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Little Streams and Legal Transformations

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LITTLE STREAMS AND LEGAL TRANSFORMATIONS

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INTRODUCTION

On May 27, 2015, the United States Army Corps of Engineers (the Corps) and the United States Environmental Protection Agency (EPA) released a rule defining the boundaries of federal jurisdiction under the Clean Water Act.[1] In other words, the Clean Water Rule, as the EPA and the Corps labeled it, helps determine which aquatic resources can be protected by the Clean Water Act and which cannot. In many circles, the immediate reactions were apoplectic. Industry opponents warned of dire consequences.[2] Conservative politicians maligned the Clean Water Rule as, in Congressman John Boehner's words, "a raw and tyrannical power grab that will crush jobs . . . . and places landowners, small businesses, farmers, and manufacturers on the road to a regulatory and economic hell."[3] The House of Representatives passed a bill that would set the whole rule aside.[4] Dozens of states, along with a wide variety of industry and advocacy groups, sued to challenge the rule; one set of cases soon generated a nationwide stay.[5] Environmental groups sued as well, on the theory that the new rule is not protective enough.[6] Before the 2016 election, many legal commentators expected some of the challenges to reach the U.S. Supreme Court, which helped set the rulemaking in motion with two previous decisions on Clean Water Act jurisdiction.[7] After the election, it seems more likely that the incoming

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[1] News Release, EPA, Clean Water Rule Protects Streams and Wetlands Critical to Public Health, Communities, and Economy (May 27, 2015), https://www.epa.gov/newsreleases/clean-water-rule-protects-streams-and-wetlands-critical-public-health-communities-and [https://perma.cc/72QU-36WY]. For the actual rule (as it was later published in the Federal Register), see Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054 (June 29, 2015).

[2] *See, e.g.,* Am. Farm Bureau Fed'n, *Clean Water Act, WOTUS*, FARM BUREAU, http://www.fb.org/issues/regulatory-reform/clean-water-act/ [https://perma.cc/B2X9-JM2C] (last visited Jan. 8, 2017) (containing materials posted by the American Farm Bureau Federation); Justin Sykes, *New Obama EPA Water Rules Set to Drown Property Rights, Economic Growth*, AM. FOR PROSPERITY (June 16, 2014), http://americansforprosperity.org/article/new-obama-epa-water-rules-set-to-drown-property-rights-economic-growth [https://perma.cc/XRG9-QJ2P].

[3] Press Release, Speaker Paul Ryan's Press Office, Speaker Boehner on the Latest EPA Power Grab (May 27, 2015), http://www.speaker.gov/press-release/speaker-boehner-latest-epa-power-grab [https://perma.cc/MTS6-P8F8]; *see also,* Jennifer Yachnin, *House Republican Compares WOTUS to Terrorism, the Plague*, GREENWIRE (Nov. 23, 2015), http://www.eenews.net/greenwire/2015/11/23/stories/1060028451 [https://perma.cc/5WP9-DYP7].

[4] Regulatory Integrity Protection Act of 2015, H.R. 1732, 114th Cong. (2015).

[5] Timothy Cama, *27 States Challenge Obama Water Rule in Court*, HILL (June 30, 2015, 12:02 PM), http://thehill.com/policy/energy-environment/246539-27-states-challenge-obama-water-rule-in-court [https://perma.cc/ZTK9-R6VG].

[6] Press Release, Center for Biological Diversity, Lawsuit Challenges Loopholes in New EPA Rule Exempting Wetlands and Streams From Clean Water Act Protections (July 22, 2015), http://www.biologicaldiversity.org/news/press_releases/2015/clean-water-act-07-22-2015.html [https://perma.cc/4W73-FN8C].

[7] Rapanos v. United States, 547 U.S. 715, 756–57 (2006); Solid Waste Agency of N.

Trump Administration will attempt to withdraw the rule. According to the EPA and the Corps, the rule itself would not actually change very much; the agencies predict "an approximate 3 percent increase in assertion of jurisdiction when compared to 2009-2010 field practice."[8] But much of the rhetoric has been apocalyptic.

It would be easy to react to all of this by yawning. Nearly any federal environmental initiative now provokes a similar reaction. Indeed, just a few months later, the EPA released another major rule, this one governing greenhouse gas emissions, and the same doomsday warnings and press releases all trotted out again, followed nearly immediately by bills and lawsuits.[9] We live, it sometimes seems, in an era when environmental policymaking resembles trench warfare, with zero-sum legal battles playing out over every major initiative, and with very little apparent movement. Within academic circles, lamenting these circumstances has become almost cliché. Accounts of the increasing polarization of environmental politics, and of gridlock, ossification, and logjams, are common, as are wishful comparisons to the 1970s, a time when environmental legislation emerged from Congress quickly and with bipartisan support.[10] We have been stuck, it seems, and the contrast between an ostensibly modest water quality rule and its outraged reception is just another reminder of the reasons why.

This Article does not dispute the accuracy of that narrative, at least in some circumstances. But in the arenas governed by the Clean Water Rule, policy actually never got stuck. It has been evolving in consequential ways. The Clean Water Rule defines the geographic scope of several regulatory programs, one of which governs discharges of dredged or fill material into "waters of the United States."[11] That

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Cook Cty. v. U.S. Army Corps of Eng'rs, 531 U.S. 159, 172–73 (2001).

[8] U.S. EPA & U.S. DEPT. OF THE ARMY, ECONOMIC ANALYSIS OF THE EPA-ARMY CLEAN WATER RULE 2 (2015). In internal memoranda that then leaked to the public, some Corps staff members raised concerns that this estimate might be high, and that the new rule would actually reduce protection of some wetlands. *See* Amena H. Saiyid, *Support Documents for Water Rule "Flawed": Corps Memo*, BLOOMBERG BNA (July 28, 2015), http://www.bna.com/support-documents-water-n17179933980/ [https://perma.cc/D7DR-GM3C].

[9] *See* Joby Warrick & Steven Mufson, *Foes of Clean-Air Rule Plan Multiple Front Battle*, WASH. POST (August 3, 2015), http://www.washingtonpost.com/national/health-science/opponents-lay-groundwork-for-state-by-state-fight-against-polluton-curbs/2015/08/03/d3418320-3a26-11e5-8e98-115a3cf7d7ae_story.html [https://perma.cc/XL8F-WCAB].

[10] *See, e.g.,* Carol A. Casazza Herman et al., *The Breaking The Logjam Project*, 17 N.Y.U. ENVTL. L.J. 1, 1–2 (2008) ("[P]olitical polarization and a lack of leadership have left environmental protection in the United States burdened with obsolescent statutes and regulatory strategies. As a result, the country has failed to deal effectively or decisively with many pressing old environmental problems as well as newly emerging ones."); David W. Case, *The Lost Generation: Environmental Regulatory Reform in the Era of Congressional Abdication*, 25 DUKE ENVTL. L. & POL'Y F. 49, 50–53 (2014); Sandra Zellmer, *Treading Water While Congress Ignores the Nation's Environment*, 88 NOTRE DAME L. REV. 2323, 2323–40 (2013).

[11] *See* 33 U.S.C.A. § 1344 (West 2016). For an excellent overview of the program, see ROYAL C. GARDNER, LAWYERS, SWAMPS, AND MONEY: WETLAND LAW, POLICY, AND

program—often referred to as "the 404 program," after the statutory section that authorizes it, or as "the wetlands program"—is well known to environmental lawyers. Every major environmental law casebook covers it,[12] and abundant litigation, including multiple Supreme Court cases, has arisen from it.[13] But despite that familiarity, many environmental lawyers do not realize that the 404 program is changing, or that the Clean Water Rule reflects—and would, to a very modest extent, advance—those changes.[14]

Instead of wetlands, the most important changes involve little streams. Those little streams[15] are now a central focus of regulatory attention after years of falling largely beyond the reach of Clean Water Act regulation.[16] The nature of stream regulation is also changing, with new permitting mechanisms, guidance documents, and techniques for rehabilitating streams all continuing to emerge.[17] The Clean Water Rule reflects that shifted emphasis; clarifying jurisdiction over tributaries is one of its central goals.[18] But despite all the kerfuffle surrounding the rule, it represents just an incremental step in a journey that began years earlier, largely unnoticed by legal commentators, and has continued through multiple regulatory decisions and under multiple presidential administrations.[19]

This Article chronicles that transformation. Part I begins with a brief overview of the environmental resource at the heart of the controversy, explaining why small streams are both ecologically important and difficult to protect. Part II then

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POLITICS 38–56 (2011).

[12] *See, e.g.,* HOLLY DOREMUS ET AL., ENVIRONMENTAL POLICY LAW: PROBLEMS, CASES, AND READINGS 380–411 (6th ed. 2012); DANIEL A. FARBER & ANN E. CARLSON, CASES AND MATERIALS ON ENVIRONMENTAL LAW 702–34 (9th ed. 2014); ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 749–61 (6th ed. 2009); RICHARD L. REVESZ, ENVIRONMENTAL LAW AND POLICY 1060–87 (2nd ed. 2012); J.B. RUHL ET AL., THE PRACTICE AND POLICY OF ENVIRONMENTAL LAW 244–80 (3d ed. 2010).

[13] *See* Dave Owen, *Regional Federal Administration*, 63 UCLA L. REV. 58, 83 (2016) (citing a partial list of prominent cases).

[14] So long as the rule is stayed, of course, no such advancement can occur.

[15] The EPA and scientists often use the phrase "headwater streams," which the EPA defines as "the smallest parts of river and stream networks. . . . They are the part of rivers furthest from the river's endpoint or confluence with another stream." *Research in Action: Headwater Streams Studies*, EPA, https://www.epa.gov/water-research/headwater-streams-studies [https://perma.cc/7HR7-T9D9] (last visited Jan. 8, 2017). That isn't a particularly precise definition, and in practice, the phrase is often extended to small streams that discharge directly to a river's mainstem, or to lakes or the ocean. "Little streams," though it sounds less scientific, more accurately describes the range of streams discussed in this Article.

[16] *See infra* Part II.C.

[17] *See infra* Part II.C.

[18] *See* 80 Fed. Reg. at 37,058–59 (June 29, 2015) (summarizing the rule, which extends jurisdiction to all tributary streams and makes wetland protection contingent upon those wetlands' proximity to other jurisdictional waterways).

[19] *See infra* part II.C.

chronicles the evolution of federal stream protection, drawing heavily on a series of interviews with regulators and others who were involved in that evolution.[20] For many years after the enactment of the Clean Water Act, that protection was largely nonexistent. Even in the 1980s and early 1990s, when wetlands protection emerged as a *cause célèbre*, stream protection languished. But over time, a combination of scientific advances, evolving agency cultures, and legal changes turned attention to even the smallest of flowing waterways.[21] Many environmental lawyers and most environmental law casebooks still refer to the 404 program as "the wetlands program," as though stream protections were inconsequential.[22] But that framing is obsolete. Protecting streams is now at the program's heart.[23]

Part III then considers what broader significance that transformation holds for environmental and administrative law. The still-unfolding history of stream regulation, like most history, is messy, and this is not a story with a single clear moral. Indeed, the clearest lessons that emerge from this story are reminders of how complicated and unpredictable environmental lawmaking can be. Nevertheless, elements of that history have been intriguingly inconsistent with many of the recurring narratives of contemporary environmental law. This is decidedly not a story of stagnation; environmental protection has expanded, dramatically, and is becoming more sophisticated.[24] Nor is it simply a story of heavily politicized policymaking—though the politics of stream protection are intense—or of captured agencies. Many changes in protection emanated from relatively conservative regions of the country, and major developments occurred under Republican presidential administrations.[25] Nor, finally, is it simply a story of zero-sum conflict. While the scope of regulatory protections has expanded, so too have efforts to increase the efficiency of regulatory approaches.[26]

Lest this all sound a bit too rosy, there are caveats. Some changes have been bitterly contested, and the jury is still out on just how effective some of the new regulatory approaches will turn out to be.[27] The next chapter of the story also will

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[20] I initially conducted most of these interviews in connection with a research project focused on the roles of regional offices within the federal government. *See* Owen, *supra* note 13. A few of the interviews were specific to this particular research project.

[21] *See, e.g.,* J.L. Meyer & J.B. Wallace, *Lost Linkages and Lotic Ecology: Rediscovering Small Streams*, *in* ECOLOGY: ACHIEVEMENT AND CHALLENGE 295, 304 (Malcolm C. Press et al. eds., 2001).

[22] *See* Case, *supra* note 10; Zellmer, *supra* note 10; Casazza Herman et al., *supra* note 10 (All of these casebooks cited there identify the 404 program with wetland protection.).

[23] *See* Rebecca Lave et al., *Why You Should Pay Attention to Stream Mitigation Banking*, 26 ECOLOGICAL RESTORATION 287, 287 (2008) ("An informal survey of EPA regional regulatory staff suggests that in many regions 50 percent or more of the individual permits issued by the Corps every year are for impacts to streams.").

[24] *See infra* Section II.C.

[25] 5*See infra* Section II.C.

[26] *See infra* notes 323–326 and accompanying text.

[27] *See, e.g.*, Margaret A. Palmer & Kelly L. Hondula, *Restoration as Mitigation: Analysis of Stream Mitigation for Coal Mining Impacts in Southern Appalachia*, 48 ENVTL. SCI. & TECH. 10,552, 10,558 (2014).

unfold under a presidential administration and Congress that have made no secret about their hostility to environmental regulation. As this Article goes to press, the implications of that hostility are far from clear. But the story, though not without troubling elements, still provides a reminder of the importance of alternative, and fundamentally more optimistic, narratives of modern American environmental law. In those alternative narratives, the history of environmental law is not just a tale of increasing gridlock and adversarialism, or of captured agencies and litigious trench warfare. Instead, it involves incremental, ongoing, and often agency-driven progress toward turning the sweeping mandates of environmental statutes into real, and workable, protections. Whether the regulatory history of little streams will continue to follow that trajectory is now a question that hangs in the balance. But for the moment, at least, the story of little streams is a story of environmental law continuing to come of age.

I. THE BIG IMPORTANCE OF LITTLE STREAMS

Imagine, for a moment, that you are flying over the Potomac River, heading upstream. You begin at the estuary, where freshwater mixes with the brackish waters of Chesapeake Bay. Here the river is wide, and boats large and small ply its waters. Further upstream, past Washington, D.C. and above the Great Falls, the river narrows. With each tributary you pass, the flow diminishes, but for miles, the river is still deep enough for motorboats and canoes. Eventually you turn and fly southwest above one of those tributaries. As you move from the piedmont plain into the foothills of the Blue Ridge Mountains, the gradient steepens, and pools and riffles, where fly fishermen cast their lines, replace the longer flatwater reaches of the river mainstem. But eventually, the tributary stream becomes too small to fish, and then, farther up, too small to see. The forest canopy closes over it, and the only visual evidence of a stream is a slight v-shaped valley cutting through the landscape.

If you descend to the ground surface and walk onward and upward, you might then see a small, perennial stream turn into a series of disconnected pools, where continuous flow appears primarily during periods of wet weather. This stretch would be what hydrologists refer to as an *intermittent stream* (as opposed to a *perennial stream*, which flows year-round).[28] Farther up, you would walk along tiny channels that flow only during and immediately after rainstorms or periods of snowmelt—*ephemeral streams*, in hydrologic parlance.[29] And throughout your journey, you would cross many other small tributaries, all forming a network across the landscape, much like the capillaries that convey blood through the far reaches of our bodies or the twigs and branches that transport sustenance from a tree's leaves to its trunk.[30]

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[28] U.S. EPA, CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS: A REVIEW AND SYNTHESIS OF THE SCIENTIFIC EVIDENCE 2–14 (2015) [hereinafter CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS].

[29] *Id.*

[30] Importantly, not all small streams are located at the far and uppermost reaches of watersheds. Some are, but many small streams discharge directly into the mainstems of larger

But you might not choose to go that far. Rivers, after all, have long been central to human culture; our stories and songs celebrate the Mississippi and the Shenandoah, not the tiny streams where those illustrious rivers begin. For years, scientists also focused much of their attention upon larger waterways.[31] But in the past two decades, that has begun to change. Scientific journals are now filled with studies of the ecology of small streams, and of the ecological connections between small tributaries and larger waters downstream.[32] Those connections form the scientific foundation for the legal evolution described by this Article, and this Part therefore provides a brief synopsis of the emerging literature.

A. The Functions of Little Streams

The importance of small streams stems in part from their sheer abundance. Headwater streams are, as many studies have noted, "the most abundant streams in both number and length in a stream network."[33] Statistics on ephemeral and intermittent streams—which are a subset of the broader category of headwater streams—reinforce the prevalence of small waterways, particularly in arid areas.[34] Beyond sheer abundance, small streams also serve important functions, some of which are summarized in more detail below.

1. Conveying Water

One the most important functions of little streams is to convey water to larger waterways. Most of the water in a major river first flows through a small stream.[35] And while that may sound like a truism, it has important implications. As tributaries change, so too will flows through the river's mainstem.

Those flows will not disappear (unless the changes involve diverting water away); water will still fall from the sky and proceed downhill, one way or another. But the water is likely to move through different pathways and at a different pace.[36]

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rivers or, in coastal areas, to the ocean.

[31] *See* K. Bishop et al., *Aqua Incognita: The Unknown Headwaters*, 22 HYDROLOGIC PROCESSES 1239 (2008); Thibault Daltry et al., *Intermittent Rivers: A Challenge for Freshwater Ecology*, 64 BIOSCIENCE 229 (2014) ("Intermittent rivers are a recent addition to the field of freshwater ecology."); Winsor H. Lowe & Gene E. Likens, *Moving Headwater Streams to the Head of the Class*, 55 BIOSCIENCE 196 (2005).

[32] *See generally* CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS, *supra* note 28 (compiling and summarizing studies).

[33] Tracie-Lynn Nadeau & Mark Cable Rains, *Hydrologic Connectivity Between Headwater Streams and Downstream Waters: How Science Can Inform Policy*, 43 J. AM. WATER WORKS ASS'N 118, 120 (2007).

[34] U.S. EPA, THE ECOLOGICAL AND HYDROLOGICAL SIGNIFICANCE OF EPHEMERAL AND INTERMITTENT STREAMS IN THE ARID AND SEMI-ARID AMERICAN SOUTHWEST 5 (2008).

[35] CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS, *supra* note 28, at 3–5.

[36] *See* COMM. ON REDUCING STORMWATER DISCHARGE CONTRIBUTIONS TO WATER POLLUTION, NAT'L RESEARCH COUNCIL, URBAN STORMWATER MANAGEMENT IN THE

A common consequence of stream filling is flooding, as water that once moved slowly through a stream's riffles and pools, or seeped into the stream from the shallow groundwater table, now speeds over a more impervious urban landscape.[37] That consequence can propagate downstream, often in the form of a flood.[38] Conversely, paving landscapes and filling streams can reduce river flows in periods between precipitation events. Because water that would have made its way slowly through the stream and its adjacent aquifers now has been flushed rapidly through the system, less remains during the periods when the weather is dry.[39] Small tributary streams therefore act like natural reservoirs; they mitigate the extremes of both flood and drought.

2. Nutrients, Sediment, Chemistry, and More

Nonscientists are generally accustomed to thinking of rivers and streams as conveyance systems for water, or, perhaps, as habitat for relatively charismatic species like sportfish or birds. But rivers and streams are vectors for many other things: carbon, nutrients, minerals, sediment, warm or cold temperatures, rocks and fallen trees, and a huge variety of living organisms.[40] They exchange those things not just up- and downstream within the river system, but also with surrounding wetlands and terrestrial landscapes.[41] Collectively, the presence or absence of these things defines the water quality of the system; to an ecologist—and to the Clean Water Act—water quality does not just mean an absence of toxic contaminants.[42]

Little streams play crucial roles within these conveyance systems.[43] That is partly because they provide physically distinctive environments; rich ecosystems often contain a diversity of habitat types,[44] and small streams are structurally, biologically, and chemically different from larger downstream waterways. Additionally, water within those streams is, on average, physically closer to the streambed and to the surrounding landscape. That physical proximity promotes a

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UNITED STATES 151–153 (2009) (describing changed flow pathways).

[37] *See id.*

[38] *See id.* at 166–70.

[39] *See* Emily S. Bernhardt & Margaret A. Palmer, *Restoring Streams in an Urbanizing World*, 52 FRESHWATER BIOLOGY 738, 740 (2007).

[40] *See generally* CONNECTIVITY OF STREAMS AND WETLANDS, *supra* note 28, at 3-1 to 347 (describing these functions).

[41] *See* CONNECTIVITY OF STREAMS AND WETLANDS, *supra* note 28, at 13 (describing different types of connectivity).

[42] 33 U.S.C.A. § 1362(19) (West 2016) (defining pollution to include "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water"); *see* PUD No. 1 of Jefferson Cty. v. Wash. Dep't. of Ecology, 511 U.S. 700, 719 (1994) (noting the broad conception of water quality indicated by this definition).

[43] *See* Meyer & Wallace, *supra* note 21, at 296 ("Headwater streams are tightly linked with the larger landscape . . . .").

[44] *See* J. Tews et al., *Animal Species Diversity Driven by Habitat Heterogeneity/Diversity: The Importance of Keystone Structures*, 31 J. BIOGEOGRAPHY 79, 79 (2004).

wide variety of interactions, many with ripple effects extending throughout the river system.[45]

One of the best examples of these phenomena involves nutrient processing. Any waterway, even in an undeveloped landscape, receives nutrients like phosphorous and nitrogen from the surrounding landscape.[46] Those nutrients form the building blocks of life within the waterway.[47] But excess fertilizer from lawns and agricultural fields, atmospheric deposition of nitrogen oxides, and wastewater discharges can all overload aquatic systems with nutrients, fueling toxic algae blooms, depleting oxygen from the water column, and creating dead zones where aquatic life cannot survive.[48] These problems recur across the country, and their scale can be massive.[49] In the Gulf of Mexico, for example, a dead zone forms each summer, fed by nutrients discharged from the Mississippi River; it can be larger than the state of Connecticut.[50]

These algae blooms and dead zones in downstream waters are directly related to tributary streams.[51] In part, that is because tributaries serve as conduits for delivering nutrients; just as much of the water in a river system comes from small tributaries, so too does a large portion of the nutrients.[52] But little streams also are particularly effective at processing, and thus removing, some of the nutrients that flow off the surrounding terrestrial landscape.[53] That is partly because of the sheer number of small streams in a watershed, and also partly because the shallow depth of small streams keeps water in closer contact with the substrate, where many of the organisms that process nutrients live.[54] When those streams are straightened, filled,

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[45] *See* Jonathan P. Benstead & David S. Leigh, *An Expanded Role for River Networks*, 5 NATURE GEOSCIENCE 678, 679 (2012) ("[S]mall streams and river ecosystems tend to be particularly active, from a biogeochemical perspective, because the water they convey has a great deal of contact with both the benthic substrate and the atmosphere.").

[46] *See* Richard B. Alexander et al., *The Role of Headwater Streams in Downstream Water Quality*, 43 J. AM. WATER RESOURCES ASS'N 41, 43 (2007).

[47] *Id.* at 42.

[48] *Id.*

[49] *See* U.S. EPA, NATIONAL SUMMARY OF STATE INFORMATION (2016), http://ofmpub.epa.gov/waters10/attains_nation_cy.control#causes [https://perma.cc/X6KA-9P9H] (listing nutrients as the third leading cause of impairment in the United States' rivers and streams).

[50] U.S. EPA, NORTHERN GULF OF MEXICO HYPOXIC ZONE, http://water.epa.gov/type/watersheds/named/msbasin/zone.cfm [https://perma.cc/EG43-6QQ9].

[51] *See* Richard B. Alexander et al., *Dynamic Modeling of Nitrogen Losses in River Networks Unravels the Coupled Effects of Hydrologic and Biogeochemical Processes*, 93 BIOGEOCHEMISTRY 91, 110 (2009) ("[D]elivery of nitrate to downstream waters . . . is strongly affected by the cumulative removal of nitrate in headwater and higher order streams. . . ."); *see* CONNECTIVITY OF STREAMS & WETLANDS TO DOWNSTREAM WATERS, *supra* note 28, at 3-23 to 3-28 (summarizing multiple studies).

[52] Alexander et al., *supra* note 51, at 44.

[53] *Id.* at 46 ("[R]ates of nitrogen uptake . . . . generally decline in a downstream direction with increases in stream size.").

[54] *Id.*

turned into fertilized fields, or replaced with culverts, they lose much of their capacity to process nutrients, and downstream loading, with all of its attendant problems, increases.[55]

Nutrient processing is a particularly important role of little streams, but it is by no means the only one. Little streams also help process and transform the carbon that flows through river systems.[56] They serve as both sinks and, during flood events, sources of sediment.[57] Fallen branches and trees—which ecologists refer to as large woody debris[58]—often accumulate in headwater streams, where they provide shade and shelter, help dissipate the streams' energy, and reduce erosion.[59] When flood events wash that debris downstream, it provides important habitat for a variety of aquatic species.[60] And while little streams can convey introduced pollutants into downstream waterways, they also can retain some of that pollution, keeping it out of larger river systems. For all of these reasons, little streams play important roles in defining the chemistry, flow, and structure—what the Clean Water Act refers to as chemical and physical integrity—of downstream waterways.[61]

3. Biodiversity

Little streams also play important roles in supporting and conveying living things. For scientists, this is a somewhat new insight; for many years they tended to view small streams as areas of marginal biodiversity.[62] They had some basis for that view; fish tend to be present in greater diversity and abundance in larger streams and rivers.[63] But more recent studies have revealed that small streams can be biodiversity hotspots on their own.[64] Large fish may not thrive, but microbes, algae, insects, crustaceans, and amphibians often do; those species disperse downstream and into

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[55] *See* Mary C. Freeman et al., *Hydrologic Connectivity and the Contribution of Stream Headwaters to Ecological Integrity at Regional Scales*, 43 J. AM. WATER WORKS ASS'N 5, 8–9 (2007).

[56] CONNECTIVITY OF STREAMS & WETLANDS TO DOWNSTREAM WATERS, *supra* note 28, at 3-23 ("A large body of literature has demonstrated that headwater streams modify and export organic carbon that significantly affects ecosystem processes throughout the river network.").

[57] *Id.* at 3-13.

[58] *See, e.g.,* N.S. Lassettre & G.M. Kondolf, *Large Woody Debris in Urban Stream Channels: Redefining the Problem*, 28 RIVER RES. AND APPLICATIONS 1477 (2012).

[59] CONNECTIVITY OF STREAMS & WETLANDS TO DOWNSTREAM WATERS, *supra* note 28, at 3-17 to 3-18.

[60] *Id.*

[61] 33 U.S.C.A § 1251(a) (West 2016) ("The objective of this chapter is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.").

[62] *See* Daltry et al., *supra* note 31, at 230 ("Intermittent rivers have long been viewed as species poor, and dry channels have been viewed as biologically inactive systems.").

[63] *See id.*

[64] *See* Judy L. Meyer et al., *The Contribution of Headwater Streams to Biodiversity in River Networks*, 43 J. AM. WATER RESOURCES ASS'N 86, 86 (2007).

surrounding terrestrial habitats, providing prey for birds, fish, and a wide variety of other living things.[65]

Small streams also sustain species that live primarily within larger waterways. Some species, like coho salmon, rely on tributary waters as relatively predator-free nurseries.[66] Those tributary streams also can serve as refuges when conditions in larger waterways are hostile for other reasons, like high temperatures or competition from invasive species.[67] If more tolerable conditions return to the downstream waters, those refuges then can become source areas for repopulation, allowing a species to persist where it otherwise might have been extirpated.[68]

For all of these reasons, there is now a strong consensus in the scientific literature that protecting the water quality of rivers, lakes, and oceans necessitates protecting their tributary streams.[69] Again, this emphasis is somewhat new; these connections were not extensively documented in scientific literature twenty or thirty years ago.[70] But interest in small streams has grown dramatically. Perhaps the best evidence of that change, and of its regulatory significance, is the scientific-basis document associated with the recent Clean Water Rule.[71] That report cites dozens of studies of stream ecology, many focused on small waterways, and concludes that "[t]he scientific literature unequivocally demonstrates that streams, individually or cumulatively, exert a strong influence on the integrity of downstream waters."[72] As the report notes, the contribution of any individual tributary to downstream water quality may be quite small.[73] But the collective impact of thousands of streams, the report finds, is enormous.[74]

B. The Threats, and Their Implications

This Part began with a scenic tour of the Potomac River, but my description left out something important. It contained little mention of human alteration of the river system. Yet the Potomac River watershed, like river systems throughout the rest of the United States and much of the world, has been drastically altered by dams,

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[65] *See id.*; Freeman et al., *supra* note 55, at 9–10.

[66] Meyer et al., *supra* note 64, at 91–92.

[67] *See* STEPHEN P. PRICE et al., *The Ecological Importance of Tributaries and Confluences*, *in* RIVER CONFLUENCES, TRIBUTARIES, AND THE FLUVIAL NETWORK 209, 212 (Stephen P. Rice et al. eds., 2008).

[68] Meyer et al., *supra* note 64, at 98.

[69] *See* V. Acuña et al., *Why Should We Care About Temporary Waterways?*, 343 SCI. 1080–81 (2014); Freeman et al., *supra* note 55, at 6 ("Every important aspect of the river ecosystem, the river geomorphic system, and the river chemical system begins in headwater streams.").

[70] *See* Bishop et al., *supra* note 31, at 1239–40 (critiquing the relative lack of knowledge about headwater streams).

[71] CONNECTIVITY OF STREAMS AND WETLANDS TO DOWNSTREAM WATERS, *supra* note 28.

[72] *Id.* at ES-2.

[73] *Id.* at ES-5.

[74] *Id.*

pollution, water withdrawals, filling, floodplain development, and other sources of impact. In this watershed, and many others, some of the heaviest impacts have fallen upon the smallest streams.[75]

If we had diverged from the mainstream and tried to follow a tributary through the Washington, D.C. suburbs, we almost certainly would have found a case study in poor water quality.[76] Indeed, the stream might simply have disappeared into a series of buried culverts.[77] Similarly, if it flowed through an agricultural area, the stream might have been diverted or converted into an irrigation ditch, filled, or deprived of its recharge by groundwater pumping.[78] Farther southwest, beyond the boundaries of the Potomac Basin, we might encounter the most dramatic impacts of all. Hundreds of miles of headwater streams now lie "entombed," to use one article's evocative but accurate phrase, beneath the piles of rubble left over after nearby mountaintops were removed and relieved of their underlying coal.[79] Overlying these site-specific impacts is a broader threat. Climate change, with its heat, droughts, and floods, is heightening strains on aquatic ecosystems of all kinds, and little streams are by no means immune.[80]

The aggregate scale of these impacts is vast. In part, that is a function of geographic prevalence; small streams reach into so much of the landscape, they are particularly likely to get in the way of people's ambitions.[81] And because of their small size and relative anonymity (and because the public has no claim of legal ownership of the bed and banks of a nonnavigable stream), they traditionally seemed easy to divert or fill.[82] Indeed, landowners may not even perceive a little stream as a stream, particularly if it appears on no map; one recent study found that many owners denied the presence of streams that were readily apparent to scientists.[83]

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[75] Meyer & Wallace, *supra* note 21, at 302 ("[S]mall streams . . . are being lost from the landscape at an alarming rate.").

[76] *See generally* CTR. FOR WATERSHED PROT., IMPACTS OF IMPERVIOUS COVER ON AQUATIC SYS. 2 (2003).

[77] *See* Allison H. Roy et al., *Urbanization Affects the Extent and Hydrologic Permanence of Headwater Streams in a Midwestern US Metropolitan Area*, 28 J. N. AM. BENTHOLOGICAL SOC'Y 911, 914 (2009) (describing the disappearance of urban streams).

[78] *See* Jeffrey A. Falke et al., *The Role of Groundwater Pumping and Drought in Shaping Ecological Futures for Stream Fishes in a Dryland River Basin of the Western Great Plains, USA*, 4 ECOHYDROLOGY 682, 692–93 (2011); Meyer & Wallace, *supra* note 21, at 302–03.

[79] Meyer & Wallace, *supra* note 21, at 305.

[80] *See generally* JIMÉNEZ CISNEROS ET AL., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY 229–57 (Zbigniew Kundzewicz ed., 2014) (summarizing impacts on freshwater resources).

[81] *See* Meyer & Wallace, *supra* note 21, at 302 ("Because they are small and numerous, they have been viewed as unimportant, insignificant or a general nuisance. . . .").

[82] *See* State v. McIlroy, 595 S.W.2d 659, 663 (Ark. 1980) ("Determining the navigability of a stream is essentially a matter of deciding if it is public or private property.").

[83] Andrea Armstrong et al., *What's a Stream Without Water? Disproportionality in Headwater Regions Impacting Water Quality*, 50 ENVTL. MGMT. 849, 856 (2012) ("Eighteen (55%) of the 'no stream' parcels had visible surface water flows or channels within the

The scale of impacts is also large because small streams tend to be sensitive.[84] Unlike rivers, which have the capacity to dilute away some pollution loading, small streams can be transformed by even a short-term event like a heavy rainstorm.[85] Because of that sensitivity, even streams that have not been physically removed are still often heavily impacted. In urban and suburban settings, for example, poor water quality is so common in small streams that scientists have coined a shorthand phrase—urban stream syndrome—to describe it.[86]

Those widespread impacts underscore the importance of legal protection for small streams, for protecting important and imperiled resources is one of the core tasks of environmental law. But the impacts also underscore the associated challenges; many protective practices have direct costs. Creating stream buffers within agricultural fields or timber harvest areas, for example, can seem like a zero-sum game, as every square foot that goes into the buffer comes out of crop production.[87] Similarly, preserving space for streams means not using that space for houses, roads, or valley fills.[88] Sometimes our perceptions of zero-sum conflict can be wrong; stream protection can benefit landowners.[89] For example, so-called "green infrastructure," which processes stormwater runoff without the need for expensive treatment facilities, has real value, as many urban stormwater managers have belatedly discovered.[90] But we would not have filled, polluted, diverted, dammed,

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property boundaries."). Armstrong and her coauthors also found that "landowners with more regularly flowing streams were more concerned about stream water quality." *Id. See also* Meyer & Wallace, *supra* note 21, at 302 ("Society considers [headwater streams] of such little value that they are ignored.").

[84] *See* Palmer & Hondula, *supra* note 27, at 10,552 ("Streams and rivers are among the most threatened ecosystem types on earth and the most vulnerable are the smallest tributaries. . . .").

[85] *See* Dave Owen, *Urbanization, Water Quality, and the Regulated Landscape*, 82 U. COLO. L. REV. 431, 441–43 (2011) (describing stressors, many of them short-term, that affect small urban watersheds).

[86] *See* Christopher J. Walsh et al., *The Urban Stream Syndrome: Current Knowledge and the Search for a Cure*, 24 J. N. AM. BENTHOLOGICAL SOC'Y 706, 706 (2005).

[87] *See* Sarah Taylor Lovell & William C. Sullivan, *Environmental benefits of conservation buffers in the United States: Evidence, promise, and open questions*, 112 AGRIC., ECOSYSTEMS, & ENV'T 249, 254 (2005) ("The most obvious cost of buffers results from the lost profit when land is taken out of production and established as a natural area."); *see, e.g.*, Pronsolino v. Nastri, 291 F.3d 1123, 1129–30 (9th Cir. 2002) (citing timber harvesters' estimates of the costs of practices designed to protect water quality).

[88] *See, e.g.*, Ohio Valley Envtl. Coal. v. Aracoma Coal Co., 556 F.3d 177, 186–77 (2009) (describing valley fills—which were 68,841 linear feet in length—associated with four coal mining projects); CLAUDIA COPELAND, MOUNTAINTOP MINING: BACKGROUND ON CURRENT CONTROVERSIES 4 (2015) (noting mining industry arguments that southern Appalachian coal mining "would not be economic or feasible if producers were restricted from using valleys for the disposal of mining overburden.").

[89] *See* Lovell & Sullivan, *supra* note 87, at 254 (citing ways that buffers can benefit landowners).

[90] *See* U.S. EPA, THE ECONOMIC BENEFITS OF GREEN INFRASTRUCTURE (2014); Margaret A. Palmer et al., *Manage Water in a Green Way*, 349 SCI. 584, 584 (2015).

and otherwise impacted so many little streams if protecting them had seemed convenient.

Beneath these practical considerations lurks a more legal reason why headwater stream protection can be challenging. Small streams—particularly those with intermittent or ephemeral flow—defy the boundaries between water and land. And that boundary region has sometimes been an uncomfortable zone for environmental law.[91] In the United States, at least, protecting the environment is widely accepted as an appropriate role for the federal government, but legal rhetoric often assigns responsibility for land use planning to state and local authorities.[92] In practice, that division can become blurry, and within the field of stream and wetlands protection, lower courts have often acquiesced to federal exercises of jurisdiction over places that are dry more often than they are wet.[93] But twice in the past fifteen years—first in *Solid Waste Agency of Northern Cook County v. U.S Army Corps of Engineers*,[94] and then again in *Rapanos v. United States*[95]—the U.S. Supreme Court has signaled its discomfort with federal water quality protections that verge onto land use regulation.[96] The Court has not articulated any clear doctrinal rule giving effect to its fears, and perhaps it never will; the boundaries between federal and state authority are much easier for judges to extoll than they are to draw. But the Court's opinions do indicate that future federal protection of small streams will confront not just the practical difficulties of changing longstanding and widespread practices, but also the blurry-edged shadows of a particular vision of American federalism.[97] State or local protection can escape those shadows, but in many states, meaningful and widespread protections for streams have not been forthcoming.[98]

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[91] *See* Owen, *supra* note 85, at 476–80.

[92] *See id.* (summarizing rhetoric from Congress and the U.S. Supreme Court).

[93] *See, e.g.*, Quivira Mining Co. v. EPA, 765 F.2d 126, 130 (10th Cir. 1985) (upholding the EPA's regulatory jurisdiction over a largely dry arroyo).

[94] 531 U.S. 159 (2001).

[95] 547 U.S. 715 (2006).

[96] *Id.* at 738 ("The extensive federal jurisdiction urged by the Government would authorize the Corps to function as a *de facto* regulator of immense stretches of intrastate land . . . . [T]he Corps' interpretation stretches the outer limits of Congress's commerce power and raises difficult questions about the ultimate scope of that power."); *Solid Waste Agency of N. Cook Cty.*, 531 U.S. at 161 ("Permitting respondents to claim federal jurisdiction over ponds and mudflats falling within the Migratory Bird Rule would also result in a significant impingement of the States' traditional and primary power over land and water use.").

[97] *Rapanos*, 547 U.S. at 738; *Solid Waste Agency of N. Cook Cty.*, 531 U.S. at 174.

[98] *See* ENVTL. L. INST., STATE WETLAND PROTECTION: STATUS, TRENDS, AND MODEL APPROACHES 13 (2008) (mapping state wetlands protection programs, and showing many states where the only protection comes from federal programs). Many states have also chosen to affect stream and wetland policy by using their influence within the 404 permitting process. *See also*, Owen, *supra* note 13, at 97–99, 101–05, 115 (describing mechanisms through which states can do this).

II. THE LEGAL EVOLUTION

At the outset of his plurality opinion in *Rapanos*, in a passage that foreshadowed his later discussion of federalism, Justice Scalia decried "the immense expansion of federal regulation of land use that has occurred under the Clean Water Act—without any change in the governing statute—during the past five Presidential administrations."[99] In one key sense, his charge was factually correct. Congress has not amended section 404 since 1977, yet there has been an immense expansion in the 404 program's reach over the past six[100] presidential administrations. This Part tells the legal story of that change. It begins with the emergence of modern water quality law, and with the Corps's initial reluctance to extend that law beyond the boundaries of traditionally navigable waterways. In a second key phase of section 404's implementation history, regulatory practices changed dramatically—but not for little streams. Wetlands protection emerged as a national issue, and as a mission that the Corps gradually embraced, but stream protection still played second fiddle.[101] Only during the most recent phase, which began during the late 1990s and continues through the present day, has stream protection begun its major shift.[102]

A. Statutory Origins and Regulatory Exemptions

In 1972, Congress enacted the Clean Water Act, a statute that would quickly dominate the field of water quality protection in the United States.[103] Congress did not write on a blank slate; state water quality law had begun to emerge decades earlier, and a series of less forceful federal statutes preceded the 1972 law.[104] By 1972, the Corps also had emerged as a player in the legal world of aquatic resource management.[105] Its responsibilities under the Rivers and Harbors Act[106] and the Refuse Act[107] gave it some authority over the discharge of materials into traditionally navigable waterways, and the Corps had begun using that authority to restrain

[99] *Rapanos*, 547 U.S. at 722.

[100] Justice Scalia wrote his opinion while George W. Bush was still in office.

[101] *See infra* notes 145–174 and accompanying text.

[102] Wetlands protections have also continued to evolve, *see* GARDNER, *supra* note 11 (summarizing wetlands protection), but that evolution is not the direct focus of this Article.

[103] 33 U.S.C.A. § 1251 et seq. (West 2016). Congress actually called the 1972 statute the Federal Water Pollution Control Act Amendments of 1972, and it later became commonly known as the "Clean Water Act."

[104] For detailed accounts of the Clean Water Act's predecessors and legislative history, see William L. Andreen, *The Evolution of Water Pollution Control in the United States – State, Local, and Federal Efforts*, 1789-1972: Part I, 22 STAN. ENVTL. L. J. 145 (2003); William L. Andreen, *The Evolution of Water Pollution Control in the United States – State, Local, and Federal Efforts,* 1789-1972: Part II, 22 STAN. ENVTL. L. J. 215 (2003).

[105] *See* Sam Kalen, *Commerce to Conservation: The Call for a National Water Policy and the Evolution of Federal Jurisdiction over Wetlands*, 69 N.D. L. REV. 873, 881–86 (1993).

[106] 33 U.S.C.A. § 403 (West 2016).

[107] 33 U.S.C.A. § 407 (West 2016).

pollution.[108] But the 1972 legislation transformed the field by adding much stronger teeth to previous laws, setting forth the primary permitting programs through which water quality protection would be implemented, and defining the responsibilities of the Corps and the EPA.[109]

One key component of the 1972 legislation was a regulatory program for discharges of dredged or fill material into waters of the United States. That program arises from the interplay of two statutory sections: 301, which prohibits unpermitted discharges of pollutants; and 404, which allows discharges of dredged or fill material if the discharging entity obtains, and complies with, a permit.[110] Section 301 creates the prohibition, in other words, and section 404 creates a conditional, permit-based exception. The Corps and the EPA jointly administer the 404 program, with the Corps completing the day-to-day work of permit issuance, and with most of that work taking place at district and field offices across the country.[111]

[108] *Id.*

[109] *See Summary of the Clean Water Act*, EPA, http://www2.epa.gov/laws-regulations/summary-clean-water-act [https://perma.cc/3D4C-TC4L] (last updated Sept. 8, 2016).

[110] 33 U.S.C.A. §§ 1311, 1344 (West 2016).

[111] *See* Owen, *supra* note 13, at 80–92.

Table 1: Roles of Federal and State Agencies in Implementing Clean Water Act Section 404 (a Partial Sampling)[112]

U.S. Army Corps of Engineers	• Administers day-to-day program, including individual and general permit decisions; • Conducts or verifies jurisdictional determinations; • Develops policy and guidance; and • Enforces Section 404 provisions.
U.S. Environmental Protection Agency	• Develops and interprets policy, guidance, and environmental criteria used in evaluating permit applications; • Determines scope of geographic jurisdiction and applicability of exemptions; • Approves and oversees State and Tribal assumption; • Reviews and comments on individual permit applications; • Has authority to prohibit, deny, or restrict the use of any defined area as a disposal site (Section 404(c)); • Can elevate specific cases (Section 404(q)); • Enforces Section 404 provisions.
U.S. Fish and Wildlife Service (National Marine Fisheries Service for marine or diadromous species)	• Evaluates impacts on fish and wildlife of all new Federal projects and Federally permitted projects, including projects subject to the requirements of Section 404 (pursuant to the Fish and Wildlife Coordination Act); • Elevates specific cases or policy issues pursuant to Section 404(q); and • Consults on projects that might adversely impact threatened or endangered species.
State environmental regulatory agencies	• Issue Clean Water Act section 401 certifications, which certify that projects will be consistent with state water quality standards.

[112] The Corps and the EPA entries on this table are pasted directly from the EPA's website, as are the first two bullets for the Fish and Wildlife Service entry. *Section 404 Permit Program*, EPA, http://water.epa.gov/lawsregs/guidance/cwa/dredgdis/ [https://perma.cc/D4DW-NTTK] (last updated Mar. 3, 2016). I have written the remaining bullets.

Almost immediately, questions emerged about which waters the new regulatory program encompassed.[113] Congress had prohibited unpermitted discharges of pollutants into "navigable waters," a phrase that, in traditional water law usage, encompassed waterways that were navigable for commercial purposes.[114] But Congress then defined "navigable waters" as "the waters of the United States"—a seemingly more expansive definition.[115] The EPA initially took a broad view of that language, but the Corps disagreed.[116] It construed its jurisdiction as extending only to traditionally navigable—navigable-in-fact, in Clean Water Act jargon—waterways.[117] Smaller streams and isolated wetlands, according to the Corps, fell outside the program's scope.[118]

That narrow view reflected years of agency history and culture. Despite a few recent forays into the field, the Corps was not really an environmental regulatory agency—at least, not yet. Its historic purpose had been to promote navigation and to build waterworks, and it had often done so at great environmental cost.[119] Hardly any biologists worked for the agency, which was staffed primarily with engineers and run by military officers.[120] In an interview, a retired Fish and Wildlife Service

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[113] *See* Kalen, *supra* note 105, at 891–94.

[114] *See* 33 U.S.C.A. § 1311 (West 2016). To put the point more precisely, Congress prohibited unpermitted discharges, *id.*, and the definition of discharge encompassed "any addition of any pollutant to navigable waters from any point source." 33 U.S.C.A. § 1362(12) (West 2016). For the classic explanation of "navigable waters," see *The Daniel Ball*, 77 U.S. 557, 563 (1870) ("[T]hey are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce . . . .").

[115] 33 U.S.C.A. § 1362(7) (West 2016).

[116] *See* Thomas Addison & Timothy Burns, Comment, *The Army Corps of Engineers and Nationwide Permit 26: Wetlands Protection or Swamp Reclamation?*, 18 ECOLOGY L.Q. 619, 628 (1991) (describing "dramatically different positions").

[117] Permits for Activities in Navigable Waters or Ocean Waters, 39 Fed. Reg. 12,115, 12,119 (April 3, 1974) (defining "navigable waters" as "those waters of the United States which are subject to the ebb and flow of the tide, and/or are presently, or have been in the past, or may be in the future susceptible for use for purposes of interstate or foreign commerce"); Permits for Activities in Navigable Waters or Ocean Waters, 38 Fed. Reg. 12,217 (May 4, 1973).

[118] *See* Addison & Burns, *supra* note 116, at 628–29.

[119] *See* MARC REISNER, CADILLAC DESERT 169–213 (revised ed. 1993).

[120] *See* Telephone Interview with Retired Army Corps Dist. Chief (Sept. 9, 2014). The former chief described the culture of that era, and subsequent changes, at some length:

> Back in those Paleozoic days when the Corps had just begun hiring biologists and oceanographers and environmental scientists, back in the early to mid-70s, things were hugely different. . . . Initially, the Corps of Engineers didn't really know what to do with biologists and environmental scientists. It was a culture dominated by engineers and military commanders. And the engineers are . . . I guess they're not entirely monolithic, but engineers are often non-verbal, linear-type thinkers, A leads to B leads to C leads to solution, not prone to discussing all the other ramifications, necessarily, and the other influences and, well, how does this affect what we did on that project, and vice versa. . . . We sort of developed our own

(FWS) staff member described the resulting mentality: "They were old school Corps of Engineers, damn the torpedoes, we're going to issue permits. We can't let these lowly fish stand in our way . . . . [I]t was almost like the developers were their clients and their duty was to issue permits, and they just steamrolled them."[121] Regulating discharges that might impede navigation fit with the agency's traditional purpose and expertise, particularly if, by occupying that role, the agency could keep the EPA from assuming exclusive authority within part of the Corps's traditional domain.[122] But protecting small streams and wetlands did not.

The Corps's narrow conception of its Clean Water Act jurisdiction turned out to be short-lived. A federal court decision compelled a more expansive understanding,[123] and in 1975, the Corps issued interim regulations defining its jurisdiction more broadly.[124] It did so grudgingly. In a press release describing the new regulations, the Corps critiqued what it had just done in terms just a few adjectives short of those used by Speaker Boehner and other modern-day critics.[125] And at least some Corps staff doubted the longevity of the new rules. According to one article, a consultant helping with the new regulations was told he should not

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> culture by necessity, since we were initially sort of sequestered and ignored. It took me three years with the Corps before I got my very first promotion, something that's completely unheard of now. And we were literally told, at one point, biologists and oceanographers were a dime a dozen. This was by our personnel director. We weren't exactly made to feel at home. So compared to that, the situation has changed radically.

Id.

[121] Telephone Interview with Retired FWS Staff Member (Aug. 26, 2014). A longtime EPA staff member put the point a bit more gently:

> The issues that we were speaking to, and still speak to in terms of why a particular filling activity might have an ecological impact, weren't . . . again, not speaking negatively, but weren't within the wheelhouse of the engineers that were issuing permits at the time, years ago at the Corps. In terms of, they didn't have the academic background and the understanding, and to some degree, attachment for that . . . contemplating those sorts of issues.

Telephone Interview with EPA Staff Member (Sep. 4, 2014).

[122] *See* Addison & Burns, *supra* note 116 at 624 (repeatedly discussing, and critiquing, the Corps's culture).

[123] Nat. Res. Def. Council, Inc. v. Callaway, 392 F. Supp. 685, 686 (D. D.C. 1975) (ordering the 1974 regulations revoked and rescinded).

[124] Permits for Activities in Navigable Waters or Ocean Waters, 40 Fed. Reg. 31320 (July 15, 1975).

[125] *See* Addison & Burns, *supra* note 116, at 629 ("Simultaneously, however, the Corps issued a press release asserting that the decision would force it to require permits for 'the rancher who wants to enlarge his stock pond, or the farmer who wants to deepen an irrigation ditch or plow a field, or the mountaineer who wants to protect his land against stream erosion.'").

work too hard, because Congress would soon make the whole problem go away.[126] But Congress did no such thing. Its 1977 Clean Water Act amendments retained a broad definition of Clean Water Act jurisdiction, and that statutory language remains governing law today.[127]

But even if the courts and Congress had rejected the Corps's narrow conception of its *jurisdiction*, that rejection did not put an end to the geographically narrow scope of *protections*. In 1975 interim regulations, and again in 1977 final regulations, the Corps drew a sharp distinction between waters that might be jurisdictional and waters where impacts would actually be meaningfully regulated.[128] Those regulations defined the waters of the United States to include "the entire length of rivers and streams."[129] But the Corps also established a cutoff point beyond which no additional permitting process would be required, and waterways could simply be filled, even though the waters might be jurisdictional.[130] For streams, that cutoff point occurred where the waterway had an annual average flow of less than five cubic feet per second.[131] And to accommodate activities in arid areas, where infrequent but heavy flows might raise the averages, the Corps's staff could use the point at which *median* flows reached five cubic feet per second as the regulatory cutoff, meaning that all but the largest perennial streams in arid regions would fall outside the reach of most regulatory constraints.[132] The Corps did establish standardized general permits[133]—some of which would eventually

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[126] *Id.* at 632.

[127] Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566 (1977); *see* Kalen, *supra* note 105, at 897–905.

[128] Regulatory Programs of the Army Corps of Engineers, 42 Fed. Reg. 37,122, 31,729 (July 19, 1977) ("We emphasize that, the 'headwaters' concept used in this new regulation is the point on the stream above which individual or general permits ordinarily will not be required. It is not to be construed as the point beyond which a stream ceases to be a water of the United States. . . .").

[129] *Id.* at 31,129.

[130] *Id.* The regulations stated, in key part:

> We have responded to these concerns and criticisms by: (1) Including the entire length of rivers and streams in our definition of waters of the United States; (2) utilizing the "headwaters" 'concept to establish the point on the stream below which an individual or general permit will be required to discharge dredged or fill material; (discharges above headwaters are being permitted through the issuance today of a nationwide permit which is discussed in greater detail below); and (3) redefining the term "headwaters."

Id.

[131] *Id.*

[132] *See id*. ("This approach more realistically represents normal base flows of such streams.").

[133] A general permit, in the parlance of environmental law, is a permit that provides blanket authorization to a particular class of activities, so long as permit holders comply with a standardized set of permit conditions. *See* Nat. Res. Def. Council v. Costle, 568 F.2d 1369,

coalesce into something known as Nationwide Permit 26—providing some legal cover for these fills, but the permits established only limited and largely hortatory requirements, and did not even include reporting obligations.[134] Consequently, in some districts, any stream that a Corps field scientist could jump across—that was a shorthand field test for the regulatory boundary—could be filled at will.[135]

In part because the Corps did not establish reporting requirements, it is difficult to know just how many streams were filled under this blanket authorization.[136] But any realistic estimate would be large. As subsequent studies have revealed, little streams make up most of our river and stream miles.[137] They also tend to get in the way of people's activities, and they are fairly easy to fill. And we know from later studies that a wide variety of human activities tend to obliterate small streams.[138] In all likelihood, much of that obliteration happened in full compliance with the 1977

1380–82 (D.C. Cir. 1977). A recent Corps/EPA study summarizes its different permit types as follows:

> **Individual Permit:** issued after a case-specific evaluation and a determination that the proposed activity is not contrary to the public interest
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> - **Standard Permit:** permit that authorizes a specific activity after issuing a public notice to solicit comments and conducting a public interest review and other required analyses.
> - **Letter of Permission:** permit issued after conducting an abbreviated processing procedure, including coordination with federal and state agencies, and making a public interest determination.
>
> **General Permits:** authorize activities that are similar in nature and cause only minimal individual and cumulative adverse environmental impacts
>
> - **Nationwide Permit:** general permit issued by Corps Headquarters, to authorize activities across the country
> - **Regional General Permit:** general permit issued by a District Engineer to authorize categories of activities within a specific geographic area
> - **Programmatic General Permit:** general permit issued by a District Engineer to authorize categories of activities regulated by another agency, to reduce duplication.

INST. FOR WATER RES., THE MITIGATION RULE RETROSPECTIVE: A REVIEW OF THE 2008 REGULATIONS GOVERNING COMPENSATORY MITIGATION FOR LOSSES OF AQUATIC RESOURCES 18 (2015).

[134] *See* Addison & Burns, *supra* note 116, at 632.

[135] Telephone Interview with EPA Staff Member (Sep. 19, 2014) ("Their test for five [cubic feet per second of flow] was whether they could jump over it or not. We never even got into ephemeral or intermittent."). Other districts used the drainage area of the stream to calculate average annual flows. *See* 42 Fed. Reg. 37,122, 37129 (July 19, 1977) (describing this method). But while the process may have been more rigorous, the implications of the cutoff point were the same.

[136] *See* Addison & Burns, *supra* note 116, at 637–40 (discussing the lack of reporting requirements and the resulting information deficits).

[137] *See supra* notes 32–35 and accompanying text.

[138] *See supra* notes 75–86 and accompanying text.

rule and its descendants—and with Nationwide Permit 26 and its predecessors—and it probably occurred on a massive scale.

This vignette also sheds some interesting light on current debates over jurisdiction. In his *Rapanos* opinion, Justice Scalia criticized the Corps and the EPA for allegedly excessive overzealous assertions of jurisdiction, implying that a creeping jurisdictional expansion was the key mechanism through which the agencies had accomplished their alleged regulatory overreach.[139] The present debates over the Clean Water Rule reflect the same emphasis; the battle over jurisdiction, one would think, is where all the stakes lie.[140] But the reality is quite different. Jurisdiction was already extensive four decades ago.[141] What has changed most, and what matters just as much as the jurisdictional boundary itself, is what agencies *do* within their jurisdiction. And for little streams, in the initial years of Clean Water Act implementation, the Corps did not do much.

That may sound scandalous. But the Corps's minimalist approach reflected a more general reality of environmental law in the 1970s and 1980s. Those may have been the glory days of American environmental legislation, but implementing those laws was another matter. To meaningfully protect small streams, or to fulfill many of the other grand mandates of the 1970s statutes, would require applying regulatory constraints to a huge variety of actions, each of which might seem to contribute to larger environmental problems only in very incremental ways.[142] And the professional infrastructure for implementing that kind of constraint was only beginning to exist. Environmental regulatory agencies with real authority were relatively new phenomena. Environmental lawyers were taking a shared crash course in a new area of law. And the environmental consulting industry, which eventually would help regulated industries comply with all their new mandates, was just beginning to emerge.[143] More broadly, the nation as a whole was slowly, and painfully, coming to grips with the reality that environmental protection might not just mean imposing constraints on a few big polluters.[144] If the Corps struggled, in

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[139] *See supra* notes 75–86 and accompanying text.

[140] *See, e.g.,* Jeremy P. Jacobs & Annie Snyder, *Mr. Clean Water Act Faces his Biggest Test*, GREENWIRE (Sept. 30, 2015), http://www.eenews.net/gw/2015/09/30 [https://perma.cc/MZ44-SXHF] (quoting a Department of Justice lawyer who characterized the Supreme Court's decision in *United States v. Riverside Bayview Homes*, 474 U.S. 121 (1985), a case that empowered comparatively broad assertions of jurisdiction, as "really the peak of environmental law under the Clean Water Act. . . . Frankly, it's been downhill since").

[141] *See supra* notes 123–127 and accompanying text.

[142] *See* David Adelman, *Environmental Federalism when Numbers Matter More than Size*, 32 UCLA J. ENVTL. L. & POL'Y 238, 240–41 (2014) (describing the importance of small sources to air quality regulation); Dave Owen, *Critical Habitat and the Challenge of Regulating Small Harms,* 64 FLA. L. REV. 141, 143–44 (2012) [hereinafter Owen, *Critical Habitat*] (noting the pervasiveness of these challenges).

[143] *See* Bernard Sinclair-Desgagne, *The Environmental Goods and Services Industry*, 2 INT'L REV. OF ENVTL. & RESOURCE ECON. 69, 72 (2008) (describing historical development of the environmental goods and services industry).

[144] *See, e.g.*, Nat. Res. Def. Council, Inc. v. Costle, 568 F.2d 1369, 1370–71, 1381–82

that historical moment, to become a regulatory champion for little streams, it should not be too hard to understand why.

B. The Wetlands Era

Small streams were not the only landscape features that received little protection during the early years of the 404 program. Small wetlands also played second fiddle.[145] By the early 1990s, however, wetland protection had emerged as one of environmental law's highest-profile issues.[146] With that emergence, the histories of wetland and stream protection began a dramatic, if temporary, divergence.

In part, the changes came from the top. President Ronald Reagan's hostility to environmental regulation was widely publicized—and, according to some commentators, well received by the Corps.[147] But by 1988, presidential candidates were openly declaring their commitment to avoiding further wetland loss.[148] George H.W. Bush's commitment to a national "no net loss" policy has guided agency policy ever since.

In the field, changes were occurring as well. To implement its new regulatory responsibilities, the Corps had begun hiring biologists.[149] While the new staff members were marginalized at first, they gradually began to integrate into, and help transform, the agency's culture.[150] The Corps's partner agencies—the FWS, the National Marine Fisheries Service, and state wetland regulators, in addition to the EPA—also were engaged in constant discussions with the Corps staff, and often

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(D.C. Cir. 1977) (compelling a reluctant EPA to regulate stormwater discharges and other dispersed sources of water pollution); Adelman, *supra* note 142, at 258–60 (describing backlashes against federal air pollution controls).

[145] *See* Addison & Burns, *supra* note 116, at 644 (focusing on impacts to vernal pools).

[146] *See* Oliver A. Houck & Michael Rolland, *Federalism in Wetlands Regulation: A Consideration of Delegation of Clean Water Act Section 404 and Related Programs to the States*, 54 MD. L. REV. 1242, 1243 (1995) ("Wetlands regulation may be the most controversial issue in environmental law.").

[147] *See* Addison & Burns, *supra* note 116, at 659.

[148] *See* J.B. Ruhl & James Salzman, *Gaming the Past: The Theory and Practice of Historic Baselines in the Administrative State*, 64 VAND. L. REV. 1, 29–35 (2011) (describing the "no net loss" policy's history).

[149] *See* Telephone Interview with Army Corps Regulatory Dist. Chief (Aug. 25, 2014) (describing the transition, at his district office, from a small staff of technicians: "That has grown into a totally professional staff, biologists, engineers, environmental scientists of all different backgrounds. We've gone from 5 people to 32 so there's organizationally there's been a big change. And, like I said, I would venture to say that was pretty consistent nationally.").

[150] *See* Telephone Interview with EPA Staff Member (Sept. 4, 2014) ("When biologists came on board, and we all grew from the perspective of staff credentials and knowledge, everyone seemed to have a better understanding and appreciation of why some of the things that filling and disturbing streams and wetlands . . . why that concerns us, and it was easier to collaborate because we had more common understanding of those issues.").

pushed for more thorough and aggressive wetland protections.[151] The resulting changes were fitful. Throughout much of the 1980s, those partner agencies reported persistent frustrations with the Corps's indifference toward environmental protection.[152] Even as late as the early 1990s, the Corps was still issuing pamphlets showing cartoons of smiling bulldozers filling wetlands.[153] But change did come. As one former FWS staff member summarized the transition:

> a new regime came into [the Corps district he worked with] and they were just so much more personable, so much more sensitive to environmental issues. I mean I truly felt that the . . . district regulatory folks and even the project planning folks to a large extent, really believed in the equal consideration for fish and wildlife that the Fish and Wildlife Coordination Act[154] called for. There were times when I felt like . . . my environmental arguments . . . may have been even a little heavier weight on the scale than the law calls for.[155]

In addition to its culture, the Corps's regulatory toolbox also evolved. Initially, the Corps's reluctance to protect dispersed resources like wetlands and streams

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[151] Palmer Hough & Morgan Robertson, *Mitigation Under Section 404 of the Clean Water Act: Where It Comes from, What It Means*, 17 WETLANDS ECOLOGY & MGMT. 15, 20–23 (2009) (describing efforts by the Fish and Wildlife Service and the EPA to make the Corps's practices more protective); *See id*. ("[W]e evolved from arguing with each other over whether salt marshes and tidal wetlands were important to a point in today's world where there's no disagreement among the Corps, EPA, Fish and Wildlife Service, all the players about those sorts of things. The early days of this program involved a lot of education.").

[152] *See* Hough & Robertson, *supra* note 151, at 21 (quoting an EPA staff member: "The Corps regularly ignores a determination of significant degradation for individual and cumulative effects. This is the major cause of continuing wetland losses.").

[153] Addison & Burns, *supra* note 116, at 663.

[154] 16 U.S.C.A. §§ 661–666c (West 2016). The Fish and Wildlife Coordination Act requires federal agencies that are authorizing or carrying out alterations of water bodies to coordinate with agencies responsible for wildlife in those waterways. *Id.* § 662(a).

[155] Telephone Interview with Retired Fish and Wildlife Serv. Staff Member (Aug. 26, 2014). He also noted that he viewed the Corps district he worked with as distinctive. *Id.* But many longtime Corps staff members from different districts described similar changes. For example:

> [W]hen I started, the principal . . . responsibility of our program was really to look at navigation, to look at the impacts of construction activities on navigation. It wasn't until the mid-seventies with the advent of the Clean Water Act and new regulations that came out in response to that, where we got heavily involved in environmental concerns. And now navigation only plays a very small part of what we evaluate. It's primarily now an environmental program. So there's been a big change in the culture over the years in the focus of the Corps.
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> Telephone Interview with Regulatory Dist. Chief (Aug. 25, 2014).

stemmed partly from manpower concerns.[156] The Corps simply did not have the staff, it argued, to keep track of so many little aquatic features.[157] But the agency gradually found better ways to provide protection while managing the manpower strains inherent in governing numerous, widely dispersed resources. Increasingly, it issued general permits—like Nationwide Permit 26—that provided blanket authorization for certain classes of activities, so long as the permittees complied with specific conditions and best management practices.[158] And some of those conditions and best management practices generated real and meaningful environmental protection.[159] By streamlining permitting for more minor activities, general permits also allowed the regulatory program's staff—which had grown since the 1970s—to focus on more significant activities.[160]

In addition to developing new permitting approaches for wetland fills, the Corps also turned to new ways to compensate for the resulting impacts. During the 1980s and 1990s, the Corps increasingly required permit recipients to provide compensatory mitigation for wetland impacts.[161] Compensatory mitigation meant creating new wetlands, or restoring, enhancing, or preserving existing ones, to offset the impacts of permitted wetland fills.[162] Sometimes the permit recipient itself would provide the compensation. The Corps also allowed permit recipients to pay impact fees into third party funds, which would then be used to pay for wetland protection, or to private businesses that had already created, restored, or enhanced wetlands somewhere else, and now had wetland credits to sell.[163] By the early 2000s, the former approach, known as an "in-lieu fee program," and the latter, known as "mitigation banking," were both available in many parts of the country.[164] By most accounts, compensatory mitigation was initially a debacle; far too often the restored or created wetlands turned out to be poor substitutes for the natural wetlands that had been destroyed.[165] But the Corps, the EPA, and their regulatory and private

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[156] Addison & Burns, *supra* note 116, at 655.

[157] *See id.*

[158] *Id.*; *see also* Owen, *supra* note 13, at 97–99 (describing the development of general permits).

[159] *See* Owen, *supra* note 13, at 98–99 (describing the use of general permits to increase stringency).

[160] *See, e.g.*, Telephone Interview with Regulatory Dist. Chief (Sept. 3, 2014) ("If we don't necessarily have to look at every small project . . . that allows my project managers to really focus on those projects that might have more than a minimal environmental effect.").

[161] *See* Hough & Robertson, *supra* note 151, at 18.

[162] *See id.* at 23–24.

[163] *See* Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594, 19,594–95 (Apr. 10, 2008) (explaining different approaches to compensatory mitigation).

[164] *See* ENVTL. L. INST., THE STATUS AND CHARACTER OF IN-LIEU FEE MITIGATION IN THE UNITED STATES 17–18 (2006) (listing programs by state); JESSICA WILKINSON & JARED THOMPSON, 2005 STATUS REPORT ON COMPENSATORY MITIGATION IN THE UNITED STATES 2 (2006).

[165] *See* COMM. ON MITIGATING WETLAND LOSSES, NATIONAL RESEARCH COUNCIL, COMPENSATING FOR WETLAND LOSSES UNDER THE CLEAN WATER ACT 45 (2001) (finding pervasive inadequacies); GEN. ACCOUNTING OFFICE, CORPS OF ENGINEERS DOES NOT HAVE

partners were gradually learning from their mistakes. Though the empirical record is far from thorough, some more recent studies suggest—and agency staff emphatically asserted—that wetlands mitigation has improved.[166]

The changes that began in the eighties and nineties, in short, were substantial.[167] But they were also focused primarily on wetlands.[168] For decades, Nationwide Permit 26 remained the primary nationwide permit for stream impacts, and it addressed the smallest of those streams largely by excluding them from regulatory protection.[169] Compensatory mitigation was also focused on wetlands; the streams

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AN EFFECTIVE OVERSIGHT APPROACH TO ENSURE THAT COMPENSATORY MITIGATION IS OCCURRING 26 (2005) (critiquing the Corps's governance of mitigation). In my interviews, Corps staff never denied that early mitigation practices had been poor. *See, e.g.*, Telephone Interview with Regulatory Dist. Chief (Sept. 16, 2014) ("[T]here's an old school, I was trained that way so I understand it, you know it's just a reluctance to lay a lot of heavy mitigation."); Telephone Interview with Regulatory Dist. Chief (Nov. 20, 2014) ("[W]hen we first started doing wetland mitigation, it was on-site, one-to-one, and for the most part failing miserably.").

[166] *See, e.g.*, Tammy Hill et al., *Compensatory Stream and Wetland Mitigation in North Carolina: An Evaluation of Regulatory Success*, 51 ENVTL. MGMT. 1077, 1089 (2013). One agency biologist summarized the change:

> As we've learned more about wetlands, their functions, the program has morphed over time, gotten more prescriptive. We've learned what doesn't work versus those that do. There's a lot of things that we didn't require ten, twenty years ago that we do today. The level of detail, types of things that work for mitigation versus those that don't. Back in the day somebody may have said, "Well I'm just gonna go create some wetlands" and we'd say "OK, here's your permit" without any level of detail of what you're gonna do and how you're gonna do it, what your success is. If it didn't work, then, "ok, well no big deal." Today it's a much tighter mindset. The level of detail is significantly higher. The way that we interpret the law . . . and what levels of information we need today are much tighter, and we don't let things go or just kind of write them off because they're not that important.

Telephone Interview with Regulatory Branch Chief (Sept. 5, 2014).

[167] *See generally* Hough & Robertson, *supra* note 151 (chronicling these changes).

[168] One district chief summarized that evolution:

> [B]ack in the 80's . . . most of our work at that time was on the rivers. It wasn't until '88 I think, President Bush, the first Bush, said, "no net loss." The program started evolving towards wetlands at that point. And then the first lawsuit for coal was in '98, Robertson versus Bragg. . . . And that was about stream impacts, and really the program wasn't positioned very well at that time to deal with stream impacts. We didn't have stream assessment methodologies. There was nothing in place other than some rough ratio, 1:1 replacement, that kind of thing, because the whole program was geared to wetlands. . . .

Telephone Interview with Regulatory Dist. Chief (Sept. 16, 2014).

[169] *See supra* notes 134–138 and accompanying text.

that were lost, as one retired Corps district chief explained to me, "were just lost."[170] Even when the Corps did require compensatory mitigation for stream impacts, it generally let wetland restoration serve as compensation.[171] It did so in part because regulators lacked clear ideas about how stream mitigation would even be done; scientific research on the subject was minimal, and permits and regulatory guidance documents were often ambiguous, or just silent, about streams.[172] In policy discussions, the rhetorical emphasis on wetlands was even more pronounced. Politicians simply did not talk about a "no net loss" policy for streams, and environmental lawyers came to think of the 404 program as a wetlands program.[173] Indeed, that framing lingers today. Environmental law articles (including several that I have written), treatises, and casebooks still routinely identify section 404 solely with wetlands protection, as though regulatory protection of streams simply did not exist.[174]

C. The Emergence of Stream Protection

One might expect the story to end there. Just two years after George H.W. Bush's "no net loss pledge," Congress enacted the 1990 Clean Air Act Amendments[175] and the Oil Pollution Act,[176] but little additional legislation followed; those statutes are widely hailed as the last significant environmental legislation to emerge from the United States' federal government.[177] And just four years after that, midterm elections handed both congressional chambers to a cohort

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[170] Telephone Interview with Retired Regulatory Dist. Chief (Sept.12, 2014).

[171] *See id*. In response to a question about how stream mitigation was done two decades ago, he said, "we probably accepted wetland restoration or enhancement." When I followed up by mentioning that other staff had told me that no mitigation was required at all, he said, "That's quite possible as well. . . ." *Id.*

[172] *See id.* ("[Q]uite frankly, we probably didn't have the technical expertise back in the early nineties to say to somebody, 'here is what we want you to do in this channel to make it better.' We just didn't know."); Telephone Interview with Retired N.C. Dep't of Envtl. Quality Emp. (Sept. 9, 2015) (noting that state and federal regulatory documents were ambiguous in their treatment of stream impacts).

[173] *See* Telephone Interview with Senior Corps Staff Members (Nov. 17, 2014) ("For a long time 404 was viewed as a 'wetland protection program.'").

[174] *See supra* note 12 and accompanying text.

[175] Clean AirAct, Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (codified at various portions of 42 U.S.C.A. §§ 7401–7671q (West 2016)).

[176] Oil Pollution Act of 1990, Pub. L. No. 101-380, 104 Stat. 484 (amending multiple parts of the U.S. Code).

[177] *See* RICHARD LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 125–26 (2004). The most prominent exception to this generalization is the Magnuson-Stevens Fishery Conservation and Management Act, which became much more environmentally protective through amendments in 1996 and in 2007. *See* PEW CHARITABLE TR. & OCEAN CONSERVANCY, THE LAW THAT'S SAVING AMERICAN FISHERIES: THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT 12 (2013) (summarizing changes to the statute).

of conservative Republicans, many of whom were fixated on rolling back environmental laws.[178] Environmental law's era of trench warfare had begun, and some of that warfare clearly continues to the present day. But the late 1990s also brought the beginning of another change, and eventually, it would lead to a transformation—which is still ongoing—in the legal regime for stream protection.

1. Changing Permit Thresholds

Though that transformation was significant, it has manifested itself in ways that might initially seem mundane. There was no major new statute, nor any grand presidential proclamation that led to the shift toward stream protections. Though the courts have been involved, their role—outside of the central Appalachian coalfields, which I discuss below in more depth—also has been minor.[179] Instead, the heart of the transformation has been a shift toward increasingly protective permitting thresholds for stream impacts. Many regulatory systems have thresholds below which no regulatory constraint exists, and they also often have a second, and higher, set of thresholds below which regulatory processes exist but are streamlined.[180] For streams, both of these thresholds have been getting lower and lower.

The most salient indicator of this trend is the evolution of the Army Corps's nationwide general permits. These permits provide standardized conditions under which large numbers of projects can be approved.[181] And while general permits in theory should cover only projects that have minimal environmental consequences,[182] tens of thousands of projects proceed under general permits every year,[183] and the collective environmental effects of at least some of those projects can be substantial.[184] The economics of general permits are also important. They are faster

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[178] *See* LAZARUS, *supra* note 177, at 128–29.

[179] *See infra* notes 200–219 and accompanying text (discussing coal cases). My research assistants and I ran multiple searches for cases involving stream protection and found few cases that did not involve either coal mining or jurisdictional determinations.

[180] *See* Owen, *supra* note 142, at 189–90 (discussing the prevalence of these thresholds and the challenges associated with setting them).

[181] *See* Owen, *supra* note 13, at 82. For broad discussion of the distinctions between individual and general permits, *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, 155–64 (2014).

[182] *See* 33 U.S.C.A. § 1344(e)(1) (West 2016) (allowing nationwide permits "if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effect on the environment.").

[183] *See* RYAN W. TAYLOR, FEDERALISM OF WETLANDS 88, 94 (2013) (finding that the Corps issued over eighty-five thousand permits per year, and that 95% of them were general permits).

[184] *See* Palmer & Hondula, *supra* note 27, at 10,557–59 (documenting massive impacts from mountaintop removal mining). In comments on a draft of this paper, Corps staff noted their agency's disagreement with a claim that the nationwide permits authorize significant environmental impacts. I am in no position to contest their position with respect to the full

and cheaper to obtain than individual permits, and regulated entities therefore usually prefer to use general permits.[185] For all of these reasons, the thresholds for these permits are quite important. And in multiple ways, those thresholds have become more protective.[186] The changes have affected all types of aquatic resources, but they have been particularly pronounced for streams.

As late as the mid-1990s, Nationwide Permit 26 still was the most important permit for stream fills, and it still was quite permissive. Until 1996, a permittee could fill ten acres of wetlands or small streams under the permit, and could fill one acre without even providing any advance notice.[187] As a practical matter, that meant permittees could fill particularly small streams nearly at will; if a stream averages eight feet wide, one could fill 5,445 feet—more than a mile—without hitting even that one-acre notice threshold.[188] But in 1996, in response to widespread criticism and litigation, the Corps lowered the permit eligibility limit to five hundred linear feet, and the agency also began a process of phasing Nationwide Permit 26 out entirely.[189] In 2000, several activity-specific permits replaced Nationwide Permit 26, and each had a three-hundred-foot linear limit.[190] In 2002, the Corps softened that limit by giving district engineers the ability to waive the three-hundred-foot threshold.[191] But in 2007, the limits again grew tighter. This time the Corps specifically included ephemeral streams—not just perennial and intermittent—in the

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suite of nationwide permits, but I do think the evidence is quite compelling that Nationwide Permits 21 and 26 did authorize environmental impacts that by any reasonable definition were substantial and significant. *See id.*; *supra* notes 136–138 and accompanying text (describing activities authorized under Nationwide Permit 26).

[185] *See* Rapanos v. United States, 547 U.S. 715, 721 (2006) (citing costs, which also have large disparities); CLAUDIA COPELAND, THE ARMY CORPS OF ENGINEERS' NATIONWIDE PERMITS PROGRAM: ISSUES AND REGULATORY DEVELOPMENTS 2 (2012) (citing substantial differences in processing times).

[186] Hough & Robertson, *supra* note 151, at 18 ("There has been a trend toward applying NWPs to ever-smaller impacts.").

[187] Final Rule for Nationwide Permit Program Regulations and Issue, Reissue, and Modify, 56 Fed. Reg. 59,110, 59,113–14, 59,125–26, 59,143 (Nov. 22, 1991) (to be codified at 33 C.F.R. pt. 330) (explaining the thresholds for protection).

[188] An acre is 43,560 square feet, and 43,560 divided by eight is 5,445.

[189] *See* Final Notice of Issuance, Reissuance, and Modification of Nationwide Permits, 61 Fed. Reg. 65,874 (Dec. 13,1996); COPELAND, *supra* note 185, at 4 (describing Nationwide Permit 26's slow demise); *On Firm Ground*, THE AMICUS JOURNAL, Sept. 30, 2000, at 43 (describing the role of litigation in Nationwide Permit 26's demise).

[190] *See* Final Notice and Issuance of Nationwide Permits, 65 Fed. Reg. 12,818, 12,889 (Mar. 9, 2000).

[191] *See* Issuance of Nationwide Permits; Notice, 67 Fed. Reg. 2020, 2058–59 (Jan. 15, 2002) (explaining the change).

three-hundred-foot limit, and it required pre-constructive notification for all uses of stream fill permits.[192] Finally, in 2012, the Corps added requirements for interagency coordination prior to any waiver of the three-hundred-foot limit.[193]

A simple hypothetical illustrates the importance of those changes. Suppose a developer wanted to build a shopping mall. Under the initial site plan, two hundred linear feet of perennial and intermittent streams (all with average annual flows below 5 cubic feet per second) would be filled, along with an additional four hundred feet of ephemeral streams. In 1991, the whole project could have proceeded without the developer even providing preconstruction notification to the Corps.[194] But by the late 2000s, the developer would no longer even be eligible (absent a written waiver) for a general permit.[195] Instead, it would need to obtain an individual permit, which would mean not only a higher level of scrutiny under Clean Water Act sections 401[196] and 404, but also individualized review under the National Environmental Policy Act and, if threatened or endangered species are present, the Endangered Species Act.[197] What once was a minimal regulatory process could now be quite rigorous. The developer might still proceed with the project, but it also might give serious thought to alternative project locations or site designs that would avoid, or at least reduce, stream fills.[198]

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[192] Reissuance of Nationwide Permits; Notice, 72 Fed. Reg. 11,092, 11,097 (Mar. 12, 2007)

[193] *See* Reissuance of Nationwide Permits, 77 Fed. Reg. 10,184, 10,189 (Feb. 21, 2012).

[194] *See* Final Rule for Nationwide Permit Program Regulations and Issue, Reissue, and Modify, 56 Fed. Reg. 59,110, 59,113–14, 59,125–26, 59,143 (Nov. 22, 1991) (explaining the thresholds for protection).

[195] *See* Issuance of Nationwide Permits; Notice, 67 Fed. Reg. 2020, 2058–59 (Jan. 15, 2002) (describing reasons for the waiver requirement).

[196] *See* 33 U.S.C.A. § 1341 (West 2016). Section 401 requires federal permit recipients whose projects involve a discharge to obtain a state certification that their activities will comply with state water quality standards. In other words, it gives states authority to deny authorization to, or impose conditions on, federal permits, including 404 permits. *Id.*

[197] *See* 42 U.S.C.A. §4332(C) (West 2016) (requiring environmental impact statements for "major Federal actions significantly affecting the quality of the human environment . . ."); 16 U.S.C.A. § 1536(a)(2) (West 2016) (requiring interagency consultation for federal agency actions that might adversely affect threatened or endangered species). The Corps also consults and completes NEPA compliance for general permits, but it does so on a programmatic basis rather than for each permit issued. *See, e.g.,* NAT'L MARINE FISHERIES SERV., ENDANGERED SPECIES ACT SECTION 7 CONSULTATION BIOLOGICAL OPINION AND CONFERENCE BIOLOGICAL OPINION 2 (Nov. 24, 2014), http://www.usace.army.mil/Portals /2/docs/civilworks/nwp/2012/NWP404_BiOp_11-24-14.pdf [https://perma.cc/92J4-GGH2] (assessing "a national program of categories of activities" rather than "individual discharges authorized by one or more of these permits"). This saves individual recipients of general permits from needing to go through project-specific NEPA and ESA compliance—unless they also need a discretionary federal permit from another agency.

[198] *See* U.S. ARMY CORPS OF ENG'RS, DECISION DOCUMENT NATIONWIDE PERMIT 39, 7, 23 (Feb. 13, 2012), http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP_39_2012.pdf, [https://perma.cc/K97R-PLCV] (explaining these incentives); Biber & Ruhl, *supra* note 181, at 182–183 (discussing the incentives created by permitting

Table 2: Evolution of Permitting Requirements for Large-Scale Residential or Commercial Developments[199]

	1991	1996	2000	2002	2007	2012
Impact level requiring individual permits	10 acres	500 ft.	300 ft.	300 ft. (waiveable)	300 ft. (waiveable) Includes ephemeral streams	300 ft. (waiveable) Includes ephemeral streams
Impact level requiring preconstruction notification	1 acre	1/3 acre	1/10 acre or discharge to open water	1/10 acre or discharge to open water	All projects	All projects

2. Mountaintop Removal

The evolution of development permits has many parallels,[200] but for one type of stream impact, the changes have come later, more fitfully, and with much more conflict. For stream fills associated with surface coal mining, the regulatory evolution is sufficiently distinctive that it merits its own discussion.[201]

The central Appalachians are rich in streams, aquatic biodiversity, and coal.[202] Miners have dug that coal for many years, and by the early 1990s, much of the readily accessible coal had been extracted, hauled away, and burned.[203] To get at what remained, coal mining companies turned to mountaintop removal, which involves taking off mountaintops, extracting the coal beneath, recreating an imitation mountaintop with some of the removed rock, and depositing the leftover rubble in nearby headwater stream valleys.[204] The effects upon streams were devastating.[205]

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thresholds).

[199] I compiled this table by reviewing permitting requirements established in Federal Register documents for each of the listed years.

[200] *See* Hough & Robertson, *supra* note 151, at 18 ("There has been a trend toward applying NWPs to ever-smaller impacts.").

[201] For a more detailed discussion of this evolution, see COPELAND, *supra* note 88.

[202] The central Appalachians are not the only coal-producing region in the country, nor are they the most important one. *See* U.S. Energy Info. Admin., *Frequently Asked Questions: Which States Produce the Most Coal?*, EIA.GOV, http://www.eia.gov/tools/faqs/faq.cfm?id=69&t=2 [https://perma.cc/FT6C-4CGJ] (last visited Aug. 23, 2016) (showing Wyoming in the lead, by a huge margin). But since the Appalachian states have been the center of conflicts between coal production and stream protection, and therefore are also the focus of this discussion.

[203] *See* COPELAND, *supra* note 88, at 1.

[204] *Id.*

[205] *See* Emily S. Bernhardt & Margaret A. Palmer, *The Environmental Costs of Mountaintop Mining Valley Fill Operations for Aquatic Systems of the Central Appalachians*, ANN. N.Y. ACAD. SCI., Mar. 2011, at 39, 44–49.

For years, the Corps and its fellow regulatory agencies did little to restrain the practice. Instead, the Corps routinely authorized stream fills under Nationwide Permit 21, which covered coal mines that were also regulated under the Surface Mining Control and Reclamation Act.[206] Nationwide Permit 21 imposed only modest controls and had no upper threshold. Environmental groups argued—among other claims—that the Corps's permits for valley fills were inconsistent with the Clean Water Act.[207] District courts agreed, first with this argument and then with a series of others, and the groups won a succession of major litigation victories—only to see the U.S. Court of Appeals for the Fourth Circuit set one decision after another aside.[208] As late as 2008, mountaintop removals continued with little regulatory restraint, offset only by weak attempts at compensatory mitigation.[209]

Yet even in the coalfields, the law of little streams is changing. As soon as it assumed office in 2009, the Obama Administration began reviewing both individual permits and broader practices.[210] The EPA, the Corps, and the Office of Surface Mining announced that they would develop new policies for reviewing coal mining permits.[211] General permits changed; the Corps first suspended Nationwide Permit 21 for the six Appalachian coal-mining states, and then, when it reauthorized the permit, excluded valley fills from its coverage and added acreage and linear foot limitations.[212] The EPA published new guidance designed to establish stricter environmental performance standards for mining-related permits, with the intended

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[206] *See* Issuance of Nationwide Permits; Notice, 67 Fed. Reg. 2020, 2081 (Jan. 15, 2002) (describing Nationwide Permit 21).

[207] *See* 33 U.S.C.A. § 1344(e)(1) (West 2016) (authorizing general permits only if the permitted activities "are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effect on the environment").

[208] *See* Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng'rs, 479 F. Supp. 2d 607, 614 (S.D.W. Va. 2007) (issuing an injunction), *rev'd*, Ohio Valley Envtl. Coal. v. Aracoma Coal Co., 556 F.3d 177, 186–87 (4th Cir. 2009); Ohio Valley Envtl. Coal. v. Bulen, 410 F. Supp. 2d 450, 470–71 (S.D.W. Va. 2004) (enjoining the use of Nationwide Permit 21 in West Virginia), *vacated in part*, 429 F.3d 493, 496 (4th Cir. 2005); Kentuckians for the Commonwealth, Inc. v. Rivenburgh, 204 F. Supp. 2d 927, 946–47 (S.D.W. Va. 2002) (issuing an injunction), *vacated*, 317 F.3d 425, 430 (4th Cir. 2003); Bragg v. Robertson, 72 F. Supp. 2d 642, 664 (S.D.W. Va. 1999) (issuing a permanent injunction), *vacated*, Bragg v. W. Va. Coal Mining Ass'n, 248 F.3d 275, 286 (4th Cir. 2001). In 2009, the plaintiffs finally won a victory in district court that was not reversed. Ohio Valley Envtl. Coal. v. Hurst, 604 F. Supp. 2d 860 (S.D.W. Va. 2009).

[209] *See* Palmer & Hondula, *supra* note 27, at 10,558.

[210] COPELAND, *supra* note 88, at 8–9.

[211] *See* Press Release, EPA, Obama Administration Takes Unprecedented Steps to Reduce Environmental Impacts of Mountaintop Coal Mining, Announces Interagency Action Plan to Implement Reforms (June 11, 2009), https://yosemite.epa.gov/opa/admpress.nsf/3881d73f4d4aaa0b85257359003f5348/e7d3e5608bba2651852575d200590f23!OpenDocument [https://perma.cc/9PYC-HRUK].

[212] COPELAND, *supra* note 88, at 11.

secondary consequence of limiting, if not entirely ending, valley fills.[213] The EPA also actually vetoed one of the Corps's individual permits for a major mountaintop removal mining project.[214] Finally, and most recently, the Department of the Interior joined the reform movement by proposing new rules for protecting streams from surface mining.[215] These administrative actions provoked more litigation,[216] and again the plaintiffs—this time representing industry—succeeded before district courts, only to lose on appeal.[217] So far the transition has not left anyone entirely satisfied. Environmental groups would prefer even stricter controls, while the industry decries the initiatives as part of the Obama Administration's "war on coal."[218] But whether environmental protection of Appalachian coal country streams has evolved too much or too little, there is no doubt that it has changed.[219]

These changes, like the changes to general permits for developments and other activities, may sound technical. But permits, though somewhat arcane, are the key

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[213] *See* COPELAND, *supra* note 88, at 12; Memorandum from Peter S. Silva & Cynthia Giles to Shawn Garvin, Gwendolyn Keyes Fleming, & Susan Hedman, Improving EPA Review of Surface Coal Mining Operations Under the Clean Water Act, the National Environmental Policy Act, and the Environmental Justice Executive Order (July 11, 2011) (on file with author).

[214] U.S. EPA, QUESTIONS AND ANSWERS: SPRUCE MINE FINAL DETERMINATION, https://www.epa.gov/sites/production/files/2015-05/documents/final_spruce_404c_qa_01 1311.pdf [https://perma.cc/ZDJ2-8GX5] (last visited Nov. 24, 2016). However, such vetoes are rare. *See* Michael C. Blumm & Elisabeth Mering, *Vetoing Wetland Permits Under Section 404(c) of the Clean Water Act: A History of Inter-Federal Agency Controversy and Reform*, 33 UCLA J. ENVTL. L. & POL'Y 215, 222–23 (2015) (noting that this veto authority has been used only thirteen times).

[215] Stream Protection Rule, 80 Fed. Reg. 44,436, 44,439 (proposed July 27, 2015).

[216] As of this writing, the DOI Stream Protection Rule is not yet final, but political reactions suggest that when it is finalized, lawsuits will follow.

[217] Nat'l Mining Ass'n v. Jackson, 880 F. Supp. 2d 119, 124 (D.D.C. 2012), *rev'd*, Nat'l Mining Ass'n v. McCarthy, 758 F.3d 243 (D.C. Cir. 2014) (considering the EPA's 2011 guidance); Mingo Logan Coal Co. Inc. v. U.S. Envtl. Prot. Agency, 850 F. Supp. 2d 133, 153 (D.D.C. 2012), *rev'd*, 714 F.3d 608, 609–11 (D.C. Cir. 2013) (considering the Spruce Mine permit veto).

[218] Nicholas Fandos, *U.S. Proposes New Rules to Protect Streams from Coal Pollution*, N.Y. TIMES (July 16, 2015), http://www.nytimes.com/2015/07/17/us/us-proposes-new-rules-to-protect-streams-from-coal-pollution.html?_r=0 [https://perma.cc/Z6RY-QEX6].

[219] One longtime Corps staff member, in responding to my question about what changes she had seen during her career, summarized this transition:

> Major environmental changes as protecting the environment. And if you said that to environmental groups they'd probably laugh but they don't have the perspective of what the program was before all this started. I mean we are making a big difference in the areas when coal mining permits are issued in what goes back and what's required and what's being mitigated. None of that was being done before. . . .
>
> Telephone Interview with Army Corps Dist. Chief (Sept. 16, 2014).

mechanism through which broad statutory and regulatory mandates become specific, binding constraints.[220] A change in permit coverage or terms therefore can be a very important shift. And with this particular set of changes, an enormous set of aquatic resources that once lacked meaningful regulatory protection now cannot be impacted without a permitting process. In the past few decades, water quality law has seen few, if any, changes that are more significant.

3. The Emergence of Stream Compensatory Mitigation

These expansions in the scope of the permitting program will have only limited effects if the permits simply rubber stamp stream fills, as many permits once did. But stream protection has evolved in other important ways as well: permit requirements now are changing along with permit thresholds. One of the most important—and still ongoing—changes involves the emergence of compensatory mitigation requirements for stream impacts.

(a) The Prevalence of the Practice

Even in the early 1990s, when compensatory mitigation for wetland impacts was becoming a standard practice, "that's all that Corps of Engineers districts were mitigating," as one retired district chief explained it.[221] Impacts to streams were still occurring, and occurring on a widespread basis, but no one was attempting to compensate for those impacts by restoring or protecting streams somewhere else. Beginning in the late 1990s, however, that began to change.

The change started humbly. In the mid-1990s, developers proposed to build Hanes Mall Boulevard, a commercial project in Winston-Salem, North Carolina.[222] Construction would necessitate placing a long length of stream in a culvert, and North Carolina state regulators were concerned about the impacts.[223] But Nationwide Permit 26 established no constraint on the destruction of the stream, and the regulators saw little basis for restraint in existing state rules.[224] Nor did regulators have clear ideas about how they might respond. "We knew we wanted to regulate streams," one retired state employee told me, "but didn't know how to do it."[225]

Even if regulators were unsure of their next step, a variety of factors were pushing toward the emergence of compensatory stream mitigation—and made North Carolina a particularly promising place for the new practice to emerge. Protecting water quality was, at the time, a salient political issue; a series of massive pollution spills and fish kills had spurred widespread and bipartisan interest in improving protection of the state's waterways.[226] The legislature and governor—the latter a

[220] *See* Biber & Ruhl, *supra* note 181, at 155–56; Owen, *supra* note 13, at 99.
[221] Telephone Interview with Retired Army Corps Dist. Chief (Sept. 9, 2014).
[222] *Id.*
[223] *Id.*
[224] *Id.*
[225] *Id.*
[226] Telephone Interview with N.C. State Univ. Scientists (Sept. 4, 2015).

Democrat, and the former containing a Democratic majority—were generally sympathetic to that public preference.[227] But North Carolina also was in the midst of a real estate development boom, and few politicians or regulators wish to stand squarely in the way of economic growth.[228] So some compromise was necessary. At a deeper level, the ideologies of environmental lawmaking were shifting, and regulatory approaches that leaned on market-like systems and private-sector actors were increasingly popular, even among environmental groups.[229] In that political context, compensatory mitigation could offer something to everyone: environmental advocates got some preservation and restoration, developers got flexibility, and regulators could plausibly claim to be doing something other than resorting to traditional command-and-control regulation. It also did not hurt that North Carolina already had a robust wetland mitigation banking industry.[230] Streams, then, could be a new frontier for an already-established business model.

And so, the answer North Carolina regulators turned to was a compensatory mitigation requirement for streams. Using its authority under Clean Water Act section 401,[231] North Carolina began requiring compensatory mitigation for any stream impacts over one hundred fifty feet in length.[232] State regulators also learned that scientists at North Carolina State University, and also private-sector consultants, had begun developing new stream restoration techniques, and they used the emerging science to guide mitigation projects.[233] The scientists, in turn, bolstered the state regulators' positions by making the case that streams were worth protecting, and by arguing that compensatory mitigation was a possible way to provide that protection. Indeed, even years later, a leading EPA section 404 specialist emphasized to me the importance of "active academic communities educating us on the importance of streams."[234] Initially, the EPA was mildly supportive and the Corps, as the former North Carolina state employee described it, was "kind of

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[227] *Id.*

[228] *See* BROOKINGS INST., CTR. ON URBAN AND METRO. POL'Y, ADDING IT UP: GROWTH TRENDS AND POLICIES IN NORTH CAROLINA 11 (2000) ("North Carolina is developing phenomenal amounts of land.").

[229] *See* Rebecca Lave, *Neoliberal Confluences: The Turbulent Evolution of Stream Mitigation Banking in the US*, *in* FIELDS OF KNOWLEDGE: SCIENCE, POLITICS AND PUBLICS IN THE NEOLIBERAL AGE POLITICAL POWER AND SOCIAL THEORY, VOLUME 27, 69–75 (David J. Hess & Scott Frickel eds., 2014).

[230] *Id.* at 78 (describing the wetland mitigation banking industry and its ties to Congress).

[231] 33 U.S.C.A. § 1341 (West 2016) (requiring state water quality certifications for federally-authorized projects that will discharge into waters of the United States). For discussion of how section 401 provides states with leverage over projects subject to the Corps permitting, see Owen, *supra* note 13, at 113–16.

[232] Hill et al., *supra* note 166, at 1078.

[233] Telephone Interview with Barbara Doll, Ph.D., P.E., Water Prot. & Restoration Specialist, Sea Grant N.C., N.C. State Univ., & Karen Hall, Ph.D., Extension Assistant Professor, Biological and Agric. Eng'g, N.C. State Univ. (Sept. 4, 2015).

[234] Telephone Interview with EPA staff members (Aug. 21, 2015) (emphasizing the role of "active academic communities educating us on the importance of streams").

bemused."[235] But soon they came on board—legally, they had little choice—and stream mitigation became a more common practice.[236]

It also spread beyond state boundaries. The mechanisms of that spread defy any simple summary; indeed, many of the Corps staff I spoke to were not entirely sure how stream mitigation went from a localized practice to a nationwide priority.[237] One academic study attributes the shift partly to the ideas (and seminars) of a few charismatic consultants, though the staff I spoke with did not emphasize that part of the story.[238] The anecdotes they related instead suggested a process in which different Corps districts and states learned about stream mitigation through a gradual, largely uncoordinated process of interjurisdictional communication and imitation. But however that evolution occurred, some basic numbers illustrate the magnitude of the resulting changes. Even in North Carolina, a 2005 retrospective study of stream mitigation projects could find few pre-1999 projects to evaluate.[239] But by 2011, two hundred forty stream mitigation banks were in operation.[240] The banks are concentrated in the southeastern United States, where stream mitigation originated and remains most prevalent, and there are other regions where the practice is still "in its infancy," as one Corps staff member put it.[241] But stream mitigation is by no means an exclusively southeastern phenomenon.[242]

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[235] Telephone Interview with Retired N.C. Dep't of Envtl. Quality Emp. (Sept. 9, 2015). He summarized the Corps's initial attitude as, "that's interesting; we don't know what you're trying to do, but, okay. . . ." *Id.* Environmental groups and other state wetland regulators, he said, were similarly puzzled at first. *Id.*

[236] *See* Owen, *supra* note 13, at 104–05 (summarizing this evolution).

[237] *See, e,g.*, Telephone Interview with Army Corps Headquarters Staff (Nov. 17, 2014). As one staff member explained to me:

> I don't know that there is one, like, defining moment when the light bulb popped on and everybody said, man we need to start worrying about mitigating for streams. If you haven't found it in your interviews I guess I would not be surprised that no one can really point you to a new focus or a new emphasis on the part of the Corps or anything that says, hey look, today we are really going to get serious about stream mitigation and everybody needs to start doing stream mitigation.

Id.

[238] *See* Lave, *supra* note 229, at 83; *see also* David Malakoff, *The River Doctor*, 305 SCI. 937, 939 (2004) (describing the influence of Dave Rosgen, a prominent and controversial stream restoration scientist).

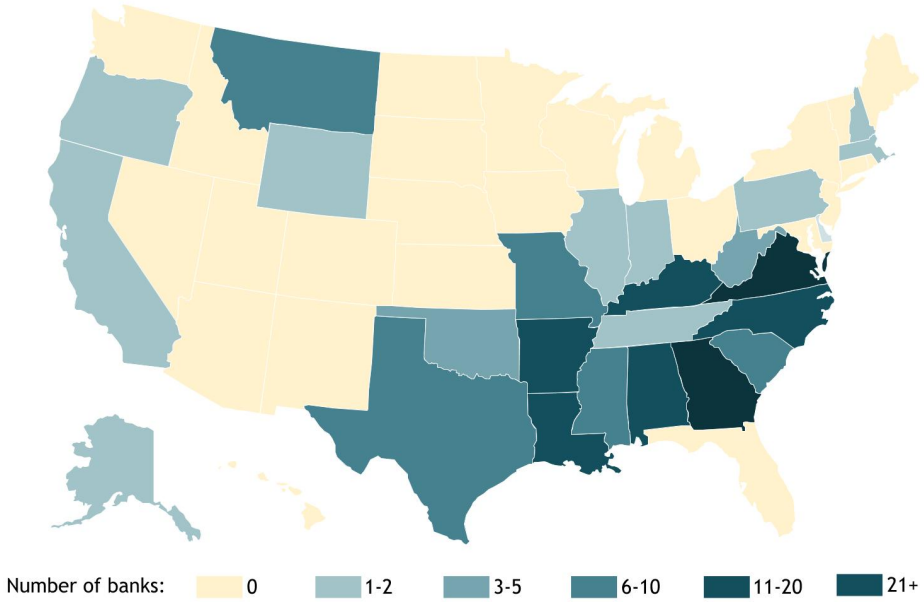
[239] Hill et al., *supra* note 166, at 1078.

[240] Martin W. Doyle & F. Douglas Shields, *Compensatory Mitigation for Streams Under the Clean Water Act: Reassessing Science and Redirecting Policy*, 48 J. AM. WATER RESOURCES ASS'N 494, 495 (2012).

[241] Telephone Interview with Senior Corps Staff Member (Nov. 24, 2014) (describing New York and New England). "I think," he added, "it kind of parallels the existence of banks, which [are] much more prevalent further south. . . ." *Id.*

[242] In-lieu, fee programs also fund stream restoration work, so my focus on mitigation banking credits almost certainly understates the full extent of the practice.

Figure 1: States Where Stream Mitigation Credits Were Available for Purchase, August 11–12, 2015[243]



The practice also enjoyed increasing support from the Corps and the EPA headquarters. In 2002, the Corps's headquarters issued a "regulatory guidance letter," which specifically stated that no net loss should be a guiding principle for all aquatic resources, not just wetlands.[244] And in a 2008 rulemaking, the Corps and the EPA provided further support for the emerging practice.[245] The primary purpose of the 2008 rulemaking was to set new rules for compensatory mitigation, and the resulting regulations devote page after page to the operation of mitigation banks and

[243] Compiled from data on the Corps's RIBITS database, Aug. 11–12, 2015. These numbers include only credits that were actually for sale. Other banks had previously sold credits but had none presently on offer, or were developing credits for future sales. These numbers also do not include credits allocated to specific species, which is a common practice on the West Coast.

[244] U.S. ARMY CORPS OF ENGINEERS, NO. 02-2. REGULATORY GUIDANCE LETTER: GUIDANCE ON COMPENSATORY MITIGATION PROJECTS FOR AQUATIC RESOURCE IMPACTS UNDER THE CORPS REGULATORY PROGRAM PURSUANT TO SECTION 404 OF THE CLEAN WATER ACT AND SECTION 10 OF THE RIVERS AND HARBORS ACT OF 1899 (Dec. 24, 2002) ("Districts should require compensatory mitigation projects for streams to replace stream functions where sufficient functional assessments are available. However, where functional assessment is not practical, mitigation projects for streams should generally replace linear feet of stream on a one-to-one basis."); *see* Mark Sudol, *A Note from Headquarters*, AQUATIC RESOURCES NEWS, Spring 2003, at 1, 1 ("Compensatory mitigation has long been associated with impacts to wetlands however, as stated in RGL 02-02 and the 2002 NWPs, all impacts to waters of the U.S. should be mitigated.").

[245] Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594 (Apr. 10, 2008).

in-lieu fee programs.[246] But the regulations apply to all waters of the United States, not just wetlands, and in the preamble, the Corps and the EPA acknowledged that they had considered, and rejected, arguments against requiring compensatory mitigation for streams.[247] Even after this endorsement, the practice still is not prevalent in some regions, and the Corps's nationwide permits still establish a stronger mandate for wetland mitigation than they do for streams.[248] But while steps still remain, compensatory stream mitigation is becoming an increasingly prevalent practice—and requirement.[249]

That requirement is also becoming increasingly standardized and rigorous. In the early years of compensatory mitigation, accounting practices were often loose, and guidance documents explaining how regulators should account for stream impacts were essentially nonexistent.[250] That created problems; valuing stream and wetland impacts is no simple matter, and if valuation is handled poorly, the environment often comes out on the losing end of the deal.[251] But in the past ten years, stream mitigation guidance documents have proliferated, and states and the Corps districts across the country now have guidance documents designed to bring some standards, rigor, and consistency to their stream mitigation efforts.[252] Those documents also are evolving; some are now in their second or third iterations.[253] Substantial room for improvement remains; in my interviews, I never heard anyone claim to have mastered the art of stream mitigation.[254] But the proliferation of guidance documents indicates, at the very least, that what once was a rare and geographically limited practice has now gone national and mainstream.

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[246] *Id.*

[247] *Id.* at 19,596–97 (explaining why stream mitigation would be required).

[248] *See* Reissuance of Nationwide Permits, 77 Fed. Reg. 10,184, 10,285 (Feb. 21, 2012) (mandating compensatory mitigation for all unavoidable wetland impacts over 1/10 acre in area, but leaving some stream mitigation requirements to the discretion of district engineers). In comments on a draft of this paper, Corps staff noted that some Corps districts have exercised that discretion and now require more stream protections that go beyond the nationwide permits' baseline levels.

[249] *See* Lave et al., *supra* note 23, at 287.

[250] I was unable to find any such guidance documents from before 1997.

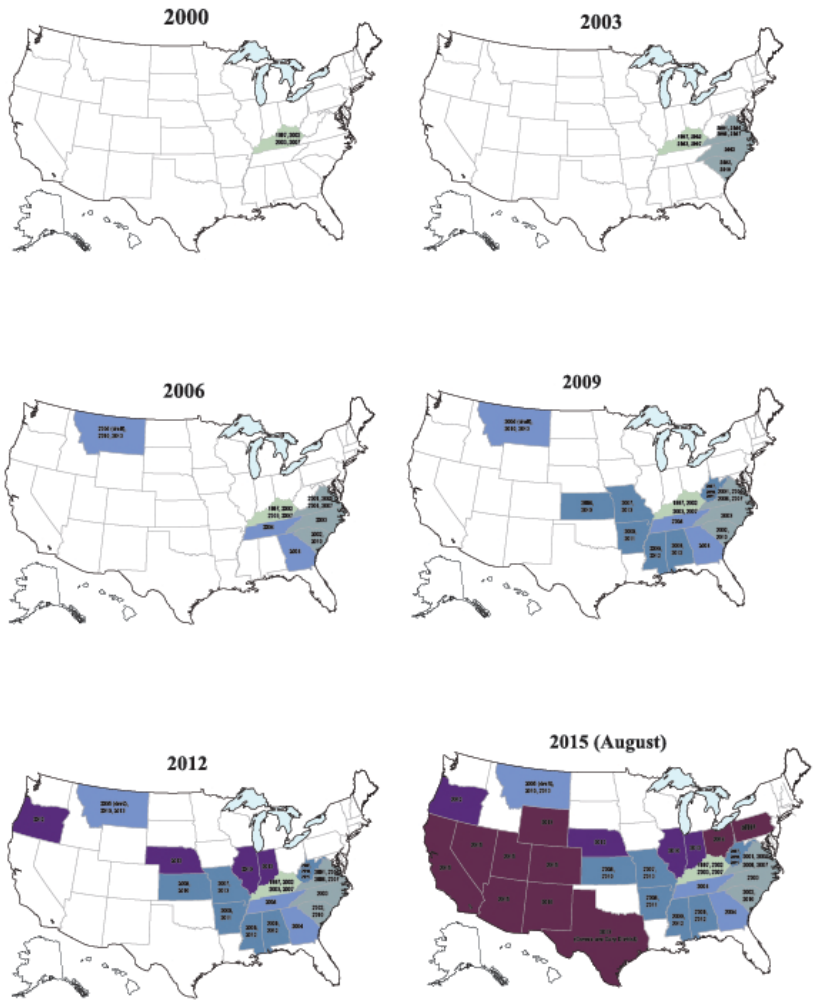
[251] For general discussion of these valuation challenges, see Dave Owen & Colin Apse, *Trading Dams*, 48 U.C.D. L. REV. 1043, 1097–99 (2014); James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 622–30 (2000).

[252] *See* ASS'N OF STATE WETLAND MANAGERS, *Stream Mitigation Guidance, Procedures, Handbooks and Protocols*, ASWM.ORG, http://www.aswm.org/wetland-programs?catid=0&id=4878 [https://perma.cc/PZZ6-T7TY] (last visited Aug. 23, 2016) (listing and providing links to guidance documents).

[253] *See* Lave, *supra* note 229, at 77 ("Every regulatory jurisdiction in which I conducted interviews had either gone through a major revision of their stream mitigation guidelines in the previous three years to address concerns [about the effectiveness of earlier guidelines] or was in the process of doing so.").

[254] *See* Telephone Interview with Regulatory Dist. Chief (Sept. 12, 2014) ("[I]t's an evolving science, very evolving.").

Figure 2: States Where Compensatory Stream Mitigation Guidance Exists[255]



[255] Readers should also be aware of a few caveats about these maps. First, I compiled the chart by searching the Internet for guidance documents, and it is possible that some early guidance documents have vanished from the Internet and have not been cited elsewhere. Second, deciding what counts as a stream mitigation guidance document involves some judgment calls. Some documents address streams fairly briefly, while others cover them in elaborate detail, and another reviewer might draw the lines at a slightly different point. Third, the chart may understate the extent to which guidance is used, for some states and Corps districts are probably using guidance from other areas. Fourth and finally, some guidance documents are specific to regions—like an individual Corps district—whose boundaries do not align exactly with those of the states.

D. Unfinished Work

Because of all these changes, little streams have more legal protection now than they did fifteen years ago. More streams fall within the scope of regulatory coverage; the regulatory requirements protecting those streams are more rigorous; and those requirements also are becoming increasingly sophisticated. But that does not mean those streams, or the downstream waters that depend upon them, receive stringent levels of protection. There are two primary reasons why. First, the 404 program increasingly relies upon compensatory mitigation, and vigorous debates continue about how, and even whether, compensatory mitigation can be done well.[256] The second reason is the 404 program's narrow bounds. Ultimately, protecting streams requires protecting the landscapes from which they flow, and the 404 program, with its focus on direct filling of aquatic features, can reach those landscapes only to a limited extent.[257]

1. Mitigation Troubles

Scientists who have studied stream mitigation generally have no objection to the increased scope of regulatory protection. Indeed, much of the scientific literature produced in the last eight years reads like a massive amicus brief, all designed to convince Justice Kennedy, who will likely cast the deciding vote in any future Supreme Court case on Clean Water Act jurisdiction, that a significant nexus really does connect small streams to downstream waters.[258] But multiple studies have expressed concern about how effective mitigation practices actually are.

The harshest assessments come from studies of Appalachian coal country. In 2014, Margaret Palmer, a leading stream scientist, and Kelly Hondula reviewed data from dozens of mitigation sites in the southern Appalachians.[259] By the measured standards of scientific prose, their assessment fairly seethes with outrage:

> [T]he assessment criteria and requirements for compliance in the projects reviewed do not meet basic scientific standards: they do not take measurements relevant to the factors of interest, they have conclusions inconsistent with the data, and are overall inadequate to assess the

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[256] Some of the most damning critiques are now aging. *See, e.g.*, COMM. ON MITIGATING WETLAND LOSSES, *supra* note 165, at 138–40. However, recent studies—particularly those focused on stream mitigation—have found plenty of continuing problems. *E.g.*, Doyle & Shields, *supra* note 240, at 500; Palmer & Hondula, *supra* note 27, at 10,554–58.

[257] *See* Margaret A. Palmer & J. David Allan, *Restoring Rivers*, 22 ISSUES IN SCI. & TECH. 40, 42 (2006) ("The primary reason why so many rivers and streams are still being degraded today is poor land stewardship.").

[258] *See, e.g.*, Alexander et al., *supra* note 46, at 56 ("The results also provide scientific information that potentially broadens understanding of the extent of Federal CWA jurisdiction in waters of the United States, a topic of continuing importance as illustrated by recent U.S. Supreme Court cases.").

[259] Palmer & Hondula, *supra* note 27, at 10,552.

> outcomes required by the [Clean Water Act] . . . . There is no evidence that mitigation is meeting the objectives of the [Clean Water Act] and looking forward there is no reason to believe this will change unless new mitigation requirements and scientifically rigorous assessments are put in place.[260]

In a broader synthesis paper published a few years earlier, Martin Doyle and F. Douglas Shields reached only slightly less damning conclusions. "The balance of published evidence," they concluded, "suggests that current practices of stream restoration . . . cannot be assumed to provide demonstrable physical, chemical, or biological functional improvements."[261] Neither set of authors declared that effective compensatory mitigation for streams is an impossibility, and Doyle and Shields identified alternative ways by which mitigation practices might be improved.[262] But they agreed, emphatically, that present practices were inadequate.

Those analyses might lead one to think that all the changes described in this Part have been for naught—that the Corps has simply come up with fancier regulatory mechanisms to paper over the same old environmentally destructive practices. And that conclusion would be consistent with much of the legal-academic literature on compensatory mitigation, some of which decries the practice as a sham, "a myth," or, at worst, a practice that actually enables environmental destruction.[263] But before drawing that conclusion, it is important to consider two mitigating facts about stream mitigation.

The first is that stream mitigation practices are not a replacement for policies that forbade stream impacts. Many legal critiques of compensatory mitigation implicitly assume that if compensatory mitigation were not available, projects would simply be stopped.[264] That assumption is questionable. Political support for environmental regulations that simply block development exists only in rare circumstances; as one veteran regulator explained to me, "there is no stopping things, with very, very, very limited exceptions."[265] Instead, at worst, we have traded a circumstance in which stream impacts occur and are not mitigated at all for one in

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[260] *Id.* at 10,558.

[261] Doyle & Shields, *supra* note 240, at 500.

[262] *Id.* at 7–13.

[263] *See* Al Lin, *Myths of Environmental Law*, 2015 UTAH L. REV. 45, 47–50, 62; Susan Walker et al., *Why Bartering Biodiversity Fails*, 2 CONSERVATION LETTERS 149, 152 (2009).

[264] *See, e.g.*, Jessica Owley, *The Increasing Privatization of Environmental Permitting*, 46 AKRON L. REV. 1091, 1110 (2013) ("Mitigation banks have enabled the conversion of thousands of acres of wetlands and endangered species habitats, facilitating development of those lands."); Nat Gillespie, *Stream Mitigation Banking*, ECOSYSTEM MARKETPLACE, http://www.ecosystemmarketplace.com/articles/stream-mitigation-banking/ [https://perma.cc/DT7H-DPUQ] (last visited Aug. 23, 2016) (describing environmentalists' fears).

[265] Telephone Interview with retired N.C. Dep't of Envtl. Quality Emp. (Sept. 9, 2015) ("It's not a process of stopping development . . . the only way to stop a project is to buy the property.").

which those impacts occur and are partially mitigated.[266] Partial mitigation may sound disappointing, and it may fall short of what the Clean Water Act and its implementing regulations seem to require, but it is usually better than nothing.

Second, sometimes merely requiring that a practice be done at all is a necessary predicate to requiring that it be done well. Indeed, that was exactly the rationale of the North Carolina agency staff who first pushed the practice: they knew present stream valuation and restoration practices stood on weak scientific footing, but they thought the most effective way to generate more science—and better stream protection—was to create a regulatory need for that science. "If you build the rules," one staff member explained, "the science will come."[267] Environmental lawyers tend to think of environmental law as a field spurred by scientific advances, and sometimes it is.[268] But sometimes the causal relationships work the other way around, and stream mitigation exemplifies that alternative dynamic.[269]

And the science is coming along. Much of the research discussed in Part I of this Article is fairly recent, and the volume of stream-related research has increased greatly in recent decades. Restoration science also is evolving; even critics of existing practices have also offered ideas about how stream restoration might be done better.[270] And the Corps and the EPA have been receptive to those new ideas. In interviews, agency staff readily acknowledged that they still have much to learn about stream mitigation, and that their practices are continuing to evolve, but they also spoke of their commitment to making those improvements.[271] To provide one example of that evolution, regulators have published guidance on using ecological functions, rather than linear feet or simple measures of physical morphology, as the

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[266] The existence of a mitigation requirement also creates an economic incentive to avoid stream impacts (and thus avoid the cost of mitigation), and that incentive exists whether or not the mitigation is done well.

[267] Telephone Interview with retired N.C. Dep't of Envtl. Quality Emp. (Sept. 9, 2015). He readily acknowledged that the policy had gotten out in front of the science; stream mitigation, in his view, was "more driven by policy than by science. . . . The science kind of caught up. . . . We saw a policy need and we did it." *Id.*

[268] *See* James D. Fine & Dave Owen, *Technocracy and Democracy: Conflicts Between Models and Participation in Environmental Law and Planning*, 56 HASTINGS L.J. 901, 907–10 (2005).

[269] Perhaps the most prominent recent example of this phenomenon is the way Justice Kennedy's "significant nexus" standard in *Rapanos v. United States* has catalyzed scientific research on what constitute a significant nexus and where such connections exist. 547 U.S. 715, 726 (2006). *See, e.g.*, Alexander et al., *supra* note 46; Freeman et al., *supra* note 55. But law has catalyzed science in other realms as well, both within and outside the environmental field. *See, e.g.*, Sanne Knudsen, *Adversarial Science*, 100 IOWA L. REV. 1503, 1504 (2014) (describing how legal requirements have spurred research on long-term ecosystem damage from oil spills); Deirdre M. Smith, *Diagnosing Liability: The Legal History of Posttraumatic Stress Disorder*, 84 TEMP. L. REV. 1, 3–4 (2011) (describing the role of law in generating a common medical diagnosis).

[270] *See, e.g.*, Doyle & Shields, *supra* note 240, at 500–04.

[271] *See* Telephone Interview with Regulatory Dist. Chief (Sept. 12, 2014) ("[W]hat we did back in 1999 we probably wouldn't do today.").

currency for compensatory stream mitigation.[272] If widely adopted, that alternative currency would create an incentive for restoring streams so they actually work like natural streams, rather than merely looking like natural streams.[273] Similarly, regulators are also allowing experimentation with alternative methods of stream restoration, like dam removal, that hold more promise than simply using bulldozers to reshape a stream channel.[274] These initiatives underscore a broader point. Environmental restoration is complicated, difficult work, and it takes learning and experimentation to do it well. With stream mitigation, that learning process has just begun.

Of course, it is one thing to identify some learning improvement and another to say that substantial progress has been made, or will continue to occur. On the former front, the debates still are vigorous.[275] On the latter, there are no guarantees. Effective compensatory mitigation practices require sustained and effective government oversight.[276] And, as the opposition to the Clean Water Rule indicates, the very idea of government regulation remains under attack, particularly in the stream mitigation heartland of the southeast.[277] In one possible future, regulatory agencies and environmental advocates—and, perhaps, mitigation bankers, whose business model depends upon credible regulators—will keep regulatory oversight in place.[278] But in another plausible future, scientists and some regulators will develop an increasingly sophisticated understanding of good stream mitigation practices, only to see regulators lose the will, or the capacity, to put those practices into effect.

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[272] *See, e.g.*, WILL HARMAN ET AL., A FUNCTION-BASED FRAMEWORK FOR STREAM ASSESSMENTS AND RESTORATION PROJECTS 19 (2012).

[273] *See* Lave et al., *supra* note 23, at 288 ("[T]he tacit assumption that a quantity of linear stream assessed solely for morphology can provide a consistent quantity of stream function is deeply problematic.").

[274] *See* Owen & Apse, *supra* note 251, at 1101.

[275] *See* Lave, *supra* note 229, at 76 (summarizing critiques of some early stream assessment methodologies).

[276] *See* Robert L. Glicksman, *Regulatory Safeguards for Accountable Ecosystem Service Markets in Wetlands Development*, 62 U. KAN. L. REV. 943, 946 (2014) (describing safeguards—which generally involve government oversight—for addressing problems associated with market-based regulatory systems); *See* Owen & Apse, *supra* note 251, at 1097–98 (explaining the importance of governance for environmental trading systems).

[277] *See, e.g.*, Trip Gabriel, *Ash Spill Shows How Watchdog Was Defanged*, N.Y. TIMES, (Feb. 28, 2014), http://nyti.ms/1eGUiHa [https://perma.cc/D2N9-BY52] (describing politicians' overt hostility toward environmental regulators).

[278] *See generally* Eric Biber, *Cultivating a Green Political Landscape: Lessons for Climate Change Policy from the Defeat of California's Proposition 23*, 66 VAND. L. REV. 399, 426–34 (2013) (explaining how industries whose business models rely on environmental protection can become effective advocates for stronger environmental laws).

2. Beyond the Stream Channel

In a second way, the changes described above are an incomplete story. With limited exceptions, the legal reforms have focused on streams rather than surrounding landscapes. The combination of Clean Water Act sections 301 and 404 prohibits unpermitted discharges of dredged or fill material to streams, and to other waters of the United States, and that is all.[279] Those sections do not prohibit developing nonwetland riparian areas adjacent to streams.[280] Nor do they prohibit building parking lots and roofs throughout a watershed, and thus altering flow patterns until streams are overloaded with flood flows and pollutants.[281] Nor do those sections prohibit groundwater pumping that drains streams dry.[282] In short, they protect streams from just one of the many threats that beset them. And that limited protection, no matter how stringently it is implemented, will often be insufficient to protect water quality in streams.

In theory, other laws might fill those gaps. Other parts of the Clean Water Act, and of other federal statutes, can reach where section 404 cannot.[283] Similarly, state and local governments have broad authority to regulate land use practices, and they could invoke that authority to restrain practices that harm streams.[284] Sometimes they do.[285] But in many places, state or local stream protections are weak or nonexistent, with legislatures and local governments preferring to let the federal government take the lead.[286] And federal assertions of authority are inhibited by the substantial costs of retrofitting landscapes to protect small streams, and by the ever-present arguments that federal stream protections represent infringements on traditional state and local land use authority.[287] Despite those limitations, the EPA is

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[279] *See* 33 U.S.C.A. §§ 1311, 1344 (West 2016) (prohibiting unpermitted discharges of pollutants to waters of the United States, but allowing permits for discharges of dredged or fill material).

[280] *See* Richard Lowrance et al., *Riparian Forests as Nutrient Filters in Agricultural Watersheds*, 34 BIOSCIENCE 374, 374–76 (1986) (describing the importance of riparian buffers).

[281] *See* Owen, *supra* note 85, at 439–45 (describing stressors affecting urban watersheds).

[282] *See* Falke et al., *supra* note 78 (describing groundwater pumping impacts); S. Zekster et al., *Environmental Impacts of Groundwater Overdraft: Selected Case Studies in the Southwestern United States*, 47 ENVTL. GEOLOGY 396, 396–97 (2005).

[283] *See* Owen, *supra* note 85, at 445–54, 456–60 (describing the Endangered Species Act and parts of the Clean Water Act).

[284] *See id.* at 454–56.

[285] *See id.* at 455.

[286] *See id.* at 456; Andrew Hecht, *Obstacles to the Devolution of Environmental Protection: States' Self-Imposed Limitations on Rulemaking*, 15 DUKE ENVTL. L. & POL'Y F. 105, 111 (2004) (describing state statutes that prohibit state agencies from creating any protections that exceed the requirements of federal law). In some of those states, regulators still may influence stream protection through their participation in the 404 program. *See* Owen, *supra* note 13, at 113–15 (describing how states influence program implementation).

[287] *See* Owen, *supra* note 85, at 476–80, 486–90.

still trying, in multiple ways, to encourage development and redevelopment patterns that are more consistent with water quality.[288] But some of the boldest regulatory levers, like a major new stormwater rule, still lie unused.[289]

For all of these reasons, the evolution of stream law still is a work in progress, and a work that cannot be completed under section 404 alone. But that should not detract from the significance of the changes that have already occurred. The United States has shifted from a legal regime in which protections were nearly nonexistent to one in which protections are partial but increasingly widespread, and unevenly effective but improving. In the messy and halting real world of environmental policymaking, that is a very big deal.

III. LESSONS FROM LITTLE STREAMS

So why does this story matter? The most straightforward answer is that an ecologically important and geographically pervasive resource now receives more protection than it once did, and there is room for additional change. That alone justifies attention to the emergence of stronger regulatory protections for streams. But the story is also interesting because key elements of it diverge from some of the darker narratives of present-day environmental law. Not all of the story so diverges, and perhaps the most important lesson of this whole study is the banal point that environmental policymaking is messy, complicated, and unpredictable. But those areas of divergence should provide a reminder that even in times of polarization and conflict, environmental law can and does evolve, in its fitful, incremental way.

Many of those dark narratives begin with gridlock. Congress, in the standard telling, cannot agree internally on, or obtain White House support for, meaningful changes to environmental laws, and statutory environmental law therefore has changed little—for better or worse—since 1990.[290] As many commentators have noted, that still leaves the possibility of action from agencies and the courts.[291] But the courts do not seem as receptive to far-reaching environmental litigation as they

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[288] For links to initiatives and programs, see *Green Infrastructure*, EPA, http://water.epa.gov/infrastructure/greeninfrastructure/ [https://perma.cc/Q67X-452D] (last visited October 28, 2015).

[289] *See* Annie Snyder, *Why Is EPA Taking So Long to Write a Stormwater Rule? It's Complicated*, GREENWIRE (July 5, 2013), http://www.eenews.net/greenwire/stories/1059983921/search?keyword=Why+Is+EPA+Taking+So+Long+To+Write+a+Stormwater+Rule [https://perma.cc/2UA5-YE5N] (describing the EPA's long-delayed stormwater rule, which still has not been finalized); *National Pollutant Discharge Elimination System*, EPA, http://water.epa.gov/polwaste/npdes/stormwater/Stormwater-Petitions.cfm [https://perma.cc/Q7JQ-NDCJ] (last updated Jan. 1, 2017) (describing three region-wide "residual designation authority" petitions, which, if granted, would have led to permitting requirements for more stormwater sources).

[290] *See, e.g.*, Shi-Ling Hsu, *Introduction: Environmental Law Without Congress*, 30 J. LAND USE & ENVTL. L. 1, 1 (2014).

[291] *E.g.*, *id.* at 12.

might have been in the 1970s or 1980s,[292] and administrative law theory provides many reasons to expect little of agencies. According to various competing theories of agency behavior, administrative agencies are either captured tools of the industries they are supposed to regulate[293] or single-minded technocrats oblivious to the collateral costs of the controls they impose.[294] It is no surprise, then, that a future premised on administrative-level reforms strikes many people as a depressing prospect.

To be fair, not everyone shares these views, and many people who do hold them would readily acknowledge that there are exceptional circumstances. And this is by no means the first article to chronicle the alternative pathways through which environmental law continues to evolve.[295] With the recent election, stasis and gridlock are also beginning to strike many people as a comparatively desirable state of affairs. But even before the election, the darker stories emerged with striking frequency, and they contributed to a widespread—and, perhaps, self-fulfilling—sense of policy malaise. That malaise heightens the importance of reminders, wherever one may find them, that there are more promising possibilities for environmental law.

A. Government Agencies as Engines of Reform

One key element of many traditional narratives of environmental law is their emphasis on actors external to government agencies—and their associated disdain for the agencies themselves. For environmental advocates, this emphasis is quite old. Even during the founding era of environmental law, environmentalists and their allied scholars were centrally focused on identifying legal mechanisms that would compel recalcitrant government regulators to act, or to stop environmental destructive agencies from acting. The public trust doctrine, as articulated by Joseph Sax, and the citizen suit were classic legal responses to this concern.[296] The agency,

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[292] *See* LAZARUS, *supra* note 177, at 132–37 (describing the increasing conservatism of the federal courts).

[293] *See, e.g.*, Mary C. Wood, *Nature's Trust: Reclaiming an Environmental Discourse*, 25 VA. ENVTL. L.J. 243, 252–55 (2007) (describing regulatory agencies as chronic enablers of environmental destruction).

[294] *See, e.g.*, Christopher C. DeMuth & Douglas H. Ginsburg, *White House Review of Agency Rulemaking*, 99 HARV. L. REV. 1075, 1080–81 (1986).

[295] *See, e.g.*, John D. Leshy, *The Babbitt Legacy at the Department of the Interior: A Preliminary View*, 31 ENVTL. L. 199, 212–213 (2001) (describing administrative reforms of Endangered Species Act implementation). The most salient contemporary examples of that evolution come from the EPA's efforts to use the Clean Air Act to address climate change. *See Regulatory Initiatives*, EPA, https://www.epa.gov/climatechange/climate-change-regulatory-initiatives [https://perma.cc/6CFR-UQBR] (last updated Jan. 6, 2017) (describing and providing links to the EPA's major policy initiatives).

[296] *See generally* JOSEPH L. SAX, DEFENDING THE ENVIRONMENT: A STRATEGY FOR CITIZEN ACTION xi–xiii (1971); Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 491–493 (1970) (identifying the public trust doctrine as the antidote courts could use to counter agency

in this view, might be a necessary vehicle for navigating the road toward environmental progress, but that vehicle was deeply unreliable.[297] Congress, therefore, would provide a clear map, through the substantive—and highly specific—mandates of its statutes, and citizen litigation would provide the backup engine.[298]

Critics outside the environmental movement often express similar views of agency dynamics. One of the central tenets of public choice theory—a particularly influential theory within the field of administrative law—is that agencies function as rational, self-interested actors as they respond to incentives created by external actors.[299] They act to please powerful interest groups or politicians (whose behavior, in turn, can be explained by similar rational-actor models), rather than placing their own distinctive stamp on policymaking.[300] Many public choice theorists may disagree with environmentalists only in their assessment of where environmental groups sit within this model; they perceive environmental groups as just another special interest within the public choice model, rather than as an antidote to public choice dynamics.[301] But the premise of agencies as passive policymakers remains largely the same.[302] Only the critics who perceive agencies as single-minded regulatory zealots seem ready to credit—or, more accurately, curse—the idea that an agency could be an engine of legal change. But even those critics still often seem to be describing agencies as somewhat inhuman automatons, eagerly grasping power but incapable of considered judgment.

There is no question that the public choice models, at least, can explain some of the actions of environmental regulators. Citizen suits have played vital roles in the development of environmental law, and other public choice dynamics can help explain agency priorities and, often, agencies' reluctance to act.[303] More specifically,

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capture).

[297] *E.g.*, Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277, 358 (1993) (arguing that agencies have systematically weakened the Endangered Species Act); Wood, *supra* note 293, at 252–55.

[298] *See* Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 882 (1997) (emphasizing the importance of specificity); James R. May, *Now More than Ever: Trends in Environmental Citizen Suits at 30*, 10 WIDENER L. REV. 1, 7 (2003) ("Citizen suit law is also the engine that propels the field of environmental law.").

[299] *See, e.g.*, Robert W. Hahn, *The Political Economy of Environmental Regulation: Towards a Unifying Framework*, 65 PUB. CHOICE 21, 37–39 (1990).

[300] *See* Steven P. Croley, *Theories of Regulation: Incorporating the Administrative Process*, 98 COLUM. L. REV. 1, 34–35 (1998).

[301] *See, e.g.*, R. Shep Melnick, *Strange Bedfellows Make Normal Politics: An Essay*, 9 DUKE ENVTL. L. & POL'Y F. 75, 77–79 (1998) (arguing that environmental groups have performed effectively within normal public choice dynamics).

[302] For an intriguing counterpoint to that view, see Brigham Daniels, *Agency as Principal*, 48 GA. L. REV. 335, 363 (2014) (arguing that agencies can and sometimes do lead Congress and the President toward new policies).

[303] *See, e.g.*, Barton H. Thompson, Jr., *The Continuing Innovation of Citizen Enforcement*, 2000 U. ILL. L. REV. 185, 186 (describing the roles of citizen enforcement in

these critiques also can shed light on some aspects of the story of stream regulation, for interest groups clearly were, and remain, influentially involved.[304] But often these critiques underemphasize the dynamic role played by agency culture and mission. They underplay, in other words, the reality that agencies often are policy instigators, not just reactive bodies.

Examples of that affirmative role recur throughout the recent history of stream regulation. Initially, the Corps provided little protection for streams largely because many of the engineers and military personnel who dominated the agency genuinely believed in building things.[305] And as the agency's staffing, culture, and mission began to reorient around the Clean Water Act's regulatory mandate—and as the regulatory program had more people to do its work—so too did the scope of protections.[306] Environmental litigation helped spur that reorientation, as did the persistent advocacy of partner federal and state agencies.[307] But Corps staff also began providing more protection to streams because providing more protection just seemed like the appropriate thing to do. Repeatedly, staff told me that leaving streams out of their protective systems just did not make sense to them, given the basic mandate of the Clean Water Act and their increasing understanding of the ecological importance of tributary streams.[308] They moved toward protecting streams, in other words, not—or, at least, not just—to acquiesce to pressure from environmental groups, but also because they viewed that protection as part of their agency mission.

The timing of changes in protection also underscores the importance of an agency's internal sense of direction. The evolution of modern stream protection

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environmental policymaking); Hahn, *supra* note 299, at 27 (describing how interest group politics can explain the common practice of grandfathering existing sources).

[304] The evolution of regulations protecting streams from coal mining has at times exemplified this traditional understanding of environmental law, with agency policy driven in significant part by litigation from environmental groups. *See supra* note 229 and accompanying text (describing the role of the mitigation banking industry).

[305] That belief continues to the present day; the Corps's own autobiography recounts the agency's history of construction with fairly obvious pride, even when describing eras that other authors have characterized as scandals. *Compare, e.g.*, *The U.S. Army Corps of Engineers: A Brief History*, *Conclusion*, U.S. ARMY CORPS OF ENG'RS, http://www.usace.army.mil/About/History/BriefHistoryoftheCorps/ConclusionandBibliography.aspx [https://perma.cc/68NG-NZHY] (last visited Jan. 14, 2017) ("As in its earliest days, the Corps of Engineers still thinks of itself as an organization ready to help build the nation's infrastructure."), *with* REISNER, *supra* note 119, at 169–213.

[306] *See supra* Parts II.B. and II.C.

[307] *See supra* notes 151–155 and accompanying text (describing interactions with partner agencies). This should not be surprising; other research has shown that interagency dynamics can play important policy-shaping roles. *See* J.R. DeShazo & Jody Freeman, *Public Agencies as Lobbyists*, 105 COLUM. L. REV. 2217, 2217 (2005).

[308] *E.g.*, Telephone Interview with Army Corps Regulatory Staff Members (Nov. 17, 2014) ("[M]e being from a district that has an abundance of streams and not exactly an abundance of wetlands, it always kind of bothered me a little bit that people called it a "wetlands protection program" instead of an "aquatic resources protection program.").

began in earnest during President Bill Clinton's second term, at a time when the administration was embracing a variety of environmentally protective initiatives.[309] But it continued through the 2000s, when the nation was governed by an administration whose environmental philosophy was, as one professor aptly put it, "anything industry wants."[310] During the George W. Bush Administration, the Corps issued a regulatory guidance letter endorsing requirements for stream mitigation, lowered thresholds on nationwide permits to include coverage for ephemeral streams, further endorsed stream mitigation—under more rigorous rules—in the 2008 compensatory mitigation rule, and expanded the practice on the ground.[311] The movement was not entirely one way; the 2002 nationwide permits also added waiver provisions and did very little to advance regulation of the stream fills associated with mountaintop removal mining.[312] But little streams had more protection at the end of the Bush Administration than they did at the beginning. And while Congress played a minor role, much of the change occurred because the Corps and the EPA were simply taking what they saw as logical next steps toward fulfilling their protective mission.[313]

This evolution supports more emphasis on the role of agencies in instigating, and sustaining, environmental policy reform. Give an agency a mission and a statutory mandate, and money to hire staff drawn to that mission and mandate, and it will probably try to turn that mandate into reality. The process may be quite slow, particularly if it requires changing agency culture, and forces external to the agency will be important. But those external forces are not the only variables that matter, or even close to it. Within agencies, the streams story suggests, there can be an evolving sense of direction and a powerful engine of reform. That engine may run in low gear, but over time it can transform a regulatory program.

B. Beyond Zero-Sum

Another of the central, and deeply negative, narratives of environmental policy have become the story of the trenches. The basic idea is that environmentalists and industry are largely dug in, with agencies stuck in the cross fire in between, and with neither side able to advance.[314] Of course, industry and environmental advocates

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[309] *See supra* notes 180–199 and accompanying text (describing the evolution of permitting requirements).

[310] Patrick Parenteau, *Anything Industry Wants: Environmental Policy Under Bush II*, 14 DUKE ENVTL. L. & POL'Y F. 363, 363–365 (2004).

[311] *See supra* notes 244–248 and accompanying text.

[312] *See supra* notes 191, 200–219 and accompanying text.

[313] *See* Lave, *supra* note 229, at 78–79 (describing how a Congressman with close ties to the mitigation banking industry passed legislation that spurred the 2008 compensatory mitigation rulemaking). Lave goes on to explain, however, that the 2008 rule's increased emphasis on function-based assessment metrics derived from agency staff preferences, not external pressure. Lave, *supra* note 229, at 80–82.

[314] Douglas A. Kysar & James Salzman, *Environmental Tribalism*, 87 MINN. L. REV. 1099, 1102 (2003) ("[O]ne still sees basically two warring camps, both politically and

often allege that the agency has gone to bed with the opposing army, but the trench metaphor still holds. And in trench warfare, one side's advance is necessarily the other side's retreat. The game is adversarial and zero-sum.

Clearly, this description sometimes fits quite well. The conflicts between the coal industry and the Clean Air Act provide perhaps the most salient example; given its heavy impacts and marginal economics, it is becoming increasingly difficult to imagine a future in which the coal industry thrives amid meaningful environmental protections.[315] Indeed, the conflicts over protecting streams from mountaintop removal mining are just one manifestation of this larger dynamic.[316] Advances in protection there have occurred belatedly and litigiously, and the political battles remain intense.[317]

But many of the changes in stream protection have not looked like trench warfare. Initially, the mere fact that so much has changed belies the analogy. In classic trench warfare, there was not much movement. Also, except for the battles of valley fills, the changes that have occurred have not been particularly litigious. A search of Lexis or Westlaw for cases involving stream regulation produces surprisingly few hits, and the only fact patterns that seem to arise with any consistency—other than the mountaintop removal cases discussed above—involve jurisdictional determinations.[318] Even those are not particularly plentiful. Many legal actions never make it into Lexis and Westlaw databases, so these searches were almost certainly somewhat underinclusive. But even with that caveat, the small number of cases suggests that until recently, regulated entities have not gotten all that worked up about the shift.[319]

Similarly, political responses to the shift toward stream regulation have—at times—been muted. That certainly is not the case right now; the political response to the Clean Water Rule has been anything but calm and measured.[320] But previous changes—the incremental decreases in permitting thresholds, the expansion of compensatory mitigation requirements, and even the 2008 rule that affirmed, on a nationwide basis, the importance of stream mitigation—provoked little media coverage or political response.[321] Indeed, in the very few media accounts to even

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ideologically entrenched on opposite ends of the environmental battlefield."); *see also* Jedediah Purdy, *Our Place in the World: A New Relationship for Environmental Ethics and Law*, 62 DUKE L.J. 857, 862 (2013) (describing the transition from the 1970s, a time of openness, to the present era of "entrenchment").

[315] *See* Brian Palmer, *Does Coal Have a Future in the United States?*, PAC. STANDARD (May 13, 2015), http://www.psmag.com/nature-and-technology/does-coal-have-a-future-in-the-united-states [https://perma.cc/X863-TQ37].

[316] *See supra* notes 200–219.

[317] *Supra* notes 200–219.

[318] I base this assertion on a series of Westlaw searches that I and my research assistant conducted over the summer of 2015.

[319] Alternatively, it suggests that regulated entities are resting all their hopes on a grand battle over Clean Water Act jurisdiction.

[320] *See supra* notes 2–6 and accompanying text.

[321] For the only mainstream media articles I could find that discuss the final 2008 rule,

discuss the 2008 rule, the only criticisms came from environmentalists.[322] John Boehner, it seems, said nothing at all.

Why is that? The obvious answer is that the present critiques fit with the favorite narrative of a party that was, until recently, in the opposition, and that narrative would not have worked so well with a Republican sitting in the Oval Office. But there is an additional possible explanation, which also fits poorly with the narrative of zero-sum trench warfare: in many circumstances, regulated industries could accommodate the changes.

If one of the dominant trends of stream and wetlands protection has been expanding protections, the other key trend has been a move toward more efficient modes of protection. Even with lowering thresholds, most of the Corps's permits are general permits, and general permits issue relatively quickly and cheaply.[323] For even a modest-scale development project, their cost will be a tiny portion of the overall budget. The emergence of in-lieu fee programs and a sophisticated mitigation banking industry has also simplified the process of complying with permit terms.[324] A builder needs only to persuade a Corps office that impacts are unavoidable, and that they cannot be further minimized, and then write a check. And the Corps has also worked on a variety of other mechanisms, from standardized mitigation agreements to creating consolidated multi-agency permitting processes, all designed to increase the efficiency of permitting processes.[325]

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see Spencer Hunt, *Federal Wetlands Rules May Sap Ohio's plans*, COLUMBUS DISPATCH (April 17, 2008, 8:16 AM), http://www.dispatch.com/content/stories/business/2008/04/17/Wetlands.ART_ART_04-17-08_C8_9N9UT7D.html [https://perma.cc/8RLD-X73L] (noting some critiques, none particularly intense and all from environmentalists); Editorial, *Just Say No*, FAYETTEVILLE OBSERVER (April 2, 2008), http://www.fayobserver.com/opinion/just-say-no/article_5f74301a-88fa-53a1-a474-3aab8ee4c4b3.html [https://perma.cc/8TJD-Q5V5] (critiquing the new rule on environmental grounds). On the 2006 proposed rule, see Michael Cary, *Subbing Out Mother Nature*, SAN ANTONIO CURRENT (April 12, 2006), http://www.sacurrent.com/sanantonio/news-subbing-out-mother-nature/Content?oid=2276336 [https://perma.cc/7DK2-FFFJ]; John Heilprin, *Developers Encouraged to Turn to Experts to Restore Wetlands*, ENVTL. NEWS NETWORK (March 27, 2006), http://www.enn.com/ecosystems/article/3953 [https://perma.cc/LAD8-MQTE] (containing criticism only from the National Wildlife Federation); Susan Palmer, *Rules Set Wetlands Standards*, EUGENE REG.-GUARD (March 28, 2006), http://pqasb.pqarchiver.com/registerguard/doc/377815168.html?FMT=ABS&FMTS=ABS:FT&type=current&date=Mar+28%2C+2006&author=Susan+Palmer+The+Register-Guard&pub=The+Register+-+Guard&edition=&startpage=B.1&desc=Rules+set+wetlands+standards [https://perma.cc/5ZPT-9UAV].

[322] *E.g.*, Heilprin, *supra* note 321.

[323] *See* Biber & Ruhl, *supra* note 181, at 163.

[324] *See, e.g.*, Telephone Interview with Headquarters Staff, Army Corps of Eng'rs (Nov. 17, 2014) ("[F]rom an applicant's standpoint, it's certainly much easier to write a check and be done. . . .").

[325] *See* Owen, *supra* note 13, at 101–02.

There will always be outliers who reject the whole process and, if they are caught, wind up in court.[326] But for most of the repeat players who work with the 404 program, stream protection may be an increasingly predictable cost of doing business. Sometimes it may even wind up being a benefit. If avoiding stream fills ultimately means that a development does not flood, or if buyers decide they like the way a little green space looks, protecting streams may ultimately produce positive economic returns.

C. The Alternative History of Environmental Law

Many environmental lawyers and law teachers—particularly those who identify with the environmental movement—are drawn to stories of epic battles. Fights over massive dam proposals or old-growth logging inspire generation after generation of law students and frame the worldviews of both professors and practicing attorneys. And those stories often follow a particular trajectory, with recalcitrant agencies declining, largely because of intense industry pressure, to fulfill the mandates set forth by the forward-thinking legislators of the 1970s and 1980s.[327] Bold lawsuits follow.[328] Sometimes the environmentalists win; sometimes they lose.[329] But the roles stay largely constant—unless conservative advocacy groups or politicians are telling the tales. Then, everything shifts; the villains are environmental zealots within and outside the halls of the EPA and other federal agencies, and the righteous victims are the defenders of employment, free enterprise, and rational thought.[330] But within that second set of stories, a similar kind of internal uniformity persists.

But if the recent history of stream protection is also a microcosm of environmental law history, then how else might that history be told? We might start by acknowledging that the legislators of the 1970s and 1980s, for all their foresight, underestimated the complexities of the tasks they assigned to administrative regulators. In particular, they underestimated the extent to which environmental

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[326] *See, e.g.*, Rapanos v. United States, 547 U.S. 715, 762–63 (2006) (Kennedy, J., concurring) (describing how John Rapanos' defiance of federal and state regulators led to a criminal prosecution).

[327] *E.g.*, Wood, *supra* note 293, at 252–55.

[328] For an interesting measure of the importance of this story to environmental lawyers, see James Salzman & J.B. Ruhl, *Who's Number One*, ENVTL. F., Nov./Dec. 2009., at 36. Salzman and Ruhl polled environmental law professors and practitioners, seeking their opinions on the most important environmental law cases in U.S. history. They also presented the results of a similar survey in 2001. Many of the chosen cases—*Tennessee Valley Authority v. Hill* and *Massachusetts v. EPA*, for example—fit this basic narrative. *Id.* at 38. For the multinational versions of this story, see OLIVER A. HOUCK, TAKING BACK EDEN (2009).

[329] *Sierra Club v. Morton*, 405 U.S. 727, 727 (1972), is a classic example of a celebrated defeat.

[330] For many versions of this story, see *Environmental Regulations*, PACIFIC LEGAL FOUND., http://www.pacificlegal.org/cases#section=tab3 [https://perma.cc/3GLL-LWYC] (last visited Aug. 24, 2016).

progress would require picky, detailed attention to thousands of small threats.[331] The incremental effects of thousands of little stream fills are just one example of this phenomenon.[332] The Congresses of environmental law's early years gave regulators the authority to respond to those problems, but neither they nor the agencies they empowered had the toolboxes or the experience to undertake the difficult, and sometimes intrusive, tasks involved in administering this brave new regime.[333] What followed, then, was a long period when the gaps between environmental mandates and actual practice were extraordinarily large and agencies were not quite sure how those gaps could be closed—and in which some efforts at closure were both clumsy and ineffective.[334]

Things are very different now. The United States may no longer pass significant environmental statutes; the glory years of environmental legislating are over. But the other key story of the last thirty years has been the evolution of administrative protections. Across many different subfields of environmental law, agencies have moved, slowly and fitfully, toward expanding and improving the protections offered within existing statutory bounds. Central to that movement has been an increasing intolerance of harms that might once have been written off as *de minimis*. The shift is by no means complete; there are still many gaps between the ambitions of the statutes of the 1970s and 1980s and the regulatory practices of the present day.[335] And figuring out ways to use limited, and often declining, staffing levels and budgets to regulate increasing numbers of pollution sources remains an enormous challenge for environmental agencies.[336] But from hazardous waste management to stormwater regulation to stream fills, environmental law is filled with examples of gradually increasing regulatory protection.[337]

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[331] *See* Owen, *Critical Habitat*, *supra* note 142, at 143–44.

[332] *See, e.g.*, Adelman, *supra* note 142, at 240–41 (explaining the importance of small sources to air quality regulation).

[333] *See, e.g.*, Nat. Res. Def. Council v. Costle, 568 F.2d 1369, 1377 (D.C. Cir. 1977) (describing the EPA's reluctance to permit thousands of stormwater sources). The *Costle* court declined to accede to the EPA's arguments, and it identified ways in which the EPA might address these challenges, some of which the EPA has gradually learned to implement. But it took over a decade before the EPA began in earnest to use the *Costle* court's recommended tools. *See* Owen, *supra* note 85, at 448–49 (describing the evolution of stormwater regulation).

[334] *E.g.*, Patrick Del Duca & Daniel Mansueto, *Indirect Source Controls: An Intersection of Air Quality Management and Land Use Regulation*, 24 LOY. L.A. L. REV. 1131, 1148–55 (1991) (describing how the EPA struggled in the 1970s to address the intersection of land use planning, transportation policy, and air quality).

[335] *See, e.g.*, 33 U.S.C.A. § 1251(a)(1) (West 2016) (stating the still-unmet goal of eliminating all discharges of pollutants).

[336] *See, e.g.*, David L. Markell & Robert L. Glicksman, *A Holistic Look at Agency Enforcement*, 93 N.C. L. REV. 1, 56–57 (2014) (describing the enforcement challenges associated with an expanding number of permittees).

[337] Even after the passage of the Resource Conservation and Recovery Act in 1976, disposal practices remained shoddy. I began my environmental career working as a geologist on contaminated sites, and much of that contamination had occurred as late as the 1980s. But

Regulated industries (and regulated governmental entities and individuals) have sometimes been an implacable opponent of those changes. But at the same time agencies have learned to protect more, they also have learned to protect in ways more solicitous of the regulated, and the regulated have learned to work with the new regulatory regimes.[338] General permits, compensatory mitigation programs, and more cooperative enforcement regimes, to provide a few examples, have all been designed to make regulation work better for regulated industries.[339] And the growth of the environmental consulting industry,[340] the emergence of private certification systems,[341] and an increasing embrace of environmental management systems and self-auditing programs,[342] to provide a few more examples, have all offered industries ways to take charge of their own compliance, and to integrate environmental requirements into functioning business models. Perhaps, then, our dominant narrative should not be of gridlock. Instead, it might be a story of a process of mutual accommodation, in which the regulated and the regulators gradually work toward turning the ambitious but somewhat naïve mandates of the 1970s into functional realities.

Of course, this alternative story is not independent of the classic narratives of conflict. Individual players are often playing out both an accommodation and a confrontation strategy, and outcomes in legislatures and courts inform everyone's willingness to negotiate. Sometimes that intertwinement is symbiotic; a lawsuit often is the jumpstart that kicks more collaborative processes into gear.[343] But the interconnections can also be problematic. In any process of social or regulatory change, there are players for whom conflict is an end, not just a means; for reasons of ideology, politics, or professional job security, they perceive accommodation as a direct threat. Those interrelationships are all the more reason for emphasizing, particularly in legal thought, the administrative evolution story of environmental

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by the mid-1990s, when I entered the field, cleanup work was becoming increasingly hard to find, largely because hazardous waste management practices had so greatly improved.

[338] For a description of similar dynamics in health and safety regulation, see Robert A. Kagan & Rachel VanSickle-Ward, *Marshall v. Barlow's Inc.: Legitimizing Regulatory Enforcement*, *in* ADMINISTRATIVE LAW STORIES 100, 122 (Peter L. Strauss ed., 2006).

[339] *See* Owen, *supra* note 13, at 97–102; Robert L. Glicksman & Dietrich H. Earnhart, *Coercive vs. Cooperative Enforcement: Effect of Enforcement Approach on Environmental Management*, 42 INT'L REV. L. & ECON. 135, 136, 145 (2015) (describing cooperative enforcement and concluding that it generates better results).

[340] *See* Sinclair-Desgagne, *supra* note 143 (describing the growth of the environmental consulting industry).

[341] *See* Lesley K. McAllister, *Regulation by Third-Party Verification*, 53 B.C. L. REV. 1, 5–12 (2012).

[342] *See* Madhu Khanna & Diah Widyawati, *Fostering Regulatory Compliance: The Role of Environmental Self-Auditing and Audit Policies*, 7 REV. L. & ECON. 129, 131 (2011) (finding that auditing leads to improved environmental performance); Steven A. Melnyk et al., *Assessing the Impact of Environmental Management Systems on Corporate and Environmental Performance*, 21 J. OPERATIONS & MGMT. 329, 332–33 (2003).

[343] *E.g.*, Owen, *supra* note 85, at 483–84 (citing multiple examples from the realm of water resource management).

regulation. By professional disposition, as well as by human nature, lawyers are often drawn to conflict; it provides our best war stories and generates many of our billable hours. But there is a very real danger that, in our fixation on the classic courtroom battles, we will not just miss the quieter evolutionary processes that occur outside the spotlight. We may fail to nurture them, or even stunt their growth through our persistent emphasis on conflict.

If that all sounds abstract, consider, for a moment, the current fight over the Clean Water Rule. Most of the rule's opponents have cast the rule as a massive power grab that will devastate key sectors of the American economy.[344] While their arguments are more measured, some environmental groups have argued that the rule actually relinquishes key protections, with disturbing consequences for water quality.[345] And no doubt many advocates have convinced themselves that these stories are true, and that they justify the many legal actions against the new rule. But a more prosaic possibility is that the rule makes slight adjustments to the existing scope of jurisdiction, and that even before the rule emerged, the Corps and the EPA were continuing to develop slowly-improving protections for streams and wetlands, and were offering those protections in ways industries could live with. That story does not resonate as well with standard narratives of environmental law, and the Clean Water Rule may well end because judges or legislators or a president believe that agencies are on the rampage, and that reining them in is the only way to restore our constitutional balance. But in this circumstance, a more prosaic story just happens to be accurate.

CONCLUSION

In 1972, Congress passed a statute whose text offered sweeping protection for waterways across the nation. In theory, those protections extended to little streams. Actual practices were different, not just in the 1970s but also well into the 1990s.[346] But over the past twenty years, small streams have become a central focus of regulatory protection, with the extent and type of those protections continuing to evolve to this day, and with additional changes still possible. The future of that evolution is uncertain, and it may hang in the balance; Congress, the incoming administration, or the courts could nip much of this progress in the bud. But so long as it lasts, the story of little streams illustrates the continuing ability of environmental law to evolve and change, and the incremental—and often unnoticed—ways in which those changes occur.

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[344] *See, e.g.*, Speaker Paul Ryan's Press Office, *supra* note 3; *Ditch the Rule,* AMERICAN FARM BUREAU FEDERATION, http://fbvideos.org/ditch-the-rule/ [https://perma.cc/PZ23-QTHC] (last visited Aug. 23, 2016).

[345] *E.g.* Tina Posterli, *US EPA and Army Corps Issue Weak Clean Water Rule*, WATERKEEPER ALLIANCE (May 27, 2015), http://waterkeeper.org/us-epa-and-army-corps-issue-weak-clean-water-rule/ [https://perma.cc/Q5T3-UVF8].

[346] *See supra* Parts II.B. and II.C.