-source-aquifer-project-review#limits [https://perma.cc/9S4Y-WHPW] (last updated Oct. 27, 2016). The EPA also notes that many critical aquifers are not protected simply because no one has petitioned for sole source aquifer status. *Id.*

interjurisdictional cooperation, land use restrictions, public education, and land purchase as protection strategies.[137] Nationwide, only eighty aquifers have received this designation.[138]

The Underground Injection Control (UIC) Program protects underground sources of drinking water against contamination from injection wells.[139] Injection wells—used for waste disposal, long term CO_2 storage, and natural gas and petroleum production—place fluid deep underground into porous rock formations, such as sandstone or limestone, or into or below the shallow soil layer.[140] The federal UIC program authorizes the EPA to regulate injection well activity.[141] Federal regulations are designed "to ensure that either: [i]njected fluids stay within the well and the intended injection zone," or mandate that "[f]luids that are directly or indirectly injected into [an underground source of drinking water] do not cause a public water system to violate drinking water standards."[142] The EPA sets standards addressing construction, operation, and monitoring on the basis of well classes.[143] Classifications are based on well proximity to an underground source of drinking water and the type of injection.[144]

Finally, the 1988 SDWA amendments contained a requirement for wellhead protection, mandating that states identify wellhead protection areas

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[137] *Id.* (implicitly cross referencing to the Underground Injection Control Program, the Clean Water Act, and the Resource Conservation and Recovery Act as source water protection tools).

[138] *Region 5 Water: Sole Source Aquifer FAQs*, U.S. ENVTL. PROTECTION AGENCY, https://www3.epa.gov/region5/water/gwdw/solesourceaquifer/ssa-faqs.html [https://perma.cc/SJW6-ZQBD] (last updated Feb. 22, 2016) (listing the number of sole source acquirers nationwide as of June 2013).

[139] "An underground source of drinking water . . . is an aquifer or part of an aquifer that is currently used as a drinking water source," or may be "needed as a drinking water source in the future." *General Information About Injection Wells*, U.S. ENVTL. PROTECTION AGENCY (2016), http://water.epa.gov/type/groundwater/uic/basicinformation.cfm [https://perma.cc/Y9F8-GX9H]. Specifically, an underground source of drinking water "supplies any public water system . . . for human consumption" or "contains fewer than 10,000 mg/l total dissolved solids." 40 C.F.R. § 144.3 (2015).

[140] *General Information About Injection Wells*, *supra* note 139. Importantly, Congress has expressly excluded injection of fluids for the purpose of oil and gas production from the statutory definition of underground injection, thereby excluding hydraulic fracturing from regulation. *See* Energy Policy Act of 2005, Pub. L. No. 109-58, sec. 322, § 1421(d), 119 Stat. 594, 694 (codified at 42 U.S.C. § 300h(d)).

[141] 42 U.S.C. § 300h. The Act requires the EPA to develop minimum federal regulations for UIC programs; the EPA may then approve state programs that meet those requirements. *Id.* Currently, the EPA has delegated primacy for thirty-three states and three territories, and shares responsibility in seven states; it implements a program in ten states, two territories, the District of Columbia, and most Indian Tribes. *General Information About Injection Wells*, *supra* note 139.

[142] *General Information About Injection Wells*, *supra* note 139.

[143] *See* 40 C.F.R. §§ 146.12–.14.

[144] 2 WILLIAM H. RODGERS, JR., RODGERS' ENVIRONMENTAL LAW: AIR AND WATER § 4:8, Westlaw (database updated Dec. 2015).

and develop a program that contains appropriate protections.[145] This program gives states substantial leeway, and while "some states require community water systems to develop management plans" or mandate local level protections, "others rely on education and technical assistance to encourage voluntary action."[146]

Although these SDWA programs encourage and provide some support for source water protection, they require very little. Many municipalities engage in some degree of source water protection, but a recent Natural Resources Defense Council assessment of the state of drinking water systems found that many cities had inadequate source protection, and that many had "serious and immediate needs for better source water protection."[147]

2. *Clean Water Act*

The CWA is SDWA's more broadly applicable and more widely discussed older sibling. Passed in its modern form in 1972,[148] the statute establishes a (quasi) comprehensive program for water pollution prevention. As has been well-documented elsewhere, however, it turns a blind eye to nonpoint source pollution, particularly that from farms.[149] The statute allocates regulatory authority over nonpoint sources, including agricultural runoff, to the states, which are free to implement robust controls but typically choose not to.

The statute's primary regulatory tool is the National Pollution Discharge Elimination System (NPDES) permitting program, which prohibits any discharge of pollutants from a point source into the waters of the United States without a permit.[150] As amended in 1977,[151] the statute expressly excludes both irrigation return flows and agricultural stormwater runoff from its

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[145] 42 U.S.C. § 300h-7.

[146] REGION 8, U.S ENVTL. PROT. AGENCY, EPA 908K10003, EVERYTHING YOU WANTED TO KNOW ABOUT ENVIRONMENTAL REGULATIONS AND RELATED PROGRAMS . . . . BUT WERE AFRAID TO ASK! 40 (Dec. 2010), https://www.epa.gov/sites/production/files/documents/EnvRegSC_Hndbk.pdf [https://perma.cc/4S6W-BGAZ].

[147] OLSON, *supra* note 42, at xii. The report also argues that a healthy water system must have good treatment, good maintenance and operation protocols, *and* good source water protection. *Id.* at 16.

[148] Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended in scattered sections of 33 U.S.C.) The statute was later renamed, and is now commonly referred to as, the "Clean Water Act" or "CWA." *See infra* note 151.

[149] *See supra* notes 7–9 (citing sources); *see also* Craig, *supra* note 6, at 181 (stating that the determination to allocate authority over point sources to the federal government and authority over nonpoint sources to states is "arguably [a] misjudgment because there is growing recognition in this country that nonpoint source pollution is the last *national* water pollution problem to solve").

[150] 33 U.S.C. § 1311(a) (2012) (prohibiting discharge except as in compliance with the Act); *id.* § 1312 (establishing the NPDES program).

[151] Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended in scattered sections of 33 U.S.C.).

definition of "point source."[152] Thus, with the exception of concentrated animal feeding operations (CAFOs), more commonly known as feedlots, which are expressly included in the definition of point source, farms are not subject to the NPDES permitting requirements.[153] For CAFOs, the NPDES can be a powerful tool for source drinking water protection, but for all other farms, it is not.[154]

In addition, the CWA also has extremely limited application to groundwater. Even where NPDES permitting is required, it extends to release of pollutants into groundwater only in very limited circumstances where groundwater is closely linked hydrologically to surface water.[155] Thus, even if NPDES applied to farms, many underground drinking water sources would remain unprotected.[156]

While traditional command and control regulatory tools provide little oversight of nonpoint source pollution, other types of regulatory tools address them more directly. For instance, several other secondary CWA programs address nonpoint source pollution through land use planning and best practice guides. These include CWA sections 208,[157] 319,[158] and 303.[159] Sections 208 and 319 both direct states to develop nonpoint source management plans.[160] The EPA assists in this process by providing detailed nonpoint source pollution "best management practices" guides on which states can model localized management plans.[161] Although these programs provide some funding and a framework for state efforts at nonpoint source pollution, neither program imposes mandatory enforceable pollution control obligations on states.[162]

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[152] 33 U.S.C. § 1362(14).

[153] *Id.*

[154] *See* Jan G. Laitos & Heidi Ruckriegle, *The Clean Water Act and the Challenge of Agricultural Pollution*, 37 VT. L. REV. 1033, 1058–61 (2013) (proving a history of CAFO regulation). *See generally* William M. McLaren, *The Death of the Duty to Apply: Limitations to CAFO Oversight Following* Waterkeeper *&* National Pork Producers, 11 J. ANIMAL & NAT. RESOURCE L. 87 (2015) (explaining how recent litigation has limited the applicability of the CWA to CAFOs).

[155] 2 RODGERS, *supra* note 144, § 4:8.

[156] The Clean Water Act's other major permitting program, section 404, does not provide a blanket exemption for agriculture. 33 U.S.C. § 1314. This program requires permits for the discharge of dredge and fill materials into waters of the United States. *Id.*

[157] *Id.* § 1288.

[158] *Id.* § 1329.

[159] *Id.* § 1313.

[160] *Id.* §§ 1288, 1329.

[161] *Id.* § 1329. Section 319 of the CWA provides federal funding to support BMP implementation. *Id.* Approximately half of the funds earmarked for section 319 programs are devoted to implementing broad NPS pollution remedies; the remaining funds are used to help develop local water quality solutions. OFFICE OF WETLANDS, OCEANS & WATERSHEDS, *supra* note 34, at 1.

[162] Zaring, *supra* note 9, at 522–28 (describing the two sections in operation).

Section 303 establishes a slightly more robust nonpoint source regulatory program requiring states to identify impaired bodies of water (bodies of water that do not meet water quality standards).[163] States must then determine the total maximum daily load (TMDL) of any contaminant for which the water body is impaired and allocate that total load among the various pollution sources.[164] One function of this program is to tie the NPDES permitting process, which is otherwise based only on best available technology, to water quality standards for local waterways.[165] State regulators are free to allocate the TMDL in any manner and can thus choose to bypass any agricultural nonpoint sources in the waterway and mandate pollution reduction only from point sources.[166] For waterways with no point source contributors, however, this program theoretically forces state regulators to mandate pollution reduction from nonpoint sources.[167] In practice, because the statute provides for no enforcement mechanism, states are free to ignore the TMDL once it is established.[168] A handful of states exercise more robust nonpoint source pollution regulatory programs.[169]

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[163] 33 U.S.C. § 1313(d)(1)(A). CWA directs states to establish water quality standards for bodies of water based on designated uses. *Id.* § 1313(a)–(c).

[164] *Id.* § 1313(d)(1)(C).

[165] *See* Oliver A. Houck, *The Clean Water Act Returns (Again): Part I, TMDLs and the Chesapeake Bay*, 41 ENVTL. L. REP. NEWS & ANALYSIS 10208, 10209 & n.16 (2011).

[166] *See id.* at 10209 & n.14. TMDLs also create a connection between point source and nonpoint source polluters, imposing costs of nonpoint source pollution on point sources. *Id.* at 10209. If a state resists regulating nonpoint sources, point sources on an impaired waterway may need to make additional reductions beyond what was already required in their technology-based permit standards. *See id.* at 10210–11.

[167] *See* 33 U.S.C. § 1313(d)(1)(c) (requiring states to identify *all* waterways with insufficient controls). Indeed, in order to meet TMDL goals, many states impose mandatory requirements on farms. In a comprehensive assessment of state-level agricultural water pollution programs, Robin Kundis Craig and Terry Schley Noto identified seven states with such programs, including Arizona, Florida, Idaho, Nevada, North Carolina, Oregon, and Washington. ROBIN KUNDIS CRAIG & TERRY SCHLEY NOTO, ENVTL. DEF. FUND, STATE NONPOINT SOURCE CONTROL PROGRAMS FOR AGRICULTURE: A LOOK AT AGRICULTURAL CERTAINTY 7 (2012) (on file with author).

[168] Ruhl, *supra* note 8, at 302 (explaining that the TMDL program provides no independent authority for enforcing load reduction allocations against nonpoint sources); *see infra* notes 274–78 and accompanying text (providing more context on development of TMDLs as a robust regulatory tool and strategies EPA has used to sidestep its limited enforcement options).

[169] Robin Kundis Craig & Anna M. Roberts, *When Will Governments Regulate Nonpoint Source Pollution? A Comparative Perspective*, 42 B.C. ENVTL. AFF. L. REV. 1, 2 (2015) (characterizing the existing regulatory structure as creating "a *de facto* fifty-state experiment in regulation—or, often, non-regulation—of [nonpoint source] water pollution," and observing that "[s]tate and regional variations in addressing nonpoint source pollution can be extreme, but one pattern is discernible: States and regions always need a significant water quality interest with political salience before they will adopt actual nonpoint source regulation in the form of enforceable requirements"); *see infra* Part IV.B.3.b.i (describing state-level innovation).

In sum, although both the SDWA and the CWA provide technical support and funding for source water protection, neither statute requires such protection. Instead, both statutes allow states to determine whether or not to engage in source water protection, and the SDWA requires water utilities to engage in end-of-line cleanup regardless of whether that protection is in place.

D. *Clean Up Options and Costs*

This pollution generates both individual and public costs. Individual costs fall into three general categories: water rate increases (or other water utility fee increases such as increased hook up costs), avoidance costs, and health care costs. It is difficult to isolate rate increases related to nonpoint source pollution in particular, but EPA has estimated that total compliance costs have led to rate increases ranging from 2% per household ($3 per year) to 55% per household ($145 per year).[170]

Avoidance costs include various household level costs incurred to avoid drinking contaminated tap water, and typical avoidance activities include purchase of bottled water and installation of home filtration systems.[171] One national study estimated that Americans spend about $942 million per year to purchase bottled water in response to contamination that affects tap water taste and odor.[172] A recent study of the San Joaquin Valley in California found that 70% of surveyed households had avoidance costs exceeding 1.5% of household income.[173] The EPA's established water affordability threshold is 1.5%.[174] Nitrates are a primary contaminant of concern in that region.[175]

The EPA estimates that nonpoint source pollution (including nonagricultural sources) imposes about $21 billion in annual costs for drinking water systems.[176] Individual examples show how particular water utilities have responded to nonpoint source pollution threats with infrastructure improvements. The following are a series of illustrative examples:

- After a 1993 cryptosporidium outbreak, the City of Milwaukee, Wisconsin spent about $89 million on infrastructure improvements.[177]
- In neighboring Minnesota, the Minnesota Department of Agriculture recently reviewed efforts in five municipalities to manage nitrate

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[170] Steinzor, *supra* note 13, at 208–09.

[171] MOORE & MATALON, *supra* note 90, at 16.

[172] STATE-EPA NUTRIENT INNOVATIONS TASK GRP., *supra* note 98, at 5 (measured in 2008 dollars).

[173] MOORE & MATALON, *supra* note 90, at 28.

[174] *Id.*

[175] *Id.* at 9–10; OLSON, *supra* note 66, at 52–54, 53 fig.1.

[176] RIBAUDO ET AL., *supra* note 22, at 16 tbl.1-3 (citing a 1997 EPA study breaking down the cost to $20 billion for microbial treatment, "$0.2 billion for nitrates, and $0.5 billion for other synthetic chemicals, including pesticides").

[177] *See supra* note 33.

contamination.[178] Each city had installed nitrate filtration equipment at construction costs ranging from $350 per resident to $970 per resident.[179]

- In the San Joaquin Valley, a survey of response projects found $62 million of proposed projects to address nitrate contamination alone and an additional $88 million for projects that proposed to address nitrate contamination and other concerns.[180]
- In its complaint against neighboring irrigation districts, the City of Des Moines' Water Works estimates that it has spent almost $9 million already and would need to spend at least $76 million more to continue meeting federal nitrate standards.[181]
- According to an EPA report, Fremont, Ohio will need to spend approximately $15 million to manage nitrate contaminate.[182] It is a city of only 20,000.[183]
- In 2009, the Oklahoma Water Resources Board estimated that it could save between $106 and $615 million if it implemented effective regulation of chlorophyll, which is essential to the growth of cyanobacteria.[184]
- Between 2002 and 2012, Waco, Texas incurred approximately $70.4 million in costs to address tap water taste and odor problems stemming from algal blooms.[185]

The EPA estimates that for small water systems serving fewer than 500 people, responding to nitrate contamination could require capital investment of about $280,000 and annual operating costs of $17,500.[186] For larger systems

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[178] MINN. DEP'T OF AGRIC., DRINKING WATER PROTECTION SERIES: NITRATE CONTAMINATION—WHAT IS THE COST?, http://www.mda.state.mn.us/protecting/waterprotection/~/media/Files/protecting/waterprotection/dwps2.ashx [https://perma.cc/7J76-NSRV].

[179] *Id.*

[180] MOORE & MATALON, *supra* note 90, at 44.

[181] *See supra* notes 4–5 and accompanying text; *see also* STATE-EPA NUTRIENT INNOVATIONS TASK GRP., *supra* note 98, at 5 (noting that the Des Moines Water Works constructed a $4 million (in 1991 dollars) facility, which is used about forty-three days per year and costs $3000 per day to operate).

[182] STATE-EPA NUTRIENT INNOVATIONS TASK GRP., *supra* note 98, at 5.

[183] *Id.*

[184] *Id.*

[185] Catherine R. Dunlap et al., *A Costly Endeavor: Addressing Algae Problems in a Water Supply*, 107 J. AM. WATER WORKS ASS'N E255, E255 (2015) (estimating lost revenue for the same period between $6.9 and $10.3 million); *Waco Water Quality & Quantity Improvements Project*, WATER & WASTES DIG. (Dec. 14, 2011), http://www.wwdmag.com/waco-water-quality-quantity-improvements-project [https://perma.cc/MX8W-28RK] (tying algal blooms to concentration of dairy farms surrounding the city).

[186] STATE-EPA NUTRIENT INNOVATIONS TASK GRP., *supra* note 98, at 4.

serving up to 3,300 people, the capital cost could exceed a half million, and the operating costs could exceed $50,000.[187]

Many states and water utilities do engage in some degree of source water protection.[188] Seattle has one of the most robust programs, relying heavily on the outright purchase of land in the watershed as well as purchase of conservation easements to limit development.[189] Other source water protection strategies include use of green payments and zoning. Despite these options, most municipalities do not have robust source water protection programs and instead rely on the infrastructure options described above.[190]

III. CHALLENGING THE ANTI-MITIGATION NORM

As Part I explains, the interplay of the SDWA and the CWA establishes a default rule of no mitigation at the source and allocates at least some of the costs of nonpoint source pollution cleanup to public water utilities. By way of simple explanation, these two outcomes follow from two long-standing political norms. First, farmers should be insulated from the costs of mitigating environmental harm.[191] Second, provision of clean drinking water is an essential function of government, and, more specifically, of local government.[192] As many scholars have argued, the first principle is deeply problematic on its own.[193] This Part looks at the consequences of the first principle in light of the second, arguing that the interaction of the CWA and SDWA statutory schemes not only provides additional fodder for the critique of the CWA's failure to regulate agricultural sources but also reveals that the SDWA's own primary focus on purification is flawed.

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[187] *Id.*

[188] OLSON, *supra* note 42, at 38 (identifying Seattle, Boston, San Francisco, and Denver as having "at least some well-protected watersheds").

[189] *Id.* at 38–39, 41

[190] Id. at 39 ("While most cities reviewed need stronger source water protection, some cities, including Albuquerque, Atlanta, Detroit, Fresno, Houston, Los Angeles, Manchester, Newark, Philadelphia, Phoenix, and San Diego, have serious and immediate needs for better source water protection.").

[191] This is as much a statement about the political power of agricultural interests as it is about a firmly held political belief. *See, e.g.*, Chen & Adams, *supra* note 114, at 372–75 (discussing laws protecting farms); Craig & Roberts, *supra* note 169, at 2 ("[I]n politically powerful agricultural states, there needs to be a countervailing and prominent water quality concern to motivate states to regulate nonpoint source pollution in general and agricultural nonpoint source pollution in particular."); Susan A. Schneider, *A Reconsideration of Agricultural Law: A Call for the Law of Food, Farming, and Sustainability*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 935, 935–36 (2010) (describing the many forms of "[a]gricultural exceptionalism").

[192] *See generally* SALZMAN, *supra* note 26.

[193] *See supra* notes 8, 9, 114 (citing sources skeptical of agricultural carve outs).

A. *The Costs of the Status Quo*

Direct drinking-water related costs of water contamination fall into two general categories: public costs, which include the costs of installing treatment facilities, drilling new wells, subsidizing the purchase of water from alternate sources, and education about water contamination; and private costs, which include home filtration systems, purchase of alternative water sources, higher use fees (water rates), and higher taxes.[194]

1. *Efficiency*

The statutory scheme assigns these costs to water users and ratepayers regardless of whether this back end response is more expensive than pollution prevention. Although there is no comprehensive cost benefit analysis comparing the costs of source water protection with end-of-line cleanup, a few specific examples demonstrate that the former will be less expensive, at least some of the time. For instance, faced with the prospect of needing to spend $6 to $8 billion on new filtration infrastructure, New York City chose instead to increase controls over source water at a cost of less than $300 million over ten years.[195] In addition, the city built a filtration system for one part of its system at a cost of $3.1 billion, for an overall savings of around $2.5 billion.[196]

A related concern is that end-of-line cleanup may not always be effective, particularly for contaminants that are difficult to test for. Where testing for a contaminant is not technologically or economically feasible, the EPA can specify a treatment technique rather than a performance standard.[197] The Agency currently maintains treatment technique requirements in lieu of maximum contaminant levels for ten contaminants including cryptosporidium, total coliforms, and turbidity.[198] These treatment standards may lead to under protection where the contaminant is present in high enough levels that the standard treatment technique is inadequate. Under these circumstances, prevention at the source is critical to ensuring safe drinking water.[199]

Further, the presence of microbial contaminants such as cryptosporidium generates the need for water treatment, but standard treatment processes can

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[194] MOORE & MATALON, *supra* note 90, at 15 (cataloguing drinking water costs).

[195] HILLARY BROWN, NEXT GENERATION INFRASTRUCTURE: PRINCIPLES FOR POST-INDUSTRIAL PUBLIC WORKS 91–94 (2014).

[196] *Id.*

[197] SDWA, 42 U.S.C. § 300g-1(b)(7)(A) (2012).

[198] *Reviewing Treatment Methods for Six-Year Review of Drinking Water Standards*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/dwsixyearreview/reviewing-treatment-methods-six-year-review-drinking-water-standards [https://perma.cc/G9AH-FKMH] (last updated July 22, 2016); *see also* 40 C.F.R. § 141.712 (2015) (establishing unfiltered system cryptosporidium treatment requirements).

[199] Conversely, treatment standards may lead to overprotection where a contaminant is present in very low levels and implementation of the technique is unnecessary. In this circumstance, the SDWA offers a variance procedure. 42 U.S.C. § 300g-4(a)(3).

themselves introduce contaminants into drinking water. Pursuant to SDWA, the EPA requires all water systems that draw on surface water to filter and disinfect that water.[200] Water utilities typically use chlorine to disinfect, but chlorine can interact with organic compounds generating harmful disinfectant byproducts such as trihalomethane and haloacetic acid.[201] Although reducing agricultural contamination would not eliminate the need for surface water treatment, it could reduce the need significantly.

Why would a water utility not engage in source water protection if that is the cheaper and more effective option? There are several critical barriers. One is that source water protection is not necessarily an immediate fix. A water system suffering from current federal standard exceedence is unlikely to expend limited resources on a solution that could take many years to resolve the problem.[202] Instead, water utilities often pursue various more immediate options such as blending contaminated water with water from another source, drilling new wells, consolidating with another water system, or installing new or upgraded treatment equipment.[203]

Another critical barrier is transaction costs complicating negotiation between farmers and water utilities. Comprehensive source water protection may require significant change to land uses within the watershed. Even if purchasing all land within a watershed and shutting down existing land uses were less expensive than building a new treatment facility, many owners may not want to sell. Without exercising eminent domain, which would require political capital likely to be absent in agricultural regions, a water utility may be unable to purchase enough land to achieve source water protection goals.[204]

Where changes to farming practices, rather than suspending farming altogether, would suffice to protect drinking water quality, water utilities are likewise limited. Even assuming that wholesale farming practices changes would be less expensive than building water treatment facilities, utilities face

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[200] *See supra* notes 128–30 and accompanying text (describing the surface water treatment rule).

[201] Rhett Larson, *Law in the Time of Cholera*, 92 NOTRE DAME L. REV. (forthcoming 2017) (manuscript at 1, 34–35), https://ssrn.com/abstract=2740610 [https://perma.cc/LWH8-M47W] (identifying this as a tension between water law's green agenda—to prevent toxic exposure—and its red agenda—to prevent the spread of disease).

[202] MOORE & MATALON, *supra* note 90, at 39–43 (reviewing sixty-three exceedence response proposals from the San Joaquin Valley and finding that none proposed wellhead protection).

[203] *Id.* at 39, 40 tbl.9.

[204] Also limiting the land purchase option, not all municipalities have the power to exercise eminent domain beyond their territorial limits. *See generally* Marjorie A. Shields, *Validity of Extraterritorial Condemnation by Municipality*, 44 A.L.R. 6TH 259, 288–91 (2009) (collecting cases). Such authority varies both from state to state and by type of local government. *See id.* In addition, where water utilities are privately operated or exist as quasi-governmental agencies, they may not have eminent domain authority at all. *See id.* Where the water utility cannot exercise eminent domain, a state government would need to get involved, further complicating the politics of such a decision.

two equally challenging options. First, the utility can pay farmers to adopt better practices. This option can be highly effective, and expansion of this type of tool is discussed further in Part III.B, but it also has some significant costs of its own that may render it unfeasible. It requires the water utility to identify accurately sources of contamination, to develop relationships with individual farmers, to identify correctly appropriate farming practices changes, and to enforce those changes. Each of these steps requires funding and expertise that many water utilities are unlikely to have. Second, utilities can lobby the state to adopt more stringent regulation of harmful agricultural practices.[205] Lobbying is a long-term solution with a low probability of success in many states.[206]

Because of these transaction costs, many utilities will continue with traditional end-of-line treatment rather than pursuing source protection alternatives. Even where transaction costs are low, utilities may opt for traditional treatment options because of path dependency. As the technology of treatment and filtration developed, water utility professionals "consolidate their position and define themselves as the experts in that field. Other professionals are then likely to respect the boundaries of expertise set up by the particular technology, further entrenching it in practice."[207] Financial and physical investment may also compound path dependency. Having already invested significant amounts of money in treatment and filtration infrastructure, water utilities can become locked into that mode.[208] In other words, it may either not occur to water utility professionals to pursue

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[205] OLSON, *supra* note 42, at 42 (calling on water utilities to work with state and federal legislators to develop legislation appropriating funds for land acquisition and conservation easements and regulating source water contamination).

[206] Although note that high salience contamination events may increase public support for more stringent regulation and help proregulation lobbies overcome the strength of agricultural resistance. *See* Craig & Roberts, *supra* note 169, at 34–35.

[207] ERAN BEN-JOSEPH, THE CODE OF THE CITY: STANDARDS AND THE HIDDEN LANGUAGE OF PLACE MAKING 94 (2005) (explaining why adoption of particular infrastructure technology breeds path dependency). One consequence of the development of expertise is that others are restricted to the role of outsider, or viewed as uninformed members of the public "in no position to question the range of treatment methods available." *Id.* (quoting Sharon Beder, *Technological Paradigms: The Case of Sewerage Engineering*, 4 TECH. STUD. 167, 175 (1997)). Although Beder's case study focuses on sewer infrastructure and wastewater treatment, Beder, *supra*, at 167–69, there is no reason to think the same pattern would not emerge in the context of drink water utilities.

[208] BEN-JOSEPH, *supra* note 207, at 91–94 (describing the various modes of path dependency in the context of infrastructure development). This is an example of the "sunk cost fallacy." Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CALIF. L. REV. 1051, 1126 (2000). Despite the standard microeconomic principle that a rational actor should not consider past, irretrievable expenditures in making future plans, many people nevertheless "routinely cite sunk costs as a reason for pursuing a particular course of action." Korobkin & Ulen, *supra*, at 1124; *see also* Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behaviorial Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1490–93 (1998).

prevention at source options, or they may perceive transaction costs to be higher than they actually are.

Further exacerbating the potential for economic inefficiency is the presence of numerous ancillary benefits of pollution prevention. SDWA cleanup addresses drinking water almost exclusively. This narrow focus on water's consumptive value misses the various other consequences of nonpoint source pollution. Ancillary benefits of source water protection (or pollution prevention) include water use values such as recreation and fishing, ecosystem values, and aesthetic values and nonuse values such as the option value of clean water, the stewardship value, and the vicarious consumption value.[209]

Although a comprehensive survey of the benefits of clean water is beyond the scope of this project, it is worth mentioning one example of the potential value of source pollution prevention.[210] As the USDA's Economic Research Service has noted, "Comprehensive estimates of the damages from agricultural pollution are lacking, but soil erosion alone is estimated to cost water users $2 billion to $8 billion annually."[211] Sediment is a useful example because these costs are felt in a wide range of water contexts.[212] For drinking water utilities, sediment can lead to reservoir siltation, decreasing the reservoirs useful life, and can increase water treatment costs.[213] At the same time, sediment from soil erosion can degrade aquatic habitats, reducing biodiversity and harming commercial and recreational fisheries.[214] Sediment can also clog roadside ditches and raise streambeds, increasing the probability and severity of floods and impinging on maritime navigation.[215]

Neither farmers, in selecting farming practices, nor water utilities, in identifying SDWA compliance options, have reason to take these ancillary benefits into account. Farmers face few regulatory consequences for water pollution. Water utility decision makers have no reason to consider these ancillary costs because their success is measured only on SDWA compliance and public health protection. As a result, even where ancillary benefits would justify a switch from end-of-line purification to pollution prevention, they will likely not be taken into account.

From a standard utilitarian perspective, end-of-line cleanup is not the most efficient policy choice. It misses the opportunity to achieve multiple benefits

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[209] MOORE & MATALON, *supra* note 90, at 16 & tbl.1 (citing a 1995 USDA Economic Research Service study cataloguing various benefits of clean water).

[210] For a more detailed description of the various benefits of clean water, see RIBAUDO ET AL., *supra* note 22, at 16 tbl.1-3. See *supra* Part II.B for a description of the various consequences of nutrient and pesticide pollution.

[211] RIBAUDO ET AL., *supra* note 22, at iv. Agriculture causes soil erosion by reducing plant coverage and making top soil susceptible to both wind and water erosion. *See id.* at 6–7.

[212] Soil eroding into water waters settles to the bottom of those waterways, becoming sediment. *See id.*

[213] *Id.* at 7.

[214] *Id.*

[215] *Id.*

with the same resource expenditure. Other water pollution harms either go unabated or are paid for separately. For instance, taking the soil erosion example from above, the same soil erosion may generate costs for a water utility that has to modify its filtration system to address suspended solids, and a public works department that has to repeatedly dredge a shipping channel. Put another way, by declining to prevent pollution at the source, a community may ultimately have to pay for that pollution several times over. Again, in simple utilitarian terms, by creating a presumption in favor of end-of-line cleanup rather than pollution prevention, the SDWA/CWA regulatory scheme does not maximize net benefits.

2. *Equity*

Not only is the SDWA/CWA scheme not welfare maximizing, it is also not equitable. Allocating agricultural nonpoint source pollution costs to water users can have disparate impacts on low-income populations and minority populations in both urban and rural areas and can lead to arbitrary distribution of clean water costs.

Data regarding disparate impacts of agricultural drinking water pollution is limited in part because community water systems are not required to gather socioeconomic data on their users,[216] but several studies suggest that there are serious reasons for concern. For instance, a recent study of nitrate contamination in the San Joaquin Valley of California revealed that contamination costs were borne disproportionately by smaller water systems and by low-income and Latino ratepayers.[217] These ratepayers paid extensive avoidance costs, including the costs of purchasing, installing, and maintaining household filters and purchase of bottled water.[218] In that region, about 70% of those surveyed spent more than 1.5% of income on avoidance costs (EPA's affordability threshold for water),[219] and on average were spending 4.4% of

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[216] James VanDerslice, *Drinking Water Infrastructure and Environmental Disparities: Evidence and Methodological Considerations*, 101 AM. J. PUB. HEALTH S109, S111 (2011).

[217] MOORE & MATALON, *supra* note 90, at 14 (finding that studies controlling for water utility size show that utilities serving a higher proportion of Latinos were more likely to have higher levels of nitrates); *see also* VanDerslice, *supra* note 216, at S111 (describing another study finding a correlation between water quality and ethnicity and poverty).

[218] MOORE & MATALON, *supra* note 90, at 18.

[219] *Id.* at 28. About 14% of drinking water utilities offer some type of subsidies to low-income customers. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 52, at 26. The United Nations has identified 3% as the appropriate threshold. *International Decade for Action 'Water for Life' 2005-2015*, UNITED NATIONS DEP'T ECON. & SOC. AFF., http://www.un.org/waterforlifedecade/human_right_to_water.shtml [https://perma.cc/MRY5-BKQX] (last updated May 29, 2014). Estimates for affordability range from around 0.8% of median household income to as high as 2.5% of median household income. *See* Aaron Janzen et al., *Cost Recovery and Affordability in Small Drinking Water Treatment Plants in*

income on water for avoidance costs and water rates combined.[220] Other studies look generally at drinking water contamination, finding disproportionate burdens on low-income communities and communities of color.[221]

A related concern is the burden of SDWA compliance on residents served by smaller water utilities. For these utilities, serving anywhere from twenty-five to several thousand people, infrastructure improvement and maintenance can impose significant per ratepayer costs. Estimates at the scope of these costs range dramatically. A 1990s EPA study found average costs in smaller systems for SDWA compliance to be $145 per year per household.[222] A more recent Minnesota study found costs as high as $970 per resident.[223] Nevertheless, these figures point to the difficulty in smaller systems to spread costs among ratepayers, and the burden on residents in these communities, which are often low-income rural areas.

In smaller systems or in systems serving low-income populations, rising compliance costs raise concerns about the system's effectiveness at achieving a nationwide right to water. Although the right to water is nowhere codified in U.S. law, this Article takes it as a foundational principle that should motivate any call for law reform.[224] The right to water requires that all people have

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Alberta, Canada, 108 J. AM. WATER WORKS ASS'N E290, E293 (2016) (describing various affordability measures).

[220] MOORE & MATALON, *supra* note 90, at 28.

[221] VanDerslice, *supra* note 216, at S111 (finding some evidence of disparities both with regard to water quality and with regard to adequate household plumbing, but finding the data sparse and calling for additional research).

[222] Steinzor, *supra* note 13, at 208–09. Under some circumstances, smaller systems, serving fewer than 3300 people, can obtain affordability-based variances, but only if the variance still ensures adequate protection of public health. 42 U.S.C. §§ 300g-4(e) to -5 (2012); TIEMANN, *supra* note 46, at 6 (describing operation of SDWA variance and exemption programs).

[223] *See supra* notes 178–79 and accompanying text (giving more detail on Minnesota report and citing sources). The Minnesota study looked not at actual payments per person but rather at the per capita cost of the system improvements. MINN. DEP'T OF AGRIC., *supra* note 178; *see also* Janzen et al., *supra* note 219, at E295 (finding that to achieve full cost recovery, many water systems would need to charge users more than 2% of median household income, which the authors deemed to be an appropriate affordability threshold).

[224] The existence of SDWA itself, in combination with building codes requiring indoor plumbing, creates a sort of statutory right to water. Although the statute itself has no statement of purpose, the legislative history contains several useful assertions focusing primarily on water quality. The House Report accompanying the first act provided: "The purpose of the legislation is to assure that water supply systems serving the public meet minimum national standards for protection of public health." H.R. REP. NO. 93-1185, at 1 (1974), *as reprinted in* 1974 U.S.C.C.A.N. 6454, 6454. Later statements also hinted at the importance of affordability, though from the perspective of the state rather than individual ratepayers. In the 1977 amendments, a House Report noted that the purpose of the new bill is, among other things, to "authorize appropriations for certain fiscal years for purposes of providing assistance to States with respect to safe drinking water." H.R. REP. NO. 95-338, at 1 (1977), *as reprinted in* 1977 U.S.C.C.A.N. 3648, 3649; *see also* S. REP. NO. 104-169,

adequate water.[225] Adequacy, in turn, has three attributes: (1) availability: "[t]he water supply for each person must be sufficient and continuous for personal and domestic uses"; (2) quality: "[t]he water required for each personal or domestic use must be safe"; and (3) accessibility: "water facilities and services have to be accessible to *everyone* without discrimination."[226] Accessibility means both physical accessibility and economic accessibility.[227] Community participation in water decisions is also important, particularly where these various goals might be in tension with SDWA's primary focus on water quality risks undermining affordability, particularly in smaller systems. The emphasis on technical solutions also risks overemphasizing expertise and drowning out community voices.[228]

For even smaller systems, those too small to be covered by the SDWA at all, the burden to provide clean water is even more acute. About 14% of the U.S. population relies on individual systems serving a single household or shared systems serving fifteen or fewer households.[229] About 23% of these well systems have some degree of chemical contamination, and 34% tested positive for total coliforms.[230] Although there is no national data on the demographics served by these wells, there have been "several case studies of low income and minority communities in rural agricultural areas that relied on groundwater that had high levels of nitrates or other agricultural chemicals."[231] These communities fall through the cracks of both CWA and SDWA.

Even where the burdens of agricultural water pollution are not borne disproportionately by low income and minority communities, there is some reason to think that the SDWA/CWA's allocation of costs is nevertheless unfairly arbitrary. The SDWA/CWA interplay establishes a deviation from the polluter pays principle, reassigning a portion of agricultural pollution costs from their generators to a subset of those within the ambit of the pollution. The CWA's treatment of agricultural water pollution functions as a congressional stamp of approval on what would, under other circumstances, be deemed a

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at 2 (1995) (noting that one goal of the 1996 amendments was to make compliance more affordable for small water systems).

[225] Comm. on Econ., Soc. & Cultural Rights, General Comment No. 15 (2002): The Right to Water (Arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), ¶ 12(a)–(c), U.N. Doc. E/C.12/2002/11 (Jan. 20, 2003) (saying the adequacy of water is part of the right to water).

[226] *Id.*

[227] *Id.* ¶ 12(c) (listing nondiscrimination as another critical attribute of accessibility).

[228] Amy Vanderwarker, *Water and Environmental Justice*, *in* A TWENTY-FIRST CENTURY U.S. WATER POLICY 52, 55 (Juliet Christian-Smith et al. eds., 2012) ("A heavy reliance and emphasis on 'engineering' solutions to water problems, such as dams, has emphasized technological skills rather than community voices or local consequences." (citations omitted)).

[229] VanDerslice, *supra* note 216, at S111 (relying on U.S. Geological Survey data).

[230] *Id.*

[231] *Id.* (describing studies of the Yakima Valley in Washington State and of migrant agricultural labor camps around the country).

market failure requiring a regulatory response. This point serves as a common critique of the CWA and does not require much additional explication here. What is important to note, however, is the added peculiarity of how this "legalized externality" interacts with the SDWA, which assigns the cost of a subset of this pollution to water drinkers.

Where point source pollution is the primary threat to safe water, this allocation of cost and responsibility is reasonable. Water utilities have a lighter burden; they are simply providing a backstop to ensure that water, whose content is often already heavily policed under the Clean Water Act, is safe to drink. Even where that system breaks down, where point source pollution contaminates drinking water, there are robust mechanisms, external to SDWA, to seek pollution abatement.[232] By contrast, where nonpoint source pollution is the primary threat, the water utility is the first line of defense.

The polluter pays is a widely used governing principle in environmental law, but there are often rational reasons to deviate from this principle.[233] For instance, where the polluter is producing a needed resource and application of the principle would make that resource inaccessible, it may make more sense to ask those benefiting from the production of the resource to pay. In other circumstances, polluter pays may be normatively desirable but not cost effective to implement.

The critical question here is whether there is a rational basis for treating farmers differently than other water polluters or whether this differential treatment is arbitrary. Commentators have identified a number of potential reasons for treating farmers differently.[234] These include normative reasons, such as the special status of the family farmer,[235] as well as practical reasons, including the sheer number of potential regulated entities,[236] variation in

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[232] The most important of these is the Clean Water Act citizen suit, which allows any individual, organization, or local government, including, if it so desired, a water utility, to bring an enforcement action against point sources not in compliance with the Act's requirements. 33 U.S.C. § 1365(a) (2012).

[233] *See, e.g.*, Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495, 1552 (1999) (characterizing the principle as "the central rule of domestic environmental regimes the world over"); Jonathan Remy Nash, *Too Much Market? Conflict Between Tradable Pollution Allowances and the "Polluter Pays" Principle*, 24 HARV. ENVTL. L. REV. 465, 466 (2000) (describing the polluter pays principle as "a normative doctrine of environmental law" that "stems from the fundamental, logical, and fair proposition that those who generate pollution, not the government, should bear pollution costs").

[234] *E.g.*, Schneider, *supra* note 191, at 937–43 (summarizing historical and normative explanations for special treatment).

[235] *Id.*; *see also* Chen & Adams, *supra* note 114, at 371–73.

[236] *See* Ruhl, *supra* note 8, at 329 (explaining that the number of farms along with their geographic distribution and diversity make them difficult to regulate). As of the most recent agricultural census, there are approximately 2.1 million farms. NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., ACH12-3, 2012 CENSUS OF AGRICULTURE HIGHLIGHTS: FARM DEMOGRAPHICS: U.S. FARMERS BY GENDER, AGE, RACE, ETHNICITY, AND MORE (May 2014), http://www.agcensus.usda.gov/Publications/2012/Online_Resourc

farming practices and local environmental conditions,[237] and technical challenges with traceability and measurability of water contamination.[238] Environmental law scholars have ably rejected these concerns, arguing persuasively that it is time to bring agriculture under regulation.[239]

Although there is ample political and cultural explanation for the statutory allocation of costs, there is little rational basis. Deviation from the polluter pays principle in this instance creates a discrepancy between water users who live near industrial agricultural operations and those who do not. A water utility (and its ratepayers) who are adjacent to polluting agricultural lands are in a worse position than those water utilities who are adjacent only to point sources of pollution. The water utility is bearing the costs of a public policy to keep food cheap, making water more expensive as a result.

This is, of course, one of many geographical factors affecting water rates. Other, perhaps more significant, deviations follow from availability of water and need for infrastructure to transport water long distances. The size of a community also has a large effect on water rates; in smaller communities water may be significantly more expensive as infrastructure and operation costs are distributed over a smaller number of ratepayers. It is not necessarily the case that water should cost the same everywhere. Indeed, it might be rational to charge less for water in water-rich places than in water-poor places, where higher rates might incentivize more efficient use of a scarce resource.[240]

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es/Highlights/Farm_Demographics/Highlights_Farm_Demographics.pdf [https://perma.cc/6JWY-RHGJ]. Compare this to about 500 coal-fired power plants. *Table 4.1. Count of Electric Power Industry Power Plants, by Sector*, *by Predominant Energy Sources Within Plant, 2005 Through 2015*, U.S. ENERGY INFO. ADMIN. (Nov. 21, 2016), http://www.eia.gov/electricity/annual/html/epa_04_01.html [https://perma.cc/M38F-QKFV]. Tools such as general permitting and potential carve outs for low risk categories of farms could make this number more manageable. *See infra* Part IV.B.1 (calling for use of these tools to craft sensible regulation of agriculture industry).

[237] Farms pose varying levels of risk to public water supplies depending on a broad range of variables including proximity to source water, topography, soil permeability, crop types, and rainfall. *See* Ruhl, *supra* note 8, at 329–30 (identifying variables). Perfect tailoring to these conditions would be extremely costly for regulators.

[238] *See* Margot J. Pollans, *Regulating Farming: Balancing Food Safety and Environmental Protection in a Cooperative Governance Regime*, 50 WAKE FOREST L. REV. 399, 411 & n.47 (2015). For much agricultural nonpoint source pollution, there is no emissions point from which to measure pollution output. *See id.* Much of agricultural water pollution, however, looks a lot like traditional point source pollution. *See id.* This is particularly true where irrigation and stormwater runoff are channelized in drainage and irrigation systems before being returned to source water. *See id.* at 404 n.20, 411 & n.47. Further, improved testing and monitoring technology may help regulators overcome measurement problems.

[239] *See supra* notes 8–9 (citing sources).

[240] *See generally, e.g.*, OLIVER M. BRANDES ET AL., WORTH EVERY PENNY: A PRIMER ON CONSERVATION-ORIENTED WATER PRICING (May 2010), http://poliswaterproject.org/sites/default/files/Pricing%20Primer%20Final.pdf [https://perma.cc/A2WE-653J]. Many municipalities are, however, limited by state statutory and constitutional law in their

In the case of proximity to agricultural operations, however, the same logic does not apply. The benefits of cheap food are distributed across all food consumers.[241] There is no good reason to concentrate the cost on adjacent communities.

B. *Cost Shifting v. Pollution Prevention*

These concerns challenge two aspects of the current regulatory scheme: (1) the default point of cleanup: centralized end-of-line purification rather than on farm pollution prevention; and (2) the assignment of cleanup costs to drinking water consumers (and to a lesser extent to tax payers) rather than to farmers and food consumers.

Both are problematic in various ways. The default point of cleanup creates inefficiencies not only because earlier cleanup can sometimes be cheaper but also because earlier cleanup can generate other kinds of benefits beyond safe drinking water. Assignment of the cleanup duty to water utilities, with narrow geographic jurisdiction and expertise, further entrenches the default. Assignment of cleanup costs to water utilities (and thus to ratepayers) generates equity concerns.

One potential way forward would be to create a liability rule allowing utilities to recover cleanup costs from farmers. The rule would look like a pollution tax imposed by water utilities on farmers. Such a rule would resolve the equity concerns described above and would force internalization of a subset of the environmental harms of agriculture. The rule, would however, be difficult to implement. Although it is possible to estimate the costs that agriculture imposes on drinking water systems, it is extremely difficult to determine how those costs should be allocated among various farmers on a watershed.[242]

Further, a rational rule would allow a farmer to choose between paying her proportionate share of end-of-line cleanup costs and modifying her farming

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discretion to set prices; some states have cost-of-service restrictions prohibiting utilities from charging any more than the cost of service. *See, e.g.*, CAL. CONST. art. XIIID, § 4(a) (establishing that utilities may not impose charges on a parcel that "exceed[] the reasonable cost of the proportional special benefit conferred on that parcel").

[241] Many economists also argue that the narrative of cheap food has been vastly oversold. Although agriculture commodity prices are low, the primary beneficiaries are food distributors and processors, not consumers. FOOD & WATER WATCH & PUB. HEALTH INST., DO FARM SUBSIDIES CAUSE OBESITY? DISPELLING COMMON MYTHS ABOUT PUBLIC HEALTH AND THE FARM BILL 7–9 (Oct. 2011), http://www.foodandwaterwatch.org/sites/default/files/Farm%20Subsidies%20Obesity%20Report%20Oct%202011.pdf [https://perma.cc/XH7U-D6YV]; *see also infra* notes 259–64 and accompanying text (arguing that cheap food is not a justification for expensive water).

[242] *See generally* Victor B. Flatt, *C(r)ap and Trade: The Brave New World of Non-Point Source Nutrient Trading and Using Lessons from Greenhouse Gas Markets to Make It Work*, 52 HOUS. L. REV. 301 (2014) (describing the challenges to implementing water pollution cap and trade schemes at the watershed level).

practices to reduce her share of the contamination. Without this option, the rule would not incentivize modified farmer behavior and would thus not generate any of the ancillary benefits following from pollution reduction. But this choice complicates the allocation of costs because the water utility's total costs are not necessarily directly proportional to the volume of a contaminant.

Consider the following stylized example. A municipality maintains a facility to manage nitrate levels in the water supply. It pays a flat rate of $5,000 for any day that the facility is in operation, and it must operate the facility on any day when nitrate contamination exceeds five parts per million (ppm).[243] The facility has the capacity to reduce nitrate levels to below five ppm no matter how high the initial level. There are fifty farmers in the region who each contribute 1/50 of the total nitrates, and thus each pay $100 for each day the facility is in operation. In most years, there are fifty exceedence days per year (about the number of rainy days), so each farmer can expect to pay $5,000 annually.

Twenty of these farmers can get their nitrate pollution down to *de minimis* levels for less than $5,000, so they opt to do that rather than pay. This reduces the total amount of nitrate pollution by 2/5, but does not necessarily reduce the number of exceedence days. Imagine that the average level on an exceedence day before those ten farmers changed their practices was twenty ppm.[244] This amount is now reduced by 2/5 to twelve ppm, which is still greater than the allowed level.

Now the municipality has to charge the remaining farmers a much larger share ($166.66/exceedence day or $8,333.33/year).[245] Assuming it chooses the latter, this would trigger a second round of opting out, as a larger group of farmers would now find it less expensive to change their practices than to pay the $8,333.33. This would continue on until the total nitrate pollution level decreased by 75% (to bring the average exceedence from twenty ppm to below five ppm), which would occur after at least thirty-eight farmers changed their practices.[246] The remaining twelve farmers would be free to continue their existing practices and would not have to pay because there would be no more exceedence days.[247]

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[243] Assume that this maximum contamination level, if achieved by pollution reduction rather than purification, is set at the correct level to maximize net benefits including both benefits of drinking water purity and ancillary benefits as described in Part III.A.1 above.

[244] This hypothetical assumes it is not possible for a farmer to make a partial reduction.

[245] Another possibility is that the municipality make up the cost difference itself, but if it did so, nitrate pollution would not be reduced further because farmers would have no additional reduction incentive and only some of the ancillary benefits of reduction would be achieved.

[246] The 75% reduction is reached once 37.5 farmers change their practices, but I have rounded up as I am assuming that a half reduction is not possible.

[247] Compare this to a carbon tax, under which those firms who choose to continue polluting will always have to pay in proportion to what they pollute. Nathan Richardson & Arthur G. Fraas, *Comparing the Clean Air Act and a Carbon Price*, 44 ENVTL. L. REP. NEWS & ANALYSIS 10472, 10476 (2014) (describing basic structure of a carbon tax). Here,

A municipality seeking to avoid this iterative pricing process might attempt to determine farmer pollution reduction costs up front and price the tax accordingly, but would only be able to do so if each farmer accurately disclosed her costs. The farmers would have an incentive to overestimate their costs as the twelve with the highest costs could ultimately avoid any payment at all. The municipality would have difficulty verifying the farmers' assertions as to their costs. Requiring the final twelve to help offset the reduction costs of the first thirty-eight might resolve this concern, but would further complicate the information gathering and cost allocation process.

A real world scenario would of course be vastly more complicated than this hypothetical as farms would contribute varying levels of pollution and establishing causation would be costly.[248] A liability rule in this context thus might address both the equity and efficiency concerns raised in Part II.A above, but would itself impose significant transaction costs (even in the simplified model) that might undermine the effectiveness of the system.[249]

A liability rule might also raise a different set of equity concerns for farmers under production contracts. Many farmers also lack the authority to make significant changes to their production practices because those practices are dictated in precise detail by production contracts that farmers enter into with buyers—including food processors, food distributors, and food retailers.[250] In some industries, as much as 84% of the commodity is produced under production contracts.[251] These farmers might not be able to change their production practices to avoid liability, even where the change would be less expensive than paying for end-of-line cleanup.

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farms would not continue to pay because the purpose of the tax is to cover water purification costs. Once water purification costs are zero, there is no reason to continuing charging the tax.

[248] Establishing causation would be difficult for the same reasons that implementing NPDES permitting would be difficult. *See supra* notes 236–38 and accompanying text (explaining the practical challenges to applying standard NPDES permitting to farms).

[249] The real world scenario is further complicated by the fact that farms are not the only source of nonpoint source pollution. *See* OFFICE OF WETLANDS, OCEANS & WATERSHEDS, *supra* note 34, at 8 & fig.A-1.

[250] *See* Christopher R. Kelley, *Agricultural Production Contracts: Drafting Considerations*, 18 HAMLINE L. REV. 397, 397–98 (1995). Production contracts are agreements for growing crops, poultry, and livestock that

> typically contain provisions covering the crop's entire production process, often specifying planting periods, husbandry practices, and other matters intended to ensure delivery of a certain quality and quantity of the crop to the purchaser. Livestock and poultry production contracts also typically specify the standards that must be satisfied during the production period covered by the contract.

Id. at 397.

[251] James M. MacDonald, *Trends in Agricultural Contracts*, CHOICES, 3d Quarter 2015, at 1, 3 tbl.1, http://www.choicesmagazine.org/UserFiles/file/cmsarticle_461.pdf [https://perma.cc/B5ET-74YS] (stating that 84% of poultry, 74% of hogs, 57% of peanuts, and 50% of fruits, nuts, and berries are under production contracts).

A second, and preferable, option would be to switch the default rule from end-of-line purification to pollution prevention. Such a property rule would require that farmers reduce their pollution levels but leaves open the possibility that, in at least some circumstances, water utilities should continue to pay for prevention costs. A property rule would ensure the full range of benefits including drinking water benefits and ancillary benefits, but would allow flexibility to allocate costs fairly.

There are a few reasons to think that farmers might not be in the best position to bear the cost of pollution reduction. First, most farmers are price takers.[252] In other words, they can sell at the price set by the market or not at all. They cannot charge more even if their costs increase. To the extent that certain categories of farmers produce essential goods but would not be economically viable if required to cover the cost of water pollution, then some cost spreading may be desirable.

Second, larger water utility systems, which have the ability to spread costs over a large number of ratepayers, may be better positioned than farmers to absorb increased costs.[253] In these circumstances, farmers should reduce their pollution, but water utilities, and thus municipal water users, should contribute all or part of the cost.[254]

By contrast, smaller water systems, particularly those in low-income rural areas, are not well positioned to bear the costs of pollution prevention. In these systems, even small increases in overall system costs may lead to significant per user increases that quickly exceed standards for water affordability.[255] For these smaller systems shifting all or even some pollution prevention costs to ratepayers would raise environmental justice concerns, and costs should be borne by the water utility only if covered by federal grant and thus spread out over all taxpayers.[256]

A pollution prevention default should also remain exactly that, a default. The juxtaposition of agriculture with drinking water systems raises an important question about the compatibility of food production and source

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[252] *See* Robert J. Myers et al., *A Century of Research on Agricultural Markets*, 92 AM. J. AGRIC. ECON. 376, 378 (2010) (summarizing existing research and describing effects of competition and consolidation at the processing level).

[253] This is a pragmatic idea that beneficiaries of environmental benefits such as clean water should, if in a position to do so, contribute to the maintenance of that benefit.

[254] This is an application of Guido Calabresi and A. Douglas Melamed's "rule four." *See* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1116–23 (1972). Under this rule, the municipal water utility has an entitlement to be free from agricultural water pollution, but must pay to exercise it. *See id.* at 1116.

[255] *See supra* notes 226–29 and accompanying text (describing the affordability measure and explaining its significance).

[256] Of course, a rule that determined cost allocation on the basis of ability to pay and capacity for cost spreading would itself be costly to implement. State-level management to determine when to shift costs could help. *See infra* Part IV.B.3.b.i (calling for more robust state source water protection and nonpoint source pollution controls).

water protection. Even agriculture with the best environmental stewardship may not always be compatible with source water protection.[257] An absolute rule would suggest that where there is a fundamental incompatibility, drinking water should win out, and agriculture should be suspended in that area. But such an inflexible rule ignores the importance of food production. Fertile land is itself a limited resource, and where prime farmland and source water are adjacent to one another, reliance on end-of-line cleanup rather than complete pollution prevention may be preferable.

Further, it will not always be true that pollution prevention will be less expensive than end-of-line cleanup. Particularly where farmers have already implemented some pollution prevention measures, imposing additional pollution prevention obligations may exceed the combined cost of end-of-line cleanup and other collateral consequences of pollution. In such circumstances, the default should shift.

Nevertheless improving environmental stewardship, even where it would not eliminate the need for end-of-line clean up, should remain the goal, relegating end-of-line clean up to its more appropriate role of fail safe measure rather than first line of defense. The question remains as to what types of regulatory tools can most effectively achieve this shift. Part IV takes up that question.

IV. ESTABLISHING A MITIGATION NORM

Water utilities facing rising compliance costs are not without options. Indeed, in some narrow circumstances, existing environmental law provides utilities a cause of action against farms. Although none of these litigation options shift the status quo end-of-line clean up to pollution prevention, they can shift obligations between particular water systems and their neighboring farms.

This Part begins with an exploration of those options, concluding that they may provide limited relief, particularly where plaintiffs can identify defendants other than farmers, but, as a whole, they are inadequate to protect the efficiency and equity interests identified in Part II.A above. Instead, a new approach is necessary. The interaction between the SDWA and the CWA must be understood in the broader context of the food system. The agriculture industry has been very successful at curbing federal environmental regulation.[258] Among the industry's wide-ranging rhetoric is the argument that

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[257] In other words, in many places the only way to obtain a filtration avoidance certificate may be to suspend agriculture all together.

[258] *See* MEGAN STUBBS, CONG. RESEARCH SERV., R41622, ENVIRONMENTAL REGULATION AND AGRICULTURE 15 (2014), http://fas.org/sgp/crs/misc/R41622.pdf [https://perma.cc/H8CH-PP67].

meager regulation generates the benefit of cheap food, which all enjoy.[259] But letting agriculture generate environmental externalities in the name of cheap food is less justifiable—if it was ever justifiable—if the spillover cost is expensive water.[260]

Scientists have long recognized the importance of watershed level management, and interjurisdictional fighting over responsibility for source water protection hinders efforts at cooperation that is essential to that management. Although states may be well-positioned to engage in watershed level management, water utilities with the primary responsibility for provision of clean drinking water are not. The best way forward involves both empowering water utilities to adequately protect their source waters and revoking the special status of farms in environmental law.

A. *Requiring Mitigation Under Existing Law*

Part II.A described cost spreading tools built into the SDWA framework. These include state and federal funding for infrastructure development and technical support for both infrastructure development and source water management.[261] But, in some narrow circumstances, cash-strapped water utilities have an additional option: litigation against source water polluters. This Part explores the scope of this option, considering the potential for suit under SDWA, the CWA, the Resource Conservation and Recovery Act (RCRA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and state nuisance and trespass law. Although these options might provide some financial relief or even force pollution prevention, the constraints on these litigation tools make them a limited option. They allow a move away from the default in a narrow set of extreme circumstances, but they do not change the default. This Part concludes that litigation may be a good option where water utilities can identify defendants, such as food processors or farm input manufacturers, who have the resources to cover water utility costs and the authority to make systemic changes in

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[259] *See, e.g.*, ANNE WEIR SCHECHINGER & CRAIG COX, ENVTL. WORKING GRP., FEEDING THE WORLD: THINK U.S. AGRICULTURE WILL END WORLD HUNGER? THING AGAIN 3 (Oct. 2016), https://static.ewg.org/reports/2016/feeding_the_world/EWG_FeedingTheWorld.pdf?_ga=1.267200973.2102012507.1485472875 [https://perma.cc/Y3UT-XJWM]; *see also* Chen & Adams, *supra* note 114, at 377 (identifying the status of the family farm as another justification for current legal treatment of agriculture).

[260] Another way to think about this is that water contamination is itself a food safety issue. Water safety law thus suffers from a similar critical flaw as the recent food safety modernization. Neither statute adequately addresses sources of cross contamination. Just as SDWA provides no mechanism to address nonpoint source pollution, 42 U.S.C. §§ 300f–300g (2012), the Food Safety Modernization Act provides inadequate mechanisms to protect leafy greens and other fresh produce from contaminated runoff from concentrated animal feeding operations, *see* FDA Food Safety Modernization Act, Pub. L. No. 111-353, 124 Stat. 3885 (2011) (codified as amended in scattered sections of 21 U.S.C.).

[261] *See supra* Part II.A.

farming practices. Where such a defendant is not available, however, litigation is less desirable.

1. *SDWA Citizen Suits and Imminent and Substantial Endangerment Suits*

SDWA provides for three types of enforcement litigation: citizen suits against water utilities for failure to comply with state and federal requirements,[262] citizen suits against the EPA for failure to fulfill statutory obligations,[263] and EPA suits against firms and individuals whose actions pose "an imminent and substantial endangerment" to drinking water.[264] Only this third category serves to impose pollution prevention obligations on farmers.

SDWA limits the authority to bring endangerment suits to the EPA itself. Neither states, nor water utilities, nor water users may bring these suits.[265] The original purpose of the provision was to provide a federal backstop where state and local authorities were not taking adequate action to protect the public health.[266]

Endangerment suits also suffer from several other limitations. First is the EPA's limited resources.[267] Indeed, the EPA brings only a handful of these suits per year.[268] Second is the standard for making a claim. Although courts reviewing administrative orders apply an arbitrary and capricious standard,

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[262] 42 U.S.C. § 300j-8.

[263] *Id.*

[264] *Id.* § 300i(a) (giving the EPA authority to enjoin activities "upon receipt of information that a contaminant which is present in or is likely to enter a public water system or an underground source of drinking water . . . which may present an imminent and substantial endangerment to the health of persons").

[265] *See id.* Perhaps one justification for withholding this authority from states is that states are free to regulate source water contamination by other means. *See infra* Part IV.B.3.b.i (discussing potential for expanded state law regulation in this area). Indeed, four states—Alabama, Maryland, Montana, and Wyoming—have delegated authority to their environmental agencies to bring enforcement actions against farms that pollute water bodies in violation of state water quality standards, but the relevant agencies in all four states have declined to exercise that power, instead presenting farms with a range of voluntary pollution reduction measures. *See* CRAIG & NOTO, *supra* note 167, at 8.

[266] H.R. REP. NO. 93-1185, at 35 (1974) (explaining inclusion of the statutory requirement that the EPA Administrator exercise his emergency powers only on a finding that state and local entities were taking no adequate action to protect the public health), *as reprinted in* 1974 U.S.C.C.A.N. 6454, 6486–87.

[267] David L. Markell & Robert L. Glicksman, *Dynamic Governance in Theory and Application, Part I*, 58 ARIZ. L. REV. 563, 594–603 (2016) (explaining that the EPA's budget declined over a period in which its responsibilities increased significantly).

[268] The EPA's online docket database shows about five emergency administrative orders per year, but this database in not complete. *See generally EPA Administrative Enforcement Dockets: Dockets by Statute SDWA*, U.S. ENVTL. PROTECTION AGENCY, https://yosemite.epa.gov/oa/rhc/epaadmin.nsf/Dockets+By+Statute?OpenView&RestrictToCategory=SDWA [https://perma.cc/NBB9-JYHR] (last updated Nov. 26, 2016).

they impose a heavy burden on the Agency to establish that there is a threat to health and that the ordered action will remedy that threat.[269] Finally, while the EPA occasionally orders cleanup, its enforcement orders more often require monitoring, and, in the case of contamination, provision of alternate sources of water, such as bottled water.[270]

Nevertheless, one recent prominent example demonstrates that, if employed strategically, this tool could be honed to curb agricultural nonpoint source pollution. In 2013, the EPA entered into a consent decree with five dairies in Yakima Valley, Washington.[271] The EPA found that manure management practices at the dairies, including lagoon storage and field spraying, were contaminating local drinking water supplies and ordered the five dairies to provide alternative water sources to neighbors with private wells, establish monitoring programs, and adopt a number of specific manure management best practices.[272]

Despite the potential of endangerment suits as a powerful regulatory tool in extreme instances, it is unlikely to lead to widespread change because of limitations on the EPA's resources.[273] The EPA simply cannot undertake a systematic campaign of suing farmers on drinking watersheds.

2. *CWA Citizen Suits*

Although the Clean Water Act provides a powerful litigation tool where contamination comes from CAFOs, which are considered point sources and thus subject to NPDES permitting requirements, litigation options related to nonpoint sources are extremely limited. Creative litigants are left with two options. First, if source drinking water is impaired in violation of state water quality standards and the state has not developed an adequate TMDL, a water utility could sue to force the state to do so.[274] This is a limited remedy. Once

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[269] United States v. Price, 688 F.2d 204, 211 (3d Cir. 1982) (articulating the standard for issuing an injunction under 42 U.S.C. § 300i). But it is important to note that very few of these cases are ever challenged in court. A search in Westlaw for cases regarding imminent and substantial endangerment orders reveals only about ten cases.

[270] *See, e.g.*, Trinity Am. Corp. v. U.S. Envtl. Prot. Agency, 150 F.3d 389 (4th Cir. 1998) (upholding an enforcement order requiring a polyurethane foam plant to engage in systematic water sampling in a three-fourth mile radius from its property and provide bottled water on the finding of contamination exceeding drinking water standards). Many also contain water boil advisories. *See, e.g.*, Emergency Administrative Order, *In re* Mountain Vill. Parks, Inc., No. SDWA-08-2014-0008 (U.S. E.P.A. Region 8, Mar. 7, 2014).

[271] Administrative Order on Consent ¶ 1, *In re* Yakima Valley Dairies, No. SDWA-10-2013-0080 (U.S. E.P.A. Region 10, Mar. 19, 2013).

[272] *Id.* ¶¶ 10, 11, 13.

[273] It may simply be that the EPA prefers to use other mechanisms to achieve cleanup. This could explain why the EPA has yet to issue an emergency administrative order to address the lead contamination crisis in Flint, Michigan.

[274] Pronsolino v. Nastri, 291 F.3d 1123, 1124 (9th Cir. 2002).

the TMDL is in place, the CWA provides no mechanism for its enforcement.[275]

A TMDL may, however, provide a vehicle for development of enforceable state pollution reduction plans. For instance, in developing the Chesapeake Bay TMDL, a multistate planning document aimed at reducing loads of nitrogen, phosphorous, and sediment throughout the Chesapeake Bay, the EPA required that states provide "reasonable assurance[s]" that target pollution reductions would be met.[276] Explaining the "reasonable assurance" framework, the EPA says that, where a water body is impaired only by point sources,

> the existence of the [NPDES] regulatory program and the issuance of an NPDES permit provide the reasonable assurance that the [waste load allocations] in the TMDL will be achieved. . . .
>
> [But] [w]here a TMDL is developed for waters impaired by both point and nonpoint sources, in EPA's best professional judgment, determinations of reasonable assurance that the TMDL's [load allocations] will be achieved could include whether practices capable of reducing the specified pollutant load: (1) exist; (2) are technically feasible . . . ; and (3) have a high likelihood of implementation.[277]

The EPA was unsatisfied by those assurances regarding Pennsylvania urban stormwater and West Virginia agriculture, so "it imposed a 'backstop adjustment,' meaning that it will require greater reductions from point sources in Pennsylvania and West Virginia if those states cannot meet their projected load allocations."[278] Thus, while a TMDL itself may provide no enforceable mechanism for pollution reduction on farms, the TMDL process may lead to such reduction.

Second, a water utility or citizen group could attempt to characterize as a point source a source that has historically been treated as a nonpoint source. Perhaps the best recent example of this phenomenon is the suit described in the introduction.[279] Although the farms that are the source of drinking water contamination in Des Moines, Iowa are traditional nonpoint sources, they use tile drainage, a subsurface infrastructure designed to draw water away from the

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[275] *See* Am. Farm Bureau Fed'n v. U.S. Envtl. Prot. Agency, 792 F.3d 281, 291 & n.4 (3d Cir. 2015) (explaining that TMDLs are not self-executing documents, rather they are information tools to guide future pollution controls), *cert. denied*, 136 S. Ct. 1246 (2016) (mem.).

[276] *Id.* at 291–92.

[277] U.S. ENVTL. PROT. AGENCY, CHESAPEAKE BAY TMDL § 7.1 (Dec. 2010), https://www.epa.gov/sites/production/files/2014-12/documents/cbay_final_tmdl_section_7_final_0.pdf [https://perma.cc/RJ23-RY85].

[278] *Am. Farm Bureau Fed'n*, 792 F.3d at 292.

[279] *See supra* Part I.

root zone.[280] In its suit, the Des Moines Water Works sued not individual farmers but a group of thirteen drainage districts that collectively maintain the tile drainage system on behalf of farmers.[281] The Des Moines Water Works charges that these drainage districts illegally "discharge nitrate pollution into Raccoon River" without a NPDES permit.[282] The Water Works argues that tile drainage is a point source because it transports very little irrigation return flow.[283] With regard to stormwater, the Water Works asserts that the stormwater is not responsible for significant amounts of nitrate leaching.[284] Instead, the drainage system itself, which "artificially lowers the water table by removing water from the saturated zone and expanding the volume of soil in which mineralization of organic matter, including plant residues and manure[,] can generate nitrate in the unsaturated zone."[285] In other words, the water carrying nitrates into the Raccoon River is naturally occurring groundwater. According to the complaint, because neither irrigation return flow nor storm water runoff is the primary mechanism of nitrogen transport from farm fields to the Raccoon River, the Clean Water Act's agricultural carveout does not apply, and the only question is whether the drainage system creates a "discrete conveyance."[286]

If this novel claim succeeds, it could change the landscape for regulation of agricultural water pollution and provide a model for other water utilities around the country. A holding favorable to the Des Moines Water Works would, however, be limited by some of the essential facts of this case: The

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[280] *See generally* DON HOFSTRAND, IOWA STATE UNIV. EXTENSION & OUTREACH, UNDERSTANDING THE ECONOMICS OF TILE DRAINAGE (July 2010), https://www.extension.iastate.edu/agdm/wholefarm/pdf/c2-90.pdf [https://perma.cc/4HFE-QEHD].

[281] Bd. of Water Works Complaint, *supra* note 4, ¶ 1.

[282] *Id.* The Complaint also states claims for public nuisance, *id.* ¶¶ 217–233, statutory nuisance, *id.* ¶¶ 234–241, private nuisance, *id.* ¶¶ 242–245, trespass, *id.* ¶¶ 246–252, negligence, *id.* ¶¶ 253–261, inverse condemnation, *id.* ¶¶ 262–275, and violation of the Due Process and Equal Protection Clauses, *id.* ¶¶ 276–282.

[283] *Id.* ¶ 135.

[284] *Id.* ¶ 152.

[285] *Id.* ¶ 147. Nitrate is a byproduct of decomposition of organic matter. *Chapter 1, The Decomposition Process*, TEX. A&M AGRILIFE EXTENSION, http://aggie-horticulture.tamu.edu/earthkind/landscape/dont-bag-it/chapter-1-the-decomposition-process/ [https://perma.cc/PTL7-WAT9] (last revised Feb. 2009).

[286] Bd. of Water Works Complaint, *supra* note 4, ¶¶ 145–147, 160–167; *see also* 33 U.S.C. § 1362(14) (2012) (defining point source). In a recent case in the U.S. District Court for the Eastern District of California, a district court judge rejected a similar argument, finding that the tile drainage was an integral part of the irrigation system and that tile drainage discharges constituted irrigation return flows except to the extent they channelized waters "not related to crop production." Pac. Coast Fed'n of Fishermen's Ass'ns v. Glaser, No. CIV S-2:11-2980-KJM-CKD, 2013 WL 5230266, at *12, *16 (E.D. Cal. Sept. 16, 2013). *Pacific Coast Federation of Fishermen's Associations* can potentially be distinguished on the ground that the fields in the Des Moines drainage districts are not irrigated. *See* Bd. of Water Works Complaint, *supra* note 4, ¶¶ 178, 212.

agricultural region is dependent on tile drainage systems,[287] and the water flowing through those systems is primarily existing groundwater.[288]

3. *The Toxic and Solid Waste Statutes*

The RCRA governs the storage, transportation, and disposal of solid and hazardous waste.[289] Historically, it has had little import for agriculture because most agricultural pollutants are not characterized as hazardous and are thus not subject to the statute's permitting requirements[290] and because many normal farming practices are exempt from the statute's solid waste open dumping prohibition.[291]

A recent case, however, expands RCRA's reach onto farms. In *Community Association for Restoration of the Environment, Inc. v. Cow Palace*, a suit involving some of the same dairies as the Yakima Valley endangerment suit described in Part III.A.1 above, a District Court in Washington State held that manure application could be subject to RCRA requirements.[292] The case

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[287] Tile drainage is common in states in the Mississippi River Basin. Although limited data exists, USDA data suggests that in some states as much as 50% of cropland has subsurface drainage systems. ZACHARY SUGG, WORLD RES. INST., ASSESSING U.S. FARM DRAINAGE: CAN GIS LEAD TO BETTER ESTIMATES OF SUBSURFACE DRAINAGE EXTENT? 5 (2007), http://www.wri.org/sites/default/files/pdf/assessing_farm_drainage.pdf [https://perma.cc/NG37-FW5P]. For maps of areas reliant on tile drainage, see D.B. JAYNES & D.E. JAMES, U.S. DEP'T OF AGRIC., THE EXTENT OF FARM DRAINAGE IN THE UNITES STATES figs.2, 3, 4, 5 & 6, http://www.ars.usda.gov/SP2UserFiles/Place/50301500/TheExtentofFarmDrainageintheUnitedStates.pdf [https://perma.cc/FTK2-FENU].

[288] The trial is scheduled for summer 2017. Bd. of Water Works Trs. v. Sac Cty. Bd. of Supervisors, No. 5:15-cv-04020 (N.D. Iowa May 12, 2016) (order resetting bench trial, final pretrial conference, and requirements for the proposed final pretrial order). Motions for summary judgment are currently pending.

[289] 42 U.S.C. § 6902 (2012) (explaining the objectives and policies of the RCRA).

[290] *See* 40 C.F.R. § 261.4(b)(2) (2015) (excluding from the definition of hazardous waste any harvested agricultural crops or animal manures that are "returned to the soils as fertilizers").

[291] Irrigation return flows are expressly excluded from the definition of solid waste. 42 U.S.C. § 6903(27); 40 C.F.R. § 261.4(a)(3); *see also* Ruhl, *supra* note 8, at 314 (describing additional RCRA exemptions for normal farming activities). For an example of a water utility suing an upstream polluter under RCRA outside of the agricultural context, see *Little Hocking Water Ass'n v. E.I. Du Pont de Nemours & Co.*, 91 F. Supp. 3d 940, 953–55 (S.D. Ohio 2015), which held that the water district had standing to pursue a RCRA claim.

[292] Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC, 80 F. Supp. 3d 1180, 1225 (E.D. Wash. 2015) ("[N]o reasonable trier of fact, upon reviewing the record here, could dispute that Defendants' excessive application of manure onto agricultural fields, untethered to the [Dairy Nutrient Management Plan] or the fertilization needs of the crops; and storage and composting of manure in ways that result in dangerous accumulations of nitrate in the environment, transformed its manure, an otherwise beneficial and useful product, into a discarded material and thus a RCRA solid waste."), *motion to certify appeal denied*, No. 2:13-CV-3016-TOR, 2015 WL 403178 (E.D. Wash. Jan. 28, 2015).

turned on the central question of whether manure held in lagoons or applied to fields was "discarded" and could thus be characterized as solid waste.[293] The court held that, where manure application exceeded a field's carrying capacity (in other words, when too much was applied), it did indeed constitute solid waste.[294] The court also held that the Dairy's manure management practices constituted a "substantial and imminent endangerment" to health or the environment.[295] The court reserved remedial issues for trial,[296] and the parties subsequently settled on that question.[297]

Cow Palace provides a road map for both water utilities and environmental NGOs seeking to curtail manure-related farm excesses.[298] Robust use of RCRA suits could play an important role in addressing nitrate (and other manure-related) contamination in drinking water, but it has no direct bearing on contamination from other types of farming practices. Further, because the burden of proof lies with the plaintiff to establish that manure application exceeds standards of care, such suits do not switch the default rule from end-of-line cleanup to pollution prevention.

Like RCRA, CERCLA has not traditionally been a powerful legal tool to respond to farm-related contamination. The statute "does not impose liability for any response costs resulting from application of FIFRA-registered pesticides, and excludes the 'normal application of fertilizer' from remediation and liability provisions."[299] Some courts have, however, suggested that excessive application would not be "normal."[300]

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[293] *Id.* at 1187.

[294] *Id.* at 1224. The court also examined the other criteria required to find that the Dairy was engaged in illegal open dumping, and found either that they were met or that there were genuine issues of material fact to be addressed at trial. *Id.* at 1218–19, 1225–27 (laying out the elements of an open dumping claim and finding that the Dairy was contaminating the environment "beyond the solid waste boundary" (quoting 40 C.F.R. § 257.3-4(a))).

[295] *Id.* at 1230.

[296] *Id.*

[297] [Proposed] Consent Decree at 2, Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC, No. CV-13-3016-TOR (E.D. Wash. May 11, 2015).

[298] But as the case itself demonstrates, repetition may be an uphill battle. Both the plaintiffs and the court relied heavily on the existence of the EPA's prior emergency administrative order, which provided much of the data and the endangerment finding upon which plaintiffs rested their claim. *E.g.*, *Cow Palace*, 80 F. Supp. 3d at 1199, 1202–03, 1210, 1216.

[299] Ruhl, *supra* note 8, at 315 (footnote omitted) (quoting 42 U.S.C. § 9601(22) (1994)) (citing 42 U.S.C. § 9607(i)).

[300] *See, e.g.*, City of Tulsa v. Tyson Foods, Inc., 258 F. Supp. 2d 1263, 1287–88, 1287 n.15 (N.D. Okla. 2003) (discussing a Senate Report explaining that the exclusion for the "normal field application" of fertilizer refers to "the act of putting fertilizer on crops or cropland, and does not mean any dumping, spilling, or emitting, whether accidental or intentional, in any other place or of significantly greater concentrations or amounts than are beneficial to crops" (quoting S. REP. NO. 96-848, at 46 (1980))), *vacated pursuant to settlement* (July 16, 2003); *see also* City of Waco v. Schouten, 385 F. Supp. 2d 595, 602

4. *State Law Nuisance and Trespass Actions*

In addition to the above-described federal statutory causes of action, water utilities may also be able to bring state nuisance and trespass actions.[301] For example, in *City of Tulsa v. Tyson Foods, Inc.*, Tulsa, Oklahoma sued various poultry processors claiming that poultry waste from factory farms was contaminating the drinking water supply and alleging intentional nuisance and trespass.[302] Although the decision was ultimately vacated due to a settlement, the Northern District of Oklahoma held that the water utility had a property interest in its source water and the right, as a public agency, to bring a public nuisance claim on behalf of the residents of Tulsa.[303]

(W.D. Tex. 2005) (concluding that release of fertilizer into waterways resulting from "improperly stor[ing] large amounts of [animal] waste . . . and . . . fail[ing] to properly maintain these waste storage areas" would not be "normal application of fertilizer").

[301] Some state common law actions may be preempted. For instance, in *Feikema v. Texaco, Inc.*, the Fourth Circuit Court of Appeals held that a federal consent order requiring the defendant to take remedial action to address imminent and substantial endangerment pursuant to the RCRA preempted a state common law cause of action seeking injunctive relief for the same endangerment, but not an action seeking damages. Feikema v. Texaco, Inc., 16 F.3d 1408, 1418 (4th Cir. 1994). The federal Clean Water Act does not preempt state common law claims. Int'l Paper Co. v. Ouellete, 479 U.S. 481, 500 (1987). The statute does, however, preempt interstate suits brought under federal common law. City of Milwaukee v. Illinois, 451 U.S. 304, 327–29 (1981) (holding that the Clean Water Act preempted interstate nuisance claims under federal common law). Interstate suits, by state or private parties, can be brought under state law provided that they are brought under the law of the source state. *See id.* (holding that the Clean Water Act preempted the common law of an affected state where that state, or a citizen of that state, attempts to impose liability on a point source in another state).

[302] *Tyson Foods*, 258 F. Supp. 2d at 1270. There are numerous other examples, many of which involve chemical companies and manufacturers. *See, e.g.*, Suffolk Cty. Water Auth. v. Dow Chem. Co., 991 N.Y.S.2d 613, 618 (N.Y. App. Div. 2014) (denying motions for summary judgment).

[303] *Tyson Foods*, 258 F. Supp. 2d at 1289–90; *see also Schouten*, 385 F. Supp. 2d at 604 (finding the plaintiff's allegation that the defendant dairies had polluted Lake Waco, diminishing drinking water quality and increasing the costs of treating that water, sufficient to state claims of negligence per se and trespass). The Des Moines Water Works also alleged a variety of state law claims including statutory nuisance, private nuisance, public nuisance, and trespass as part of its complaint against neighboring agricultural irrigation districts. *See* Bd. of Water Works Complaint, *supra* note 4, ¶¶ 233, 241, 245, 252. In January 2016, the district court certified several questions to the Iowa Supreme Court regarding the legal nature of the drainage districts. Bd. of Water Works Trs. v. Sac Cty. Bd. of Supervisors, No. 5:15-cv-04020-MWB (N.D. Iowa Jan. 11, 2016) (order certifying questions to the Iowa Supreme Court). Litigation of claims related to this issue is stayed pending reply. *Bd. of Water Works Trs.*, No. 5:15-cv-04020-MWB (N.D. Iowa Jan. 19, 2016) (order on motion to stay district court proceedings pending certification of questions to the Iowa Supreme Court). Courts have consistently found that water utilities have property interests in their source waters. *See, e.g.*, City of Greenville v. Syngenta Crop Prot., Inc. (*Syngenta I*), 756 F. Supp. 2d 1001, 1011 (S.D. Ill. 2010) ("[P]laintiffs . . . have rights to possess water from their raw water sources in order to use the raw water to

In *City of Greenville v. Syngenta Crop Protection, Inc.*, a class of 1,930 drinking water providers bypassed agricultural polluters and brought their claim directly to Syngenta, the producer of the herbicide atrazine.[304] The plaintiffs in the suit alleged that Syngenta had sold atrazine to farmers "knowing it had great potential to run off of crop land and into bodies of water, including the bodies of water from which water providers like the plaintiffs draw their raw water" and asserted causes of action for trespass, public nuisance, and negligence.[305] The parties settled the case for $105 million, to cover plaintiffs' costs to test for, monitor, and treat atrazine in their water sources.[306]

One potential limitation on these suits is state right-to-farm laws, which protect agricultural lands from nuisance suits.[307] Particularly in regions with more recently established public water utilities, statutory right-to-farm laws may limit the effectiveness of nuisance suits. These laws codify first-in-time common law nuisance principles, creating a complete defense to nuisance where the farm was in operation prior to the initiation of the plaintiff's property right.[308] Although these statutes have been tested, for the most part, in the context of residential housing development, it seems likely that they may also curtail nuisance suits where a newer water utility, or an older water utility cultivating a newer source of drinking water, attempts to sue a preexisting farm.[309]

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provide finished, potable water to the public."). While this Article was being finalized for print, the Iowa Supreme Court issued an opinion answering the certified questions concluding, among other things, that Iowa irrigation drainage districts are immune from suit for the state common law and constitutional claims, and that the Board of Water Works does not have a protectable property interest. Bd. of Water Works Trs. v. Sac Cty. Bd. of Supervisors, No. 16-0076, 2017 WL 382402 (Iowa Jan. 27, 2017).

[304] City of Greenville v. Syngenta Crop Prot., Inc. (*Syngenta II*), 904 F. Supp. 2d 902, 904, 907–08 (S.D. Ill. 2012) (approving the settlement and authorizing attorney's fees for class counsel); *see also supra* notes 110–13 and accompanying text (describing the problem of atrazine contamination).

[305] *Syngenta I*, 756 F. Supp. 2d at 1004. Plaintiffs also brought a strict liability for manufacturing claim under Indiana law, but that claim was dismissed. *Id.* at 1009–10.

[306] *Syngenta II*, 904 F. Supp. 2d at 905.

[307] *See* Terence J. Centner, *Governments and Unconstitutional Takings: When Do Right-to-Farm Laws Go Too Far?*, 33 B.C. ENVTL. AFF. L. REV. 87, 87–88 (2006).

[308] *Id.* at 95–98.

[309] *Id.* app. 1 (listing right to farm statutes by state); Margaret Rosso Grossman & Thomas G. Fischer, *Protecting the Right to Farm: Statutory Limits on Nuisance Actions Against the Farmer*, 1983 WIS. L. REV. 95, 98; Alexander A. Reinert, Note, *The Right to Farm: Hog-Tied and Nuisance-Bound*, 73 N.Y.U. L. REV. 1694, 1694–95 (1998); *see also* Dalzell v. Country View Family Farms, LLC, No. 1:09-cv-1567-WTL-MJD, 2012 WL 4052263, at *1–2 (S.D. Ind. Sept. 13, 2012) (holding that the feedlot was protected by the right-to-farm despite the fact that the residential neighbors moved in before the farm was converted to a pig feedlot), *aff'd*, 517 F. App'x 518 (7th Cir. 2013) (mem.).

5. *Some Conclusions*

These litigation options can provide some relief for water utilities. Indeed, in certain circumstances, they could present a complete solution for individual water utilities seeking to add source water cleanup to their safe drinking water arsenals. From a systemic perspective, litigation may be its most effective in circumstances where utilities are able to identify a defendant or class of defendants other than farmers themselves. For instance, in *City of Tulsa v. Tyson Foods Inc.*, the city sued not individual poultry producers, but Tyson Foods and several other companies that were contracting for poultry production.[310] These companies are in a position to change poultry raising practices on large numbers of farms by altering the terms of their production contracts. Likewise, in *City of Greenville v. Syngenta Crop Protection, Inc.*, the class sued Syngenta, the atrazine manufacturer, rather than individual farmers who had applied atrazine to their crops.[311] Finally, in *Board of Water Works v. Sac County Board of Supervisors*, the city sued a series of drainage districts rather than individual farmers.[312] These types of defendants offer not only deeper pockets but also avenues for more comprehensive solutions. Further, shifting liability to corporations such as Tyson Foods reduces the equity concerns that might follow from shifting liability to individual farmers.[313]

But litigation by no means constitutes a comprehensive solution to the problems described in Part II.A, above. For many water utilities, no appropriate cause of action will be available. For others, litigation is an unappealing option. It is a solution with large upfront costs, potentially significant delays from detection of a contaminant to implementation of a clean up plan, and no guarantee of success, particularly with more creative litigation strategies. Even if litigation would ultimately be less expensive and more effective in the long term, a water utility seeking to come into compliance with federal drinking water standards as quickly as possible may nevertheless prefer to upgrade its treatment and filtration infrastructure. In other words, because litigation may take many years, a utility may prefer to invest in infrastructure rather than risk a lengthy term of noncompliance with federal standards.

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[310] City of Tulsa v. Tyson Foods, Inc., 258 F. Supp. 2d 1263, 1297 (N.D. Okla. 2003) (concluding that the defendants were vicariously liable for any trespass or nuisance created by their growers "because they were aware that in the ordinary course of doing the contract work, a trespass or nuisance was likely to result"), *vacated pursuant to settlement* (July 16, 2003).

[311] *Syngenta I*, 756 F. Supp. 2d 1001, 1004, 1110–11 (S.D. Ill. 2010).

[312] *See* Bd. of Water Works Complaint, *supra* note 4, ¶ 1.

[313] *See supra* notes 252–54 and accompanying text (explaining the challenges of shifting costs and responsibility to farmers when farmers have little control over their production practices and when farmers are price takers).

For most utilities, litigation is also beyond the scope of their usual activities; in other words, it may not be an option on the table because it is not something in which utilities have expertise. This hesitation to engage in litigation parallels the hesitation, described above, for water utilities to sink resources into source water protection.[314] Ultimately, water utilities are in the technocratic business of end-of-line cleanup.

Worse, the interplay between the Clean Water Act and the SDWA pits cities against agricultural areas and residential communities against farmers.[315] Where water utilities do choose to pursue source water cleanup, some may enter into cooperative relationships with their rural hinterlands, but others will take a more antagonistic path. This antagonism perpetuates the perception of an urban/rural dichotomy and obscures the mutually dependent relationship between the two that is the basis of a healthy food system.[316] Either a comprehensive protection for source water must come from other actors in the system, or the fundamental mission and structure of water utilities must be changed.

B. *Legal Reforms*

A strong and swift fix to this problem requires a suite of state and congressional actions. Although many of the following proposals are beyond political reach, some are more realistic. Thus this Part presents both an ideal fix and some practical second bests.

These solutions each function within existing regulatory frameworks but the overarching goal is a shift to a systems based approach to water management which recognizes not only that watersheds, the fundamental unit water systems, do not align well with political jurisdictions, but also that water is both an input and an output functioning within a closed system.[317] Any

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[314] *See supra* notes 207–09 and accompanying text (hypothesizing that water utility professional expertise in treatment and filtration helps create path dependency).

[315] The Des Moines Water Works litigation is itself an example of this, and it is not the only one. The cities of Waco, Texas and Tulsa, Oklahoma have also used litigation against its neighboring agricultural region as a tool to achieve cleaner drinking water. *See supra* notes 302–06 and accompanying text (describing this litigation). In an inverse example, the town of Hunter, New York sued New York City in a dispute over New York City's extrajurisdictional exercise of watershed control. Town of Hunter v. City of New York, 853 N.Y.S.2d 387, 388 (N.Y. App. Div. 2007) (holding that recreation restrictions on town water bodies were invalid because the New York City Department of Environmental Protection had failed to seek prior approval from the State Department of Health as required by state law).

[316] WILLIAM CRONON, NATURE'S METROPOLIS: CHICAGO AND THE GREAT WEST, at xiv–xv (Norton paperback ed. 1992).

[317] Calls for watershed level resource management are common in the natural resources literature. *See, e.g.*, Adler, *supra* note 7, at 855; Keith H. Hirokawa, *Driving Local Governments to Watershed Governance*, 42 ENVTL. L. 157 (2012) (discussing the importance and benefits of implementing watershed planning and management at the local

regulatory structure that looks only at one aspect of that system is necessarily incomplete.

The call for reform here thus draws on architect Hillary Brown's characterization of "next generation infrastructure": "[w]hereas the legacy of industrial-era infrastructure is one of independent, single-purpose assets and 'non-reimbursed,' or one-way flows, post-industrial solutions are modeled on the multifunctional, closed-loop exchanges characteristic of natural ecosystems. . . . [T]he first principle of the post-industrial paradigm: systems should be multipurpose, interconnected, and, ideally, synergistic."[318]

In the drinking water contexts, this means maximizing the benefits of infrastructure investment by focusing on "soft-path" water systems that "capture, store, treat, and re-utilize stormwater runoff at or near the site of use" and "rely on the movement of water through streambeds, plant material, and/or soil, where living organisms remove sediments and metabolize ('bioremediate') impurities, filtering and adsorbing [sic] pollutant molecules such as phosphates and nitrogen."[319] In other words, every farm could be its own wastewater manager and recycler. Or, to the extent this is inefficient or cost prohibitive, water utilities can facilitate development of regional soft-path water systems that provide both clean drinking water and generate other benefits including clean irrigation water, aquatic habitats, and recreational opportunities.

1. *CWA Amendment: Expanded NPDES Permitting*

Here, this Article joins the call for a rollback of the Clean Water Act's agricultural exceptions.[320] Application of the NPDES permit program could bring significant relief to water utilities and to particularly burdened ratepayers. The easiest way to do this would be to change the definition of point source to include at least some agricultural activities, particularly those that resemble point sources. Many forms of irrigation return flows and field drainage systems channelize both irrigation and stormwater runoff, creating

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level); Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity, and Dynamism*, 21 VA. ENVTL. L.J. 189, 190–92 (2002); J.B. Ruhl et al., *Proposal for a Model State Watershed Management Act*, 33 ENVTL. L. 929 (2003) (proposing a model watershed management act that would rely on a multi-tiered system of governance and state-level watershed management initiatives).

[318] HILLARY BROWN, NEXT GENERATION INFRASTRUCTURE: PRINCIPLES FOR POST-INDUSTRIAL PUBLIC WORKS 18 (2014). Brown offers two basic paths to implementing this principle: (1) "colocation," for instance, colocating multiple utilities in a single ditch to achieve efficiency; and (2) "coupling," which refers to "symbiotic exchanges across different infrastructural systems, whereby output from one system supports the functions of another." *Id.* at 18–19, 32.

[319] *Id.* at 70–71.

[320] *See supra* notes 8–9 (citing numerous sources).

the potential for measuring pollution outputs, and, if necessary, for installing on farm runoff filtration systems.[321]

Although many criticize pollution permitting systems, under both the CWA and other critical environmental statutes such as the Clean Air Act, as inflexible and outdated regulatory mechanisms that should not be expanded, a well-designed permitting program for farms could learn from these flaws.[322] Removing the agriculture exemption would subject millions of farms to the NPDES program but would not necessarily require that the EPA and state environmental agencies issue millions of new permits. Instead, relying on the general permitting power, the EPA and state agencies could categorize farms based on relevant factors such as size, crop type, regional hydrology, and proximity to drinking water sources.[323] The advantage of general permits is that they do not require each farm to apply for an individual permit, thus saving farmers the onerous task of drafting applications and state environmental agencies the time consuming burden of separately evaluating each application.[324] Issuing category-wide general permits for these categories, EPA could impose permit conditions that draw from the Agency's existing best management practices.[325] These conditions would rely on EPA's authority to issue process rather than performance standards.[326] The Agency might also carve out certain types of low risk farms.[327]

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[321] Changing farming practices by reducing inputs (fertilizers and pesticides) and building in natural filtration through field buffer zones would likely be preferable to runoff filtration, but the existence of a measurable effluent point also facilitates measurement for compliance.

[322] *See, e.g.*, Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 27–38 (2001) (critiquing command and control regulation for its inflexibility and inefficiency).

[323] Nat. Res. Def. Council, Inc. v. Costle, 568 F.2d 1369, 1380–82 (D.C. Cir. 1977) (explaining how general permits might be used to overcome challenges of applying NPDES to agriculture).

[324] *See* Eric Biber & J.B. Ruhl, *The Permit Power Revisited: The Theory and Practice of Regulatory Permits in the Administrative State*, 64 DUKE L.J. 133, 181–82 (2014) ("General permits are a way of reducing the fixed costs of permitting by making those costs less significant without necessarily relaxing the underlying substantive regulatory standards.").

[325] *See supra* notes 157–61 and accompanying text (describing EPA's existing work developing best practice guidelines).

[326] *Nat. Res. Def. Council*, 568 F.2d at 1380 (concluding that where effluent limitations were not enforceable, the EPA could impose process rather than performance standards). Although performance standards might be preferable because they would give farmers more flexibility, they may not always be feasible since non-point source pollution can be difficult to measure.

[327] Launching such a program would impose significant transition costs on farms and could force some farms out of business. *See generally* Bruce R. Huber, *Transition Policy in Environmental Law*, 35 HARV. ENVTL. L. REV. 91 (2011) (describing various types of transition relief in environmental law); Michael P. Van Alstine, *The Costs of Legal Change*, 49 UCLA L. REV. 789 (2002) (laying out the problem of transition costs and arguing that they ought to be taken into account in assessing merits of new programs).

The advantage of this type of reform is that it responds to the full scope of agricultural water pollution, not just that affecting drinking water supplies. This kind of Clean Water Act amendment is, however, unlikely to occur in the near future. Current fights over the scope of EPA's CWA jurisdiction suggest concern in Congress for any expansion of the Agency's authority, particularly with regard to agriculture. EPA's efforts to redefine "waters of the United States" (those waters subject to CWA regulation) have led to numerous congressional hearings and several proposed bills to contract EPA's authority.[328] Although CWA amendment should remain a part of reform discussion as a long-term goal, it is not politically realistic in the near term.

2. *SDWA Amendment*

SDWA reform boasts two political advantages over CWA reform. First, reforms need not impose additional express burdens either on drinking water utilities or on nonpoint sources. Instead, the proposed reforms empower drinking water utilities without singling out any type of polluter in particular. By contrast, compare this proposal to the CWA amendment discussed in the next Part, which would require eliminating the CWA's express carve out for agricultural interests. Second, the safety of drinking water is a concrete and salient concern. Even where agricultural interests oppose reforms, drinking water safety might rally support in a more concentrated way than is available in a generic fight between agricultural and environmental interests.

Amending SDWA could provide comprehensive relief for burdened water utilities and ratepayers. Two changes in particular could help shift the default from end-of-line clean up to source water protection and break the technocratic hold on SDWA implementation.

The first would build on the existing source water assessment program and mandate that states develop and implement federally enforceable source water protection programs. While leaving flexibility for states to design different kinds of programs, such an amendment would mandate that states meet certain minimum federal requirements, including identifying vulnerable areas and creating appropriate land use, fertilizer, and pesticide restrictions in those

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Some transition relief might be appropriate in this context but should come primarily in the form of giving regulated entities a reasonable amount of time to come into compliance. A good model might be that used in the Food Safety Modernization Act, which tiers compliance deadlines based on farm size. *See* 21 U.S.C. § 350h(b)(3) (2012).

[328] *See generally* CLAUDIA COPELAND, CONG. RESEARCH SERV., R43943, EPA AND THE ARMY CORPS' "WATERS OF THE UNITED STATES" RULE: CONGRESSIONAL RESPONSE AND OPTIONS (2016), https://www.fas.org/sgp/crs/misc/R43943.pdf [https://perma.cc/GYK4-GSCA] (summarizing political tug-of-war over the rule). In the final days of the Obama Administration, Congress passed and President Obama vetoed a resolution rescinding the WOTUS rule. Timothy Cama, *Obama Vetoes GOP Attempt to Block Water Rule*, HILL (Jan. 19, 2016), http://thehill.com/policy/energy-environment/266395-obama-vetoes-gop-attempt-to-block-water-rule [https://perma.cc/9GG6-VM29]. At the moment of this writing, the rule remains on the books.

areas. The amendment would also require that water utilities develop enforceable source water protection plans and provide funding to support those plans.

This amendment would shift SDWA priorities from filtration and treatment to source water protection as the first line of defense against drinking water contamination, continuing a trend that started with the 1996 SDWA amendments. Although those amendments provide few robust protections, they recognized the importance of source water protection.[329] The primary result of the 1996 amendments was to require states to gather data regarding source water. After twenty years of data collection, the time is ripe for putting that data to regulatory use. Such a shift would have benefits beyond agriculture and would allow water utilities and states to consider regulatory approaches for other sources of both point and nonpoint source pollution.

This proposed amendment would require EPA to set sourcewater protection targets for each state based on an assessment of existing data on noncompliance with federal drinking water standards and source of water contamination. Each state would then be required to submit a federally enforceable source water protection plan.[330] These plans could include a broad range of protection tools such as funding for land acquisition and easements, development restrictions in particularly sensitive watershed areas, fertilizer and pesticide application restrictions and/or permitting requirements, green payments for installation of buffer zones between cropland and waterways, and technical support for farmers and other nonpoint source polluters.[331]

A second critical change would be to extend SDWA imminent and substantial endangerment litigation authority to states, water utilities, and, perhaps most importantly, to ratepayers. This type of suit is arguably the most powerful of the litigation options described in Part III.A, and expanding its reach would allow ratepayers to take action where the EPA was unable to do so. Extending the right to ratepayers in particular, and not just to water utilities, could bypass the technocratic bias of water utilities. Allowing ratepayers to sue creates a parallel to NPDES CWA citizen suits, empowering communities to protect themselves from threats to public health.[332]

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[329] H.R. REP. NO. 104-741, at 3–4 (1996) (Conf. Rep.) ("[M]ore effective protection of public health requires . . . enhanced protection of source waters of public water systems").

[330] This would parallel the state implementation plan process under the Clean Air Act. *See supra* notes 157–69 and accompanying text. If a state chose not to develop a plan, EPA could develop one instead.

[331] Many states do some combination of these things already. *See, e.g.*, RIBAUDO ET AL., *supra* note 22, at 20 tbl.1-5 (identifying practices already in place in each state). This program would push states to accelerate these activities, prod recalcitrant states into action, and create the opportunity for federal enforcement.

[332] Plaintiffs in such suits might face considerable evidence gathering hurdles because they would need to identify source farms, prove that water contamination from those farms was reaching drinking water sources, and prove that those levels of contamination were causing endangerment to human health. *See supra* note 238.

3. *Farm Bill Amendment*

Passed about every five years since the Great Depression, the farm bill is omnibus federal legislation governing federal farm policy.[333] Its major farm-related components are commodity programs (providing subsidy support for commodity crop growers), conservation programs (providing funding to support improved environmental practices), crop insurance, and research support.[334] The multibillion dollar bill identifies federal priorities for the agricultural industry and plays a critical role in shaping farm practices both through the incentives subsidies create and through research and education programs.

Although the precise relationship between farm bill spending and agriculture's environmental impacts is not well understood, scholars agree that such a relationship exists.[335] And both environmental harms and benefits can be attributed to its various programs. For instance, modern programs aimed at reducing soil erosion likely played a role in a reduction in erosion levels in the 1980s and 1990s.[336] This Article calls for two drinking-water targeted farm bill reforms that would also generate other collateral benefits.

a. *Cross-Compliance (Conditional Subsidies)*

Cross-compliance, or conditioning receipt of farm subsidies on compliance with conservation requirements, has long been a feature of the farm subsidy system. Soil conservation, i.e. prevention of soil erosion, has been a central goal of the federal farm policy since the first farm bill was passed during the Great Depression.[337] Since 1985, the farm bill has conditioned receipt of commodity subsidies on compliance with basic "sodbuster" and "swampbuster" programs designed to limit farming on "highly erodible land" and to prevent future conversion of wetlands for farm

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[333] *See* RENÉE JOHNSON & JIM MONKE, CONG. RESEARCH SERV., RS22131, WHAT IS THE FARM BILL? 1, 3 fig.1 (2014).

[334] *Id.* at 2. The statute also includes the supplement nutrition assistance program, previously referred to as food stamps, and various other nutrition programs. *Id.*

[335] *See generally, e.g.*, George B. Frisvold, *How Federal Farm Programs Affect Water Use, Quality, and Allocation Among Sectors*, WATER RESOURCES RES., Nov. 25, 2004, http://onlinelibrary.wiley.com/doi/10.1029/2003WR002753/epdf [https://perma.cc/FZG9-AUQL].

[336] RIBAUDO ET AL., *supra* note 22, at 7 (crediting the Conservation Reserve Program and Conservation Compliance Programs and estimating that these programs may generate anywhere from several hundred million to several billion dollars' worth of benefits over their lives).

[337] *See generally Conservation Programs – An Overview*, NAT'L AGRIC. L. CTR., http://nationalaglawcenter.org/overview/conservation-programs/ [https://perma.cc/BNS8-JM85].

production respectively.[338] In 2014, cross-compliance requirements were extended to participation in federal crop insurance programs, which are surpassing direct payments and counter-cyclical payments as the primary farm safety net.[339]

Although the current requirements are minimal, requiring just an adequate "soil conservation plan" for sodbuster compliance, conditioning subsidies is theoretically a very powerful tool. For instance, under the Common Agricultural Policy in the European Union, cross-compliance includes a broad range of substantive obligations.[340] To be eligible for subsidies, farmers must adhere to more than a dozen mandatory statutory management requirements and must maintain "good agricultural and environmental condition[s]," which are otherwise voluntary.[341] Provisions include mandatory soil cover requirements, field boundary requirements, and restrictions on spreading fertilizers (including location restrictions and volume caps) in designated nitrate vulnerable zones.[342] These conditions, among other regulatory strategies, are partly responsible for the EU's achievement of ammonia reduction targets.[343]

Carefully targeted cross-compliance requirements could protect drinking water sources. Such provisions might include fertilizer application limits set by region, manure application limits, prohibition on fertilizer and manure application in periods directly before predicted rainfall, and field buffer zone requirements. Simple, and often low cost, changes to farming practices could significantly reduce drinking water contamination and have collateral benefits for aquatic ecosystems and other water use values.

As with the congressional actions described above, these kinds of reforms are not immediately politically feasible. The effort to extend current cross-compliance to crop insurance was a difficult and barely won political battle. But, particularly as farmers begin to feel the consequences of climate change, green farm bill programs, which have the added benefit of making farms themselves more resilient to severe weather, may become more palatable.

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[338] MEGAN STUBBS, CONG. RESEARCH SERV., R43504, CONSERVATION PROVISIONS IN THE 2014 FARM BILL (P.L. 113-79) 13–17 (2014) (explaining conservation compliance); FOOD & WATER WATCH & PUB. HEALTH INST., *supra* note 241, at 5–7 (documenting the modern history of farm subsidy programs).

[339] STUBBS, *supra* note 338, at 14.

[340] *Cross Compliance*, EUR. COMMISSION, http://ec.europa.eu/agriculture/direct-support/cross-compliance/index_en.htm [https://perma.cc/YK6L-F3CK] (last updated July 6, 2016).

[341] *Id.*

[342] *Id.*

[343] *Agriculture – Ammonia Emission Statistics*, EUROSTAT STAT. EXPLAINED, http://ec.europa.eu/eurostat/statistics-explained/index.php/Agriculture_-_ammonia_emission_statistics [https://perma.cc/SPK6-5XT6] (last modified Oct. 19, 2016). Ammonia is a common agricultural air and water pollutant. *See id.* As a water pollutant, it contributes to eutrophication. *Id.*

b. *Green Payment Programs*

Not all of the above proposed subsidy conditions are low cost. For many farms with small profit margins, compliance costs with above programs could be the difference between economic viability and bankruptcy.[344] A well-designed green payment program could cover some of these additional costs making the above programs more politically palatable and preserving farm-size diversity, which is essential to rural economic development.[345]

This approach draws on the ecological characterization of "farms as housing the natural capital capable of providing a stream of diverse good[s] and services, including ecosystem services such as increased biodiversity, carbon sequestration, pollination, groundwater recharge," and, importantly for this discussion, "improvement of water quality."[346] Rather than identifying farmers as polluters that must be reigned in, the green payment framework characterizers farmers as partners in a mutual endeavor to produce both adequate food and fiber and environmental benefits.[347]

Under the existing Conservation Stewardship Program, the USDA's Natural Resources Conservation Service makes payments to farmers for adopting a range of conversation practices on working farmlands.[348] This program was launched in 2002,[349] and reflected a change in policy from older conservation programs that paid farmers simply to take land out of

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[344] Many farms operate on very low profit margins. *See, e.g.*, U.S. FOOD & DRUG ADMIN., ANALYSIS OF ECONOMIC IMPACTS—STANDARDS FOR THE GROWING, HARVESTING, PACKING AND HOLDING OF PRODUCE FOR HUMAN CONSUMPTION 313–18 (Aug. 2013), http://www.fda.gov/downloads/Food/FoodSafety/FSMA/UCM334116.pdf [https://perma.cc/XY6Q-F8D2] (identifying the financial burden of new food safety rules for farms and finding that such rules may force many farmers to supplement revenue with off-farm employment).

[345] *See generally* DOUGLAS JACKSON-SMITH ET AL., AGREE, ASSESSING THE IMPACTS OF FEDERAL FARM BILL PROGRAMS ON RURAL COMMUNITIES (Apr. 2013), http://www.foodandagpolicy.org/sites/default/files/AGreeFarmBill%20Programs%20on%20Rural%20Devlp%20Apr2013.pdf [https://perma.cc/2V86-HLLC].

[346] J.B. Ruhl, *Agriculture and Ecosystem Services: Strategies for State and Local Governments*, 17 N.Y.U. ENVTL. L.J. 424, 426 (2008). "Ecosystem services are economically valuable benefits humans derive from ecological resources directly, such as storm surge mitigation provided by coastal dunes and marshes, and indirectly, such as nutrient cycling that supports crop production." *Id.* at 426 n.10.

[347] Many might object to green payment programs as a deviation from the polluter pays principle. *E.g.*, Jim Chen, *Get Green or Get Out: Decoupling Environmental from Economic Objectives in Agricultural Regulation,* 48 OKLA. L. REV. 333, 344 (1995).

[348] STUBBS, *supra* note 338, at 8.

[349] *Conservation Stewardship Program: Rewarding Farmers for Adopting and Managing Advanced Conservation Systems*, NAT'L SUSTAINABLE AGRIC. COALITION, http://sustainableagriculture.net/publications/grassrootsguide/conservation-environment/conservation-stewardship-program/ [https://perma.cc/M367-LYC3] (last updated Oct. 2016).

production.[350] Local and regional USDA offices administer the program, allocating funds on the basis of local and national funding priorities, which are set annually.[351]

Without any congressional action, the Natural Resources Conservation Service could prioritize funding farming practices that would protect drinking water sources. The Agency could also direct funds to particularly vulnerable watersheds. The scope of the program's reach is, however, extremely limited by its funding.[352] The 2014 Farm Bill cut conservation funding for the first time since it became a regular feature of the modern farm bill in 1985.[353] Expanded funding, if it were to become politically feasible, would expand the program's reach.[354]

The USDA also manages several conservation easement programs aimed at protecting farmland and wetlands from development.[355] Through both programs, the USDA funds easement purchases; the farmer receives an influx of cash, and the development rights are then held in perpetuity either by the USDA itself or by a state partner program. The easement programs present an opportunity to generate source water protection. First, the USDA could condition farmland easement purchase on adoption of a narrow set of targeted conservation measures. Second, it could set proximity to drinking water sources as a priority for selecting wetlands for protection.[356]

i. *Developing State Watershed Programs*

States have enormous flexibility both within SDWA and CWA frameworks and beyond them to develop creative approaches to watershed protection and agricultural water pollution mitigation. Many states have taken advantage of this flexibility to develop creative approaches to watershed

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[350] The Conservation Reserve Program paid farmers to take land out of production, and, while the program still exists, it has been deemphasized. STUBBS, *supra* note 338, at 9–10.

[351] *Conservation Stewardship Program – Payment for Performance*, U.S. DEP'T AGRIC., https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/financial/csp/?cid=nrcs143_008316 [https://perma.cc/3NBG-3XMN].

[352] *See Agricultural Water Enhancement Program*, U.S. DEP'T AGRIC., http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/awep/ [https://perma.cc/QXK2-LVB2] ("The 2008 Farm Bill provided $73 million for fiscal year 2009, $73 million for fiscal year 2010, $74 million for fiscal year 2011, and $60 million for fiscal year 2012 and each year thereafter for AWEP.").

[353] STUBBS, *supra* note 338, at 1.

[354] *Cf.* Ruhl, *supra* note 346, at 428–29 (noting slow movement at the federal level on these programs and calling on states to implement them directly).

[355] *See* STUBBS, *supra* note 338, at 9–12 (discussing agricultural easements).

[356] *See* Agricultural Conservation Easement Program, 7 C.F.R. § 1468.32 (2016) (describing prioritization process).

protection.[357] Other states are moving in the other direction, providing more robust protections for agricultural and insulation from potential regulation, such as Missouri recently amended its constitution to guarantee a right to farm.[358] Although the scope of this protection is extremely vague, it is very possible that it will significantly limit any state or local level efforts to curtail agricultural water pollution.

But, at the state level, affected water utilities and municipalities may be more effective at lobbying for source water protection.[359] And, at the state level, contamination events may generate adequate public salience to create the political will for action. For instance, the recent microcystin contamination in Toledo, Ohio led to several actions at the state level including fertilizer applicator licensing requirements and restrictions on application timing.[360] The high-profile and tragic Flint, Michigan water crisis, though not directly related to agricultural contamination, has also generated significant attention for aging water infrastructure and for the need for technical support for local water systems.[361] In Iowa, a heavily agricultural state, more than half of state residents support the Des Moines Water Works lawsuit.[362]

A few other examples of state programs help illustrate the range of options. In California, the Port-Cologne Water Quality Control Act, the state's version of the Clean Water Act, sets up a three-tiered approach to nonpoint source pollution.[363] At Tier 1, contributors to nonpoint source pollution engage in "self-determined cooperation" while at Tiers 2 and 3, polluters are subject to effluent limitations.[364] In practice, farms and dairies have long held regulatory waivers under this program, but in the last fifteen years, these waivers have come under attack, and are being replaced with more robust conditional waivers.[365]

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[357] *See* CRAIG & NOTO, *supra* note 167, at 7 (surveying programs in all fifty states and finding five states with robust programs, nineteen with some degree of mandatory requirements, and many others with voluntary programs).

[358] MO. CONST. art. I, § 35 ("[T]he right of farmers and ranchers to engage in farming and ranching practices shall be forever guaranteed . . . .").

[359] As the NRDC has noted, "[t]he argument that source water protection is beyond a utility's control is simply not valid; water utilities can aggressively pursue polluters of their water supply through both political and legal means," including pushing for federal and state legislation to fund acquisition of land, and pushing for federal and state pollution controls. OLSON, *supra* note 42, at 42.

[360] *See supra* notes 81–84 and accompanying text.

[361] *See, e.g.*, Coral Davenport, *With Nod to Flint Crisis, Senate Weighs a $9 Billion Water Infrastructure Bill*, N.Y. TIMES (Sept. 7, 2016), https://www.nytimes.com/2016/09/08/us/politics/senate-water-bill.html?_r=0 [https://perma.cc/5PSU-HJ7H].

[362] *See* Eller, *supra* note 41.

[363] CAL. WATER CODE § 13369 (West 2009 & Supp. 2016).

[364] *See* CRAIG & NOTO, *supra* note 167, at 24 (providing a detailed description of the California program).

[365] *See* OLSON, *supra* note 66, at 55–59. Under more recent law, regional water quality control boards must reconsider whether these waivers remain in the public interest. In 1999, the California legislature passed S.B. 390, which caused all agricultural waivers to

In Kentucky, the Agriculture Water Quality Act "requires farmers with 10 or more contiguous acres develop and implement an Individual Plan to address water pollution, consisting of [best management practices] to prevent pollution."[366] The Act establishes a monitoring program to be used to identify regions where agriculture is contributing to water quality problems; in those regions, compliance with plans becomes mandatory.[367] The statute only provides for enforcement, however, where a farmer "receive[d] written notification of documented water pollution and of the agriculture water quality plan needed to prevent water pollution, and is provided technical assistance, and financial assistance when possible . . . but still refuses or fails to comply with the requirements of the agriculture water quality plan."[368] This enforcement provision allows the state to pursue enforcement when necessary but ensures that farmers have support in achieving compliance.

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expire in 2003, forcing the Regional Water Quality Control Boards, which are responsible for implementation of the Porter-Cologne Water Quality Act, to reevaluate each waiver. *Id.* The statute directed that waivers could be reissued only on a finding that they remained in the public interest. CAL. WATER CODE § 13269(a)(1) (West 2009). The Regional Water Quality Control Boards in California's main agricultural regions replaced those complete waivers with conditional waivers that imposed monitoring and reporting requirements. *See generally, e.g.*, CENT. COAST REGION, CAL. REG'L WATER QUALITY CONTROL BD., MONITORING AND REPORTING PROGRAM NO. R3-2004-0117 FOR DISCHARGERS ENROLLED UNDER CONDITIONAL WAIVERS OF WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM IRRIGATED LANDS (July 2004), http://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/2004/2004_0117_mrp_conditional_ag_waiver.pdf [https://perma.cc/37VZ-UHRG]. Finding these requirements inadequate to curb nitrate contamination, some of these Regional Boards have added additional requirements. For instance, the Central Coast Region updated its agricultural order, requiring that "[d]ischargers . . . implement, and where appropriate update or improve, management practices, which may include local or regional control or treatment practices and changes in farming practices to effectively control discharges, meet water quality standards and achieve compliance with this Order." CENT. COAST REGION, CAL. REG'L WATER QUALITY CONTROL BD., ORDER NO. R3-2012-0011, CONDITIONAL WAIVER OF WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM IRRIGATED LANDS ¶ 10 (Mar. 15, 2012), http://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/docs/ag_oder/final_agorder_atta_032612.pdf [https://perma.cc/3U9H-PJA6]. Shortly after this Order was issued, however, agricultural organizations appealed the Order to the California State Water Resources Control Board, which weakened some of its requirements. *See* Monterey Coastkeeper v. Cal. State Water Res. Control Bd., No. 34-2012-80001324, slip op. at 1–2 (Cal. Super. Ct. May 15, 2015). Several environmental groups challenged the revised order and a California Superior Court judge recently ruled that the revised order "lacks sufficient measures to meet the . . . water quality objectives." *Id.* at 36. The State Board is currently considering revisions. *See* CENT. COAST REGION, CAL. REG'L WATER QUALITY CONTROL BD., NOTICE OF OPPORTUNITY FOR PUBLIC COMMENT AND NOTICE OF PUBLIC HEARING (Dec. 23, 2016), http://www.swrcb.ca.gov/centralcoast/board_decisions/tentative_orders/2017/2017_002revised_public_notice_dec23_2016.pdf [https://perma.cc/QV5Q-8H4Q].

366 *See* CRAIG & NOTO, *supra* note 167, at 33.

367 KY. REV. STAT. ANN. § 224.71-120 (LexisNexis 2012).

368 *Id.* § 224.71-100(2).

Successful state programs, particularly those that manage to strike a balance between the interests of water drinkers and the economic interests of farmers, may serve as models for other states and ultimately for federal legislation.

ii. *Research Support and Education*

Last, but certainly not least, research and education have long been critical tools in federal farm policy.[369] For farmers, information support can help overcome challenges associated with modifying farming practices to reduce water pollution. For instance, through recent research at the University of California, Davis, scientists have developed cheap field tests to monitor nitrate levels.[370] Existing methods were expensive and required lab analysis; cheaper testing allows farmers to monitor field nitrate levels and reduce application of additional fertilizers when levels are high.[371]

Likewise, for water utility professionals, research and education on source water protection strategies might help break the cycle of reliance on treatment and filtration. Some efforts on this front are already underway. In 2006, a coalition of drinking water professional associations, nonprofit organizations, and federal agencies formed the Source Water Collaborative, whose mission is "to combine the strengths and tools of a diverse set of member organizations to act now, and protect drinking water sources for generations to come."[372] The Collaborative provides a variety of resources including maps, data, and access to information about various source water protection efforts around the country.[373] Diverting additional resources toward this type of effort could provide support for burdened water utilities, particularly in smaller communities.

V. CONCLUSION

Agricultural nonpoint source pollution is not the only threat to drinking water safety. Aging infrastructure and other types of pollution also raise

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[369] Anne B.W. Effland, *U.S. Farm Policy: The First 200 Years*, AGRIC. OUTLOOK, Mar. 2000, at 21, 21–22, http://www.farmlandinfo.org/sites/default/files/US_Farm_Policy_March_2000_1.pdf [https://perma.cc/WCK6-KEXG] (dating federal support to farms via research and education to the 1830s).

[370] Timothy K. Hartz et al., *On-Farm Nitrogen Tests Improve Fertilizer Efficiency, Protect Groundwater*, CAL. AGRIC., July–Aug. 1994, at 29, 31–32 (observing that where tests were expensive and fertilizer was cheap farmers had little incentive to monitor nitrate levels, but lower cost tests can increase farmer interest in monitoring).

[371] *Id.*

[372] *About the Source Water Collaborative*, SOURCE WATER COLLABORATIVE, http://sourcewatercollaborative.org/about/ [https://perma.cc/JH4H-YZHV].

[373] *Map of Collaborative Efforts*, SOURCE WATER COLLABORATIVE, http://sourcewatercollaborative.org/how-to-collaborate-toolkit/map/ [https://perma.cc/LP4G-5JJC].

serious concerns.[374] But agricultural nonpoint source pollution, and other types of unregulated nonpoint source pollution, generate a particular set of questions about who cleans up pollution and who pays for that cleanup that merit unique attention. This Article argues that current regulatory schemes misallocate those responsibilities and costs in ways that are not only inefficient and unfair but also undermine successful water resource management. It offers a range of solutions that each attempt to prioritize source water protection, shifting the focus from technocratic end-of-line clean up to pollution prevention. This shift recognizes both the ancillary benefits of prevention and the limits of end-of-line cleanup. As engineer George W. Fuller said in 1907, "a pure water is better than a purified water."[375]

A focus on source water protection also fits within a broader trend among environmental scholars to recognize the value of systems approaches. Of course, water itself forms a complex natural system as it moves across the landscape creating interdependence between various communities for collective access to both clean water and enough water.[376] But water is also an integral part of the food system, as a critical resource for agricultural production and as food itself.[377] This lens reemphasizes the importance of a systems approach and the shortsightedness of reliance on end-of-line cleanup.

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[374] OLSON, *supra* note 42, at 5 ("As . . . water infrastructure outlives its useful life, it can corrode and deteriorate, and we have witnessed the results: a nationwide epidemic of burst water mains, unreliable pumps and collection equipment, and aging treatment plants that fail to remove important contaminants.").

[375] Keith S. Porter, *Fixing Our Drinking Water: From Field and Forest to Faucet*, 23 PACE ENVTL. L. REV. 389, 398–99 (2006) (quoting George W. Fuller, *Water Supply: An Informal Discussion of the Annual Convention, July 10th, 1907*, *in* PURE AND WHOLESOME 39, 44 (Am. Soc'y of Civil Eng'rs ed., 1982)) (describing the history of dominant approaches to clean drinking water and the shift from watershed protection to end-of-line cleanup at the turn of the twentieth century).

[376] Although this Article focuses on water purity, similar concerns play out in analysis of water quantity.

[377] *See generally* Margot J. Pollans, *The Safe Drinking Water / Food Law Nexus*, 32 PACE ENVTL. L. REV. 501 (2015) (arguing for the importance of treating water as food and evaluating its regulation through the lens of food law).