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Enter Sandman: The Viability of Environmental Personhood to US Soil Conservation Efforts

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Enter Sandman: The Viability of Environmental Personhood to US Soil Conservation Efforts

ABSTRACT

The US agricultural system relies on healthy soil for economic and environmental stability. The federal government established soil conservation efforts following the Dust Bowl, and state and local entities later developed legal tools to supplement soil conservation. These efforts, however, are insufficient to protect the nation’s soil in the face of a changing climate. Conservation techniques are available that could substantially mitigate the effects of climate change, but the federal government lacks the tools to encourage their uniform adoption. The rigidity of prior state efforts, moreover, has disabled some landowners from adapting conservation lands to modern challenges. This Note recommends that US conservationists utilize environmental personhood—a legal tool already adopted by other nations—to implement and enforce new conservation techniques that could both mitigate climate change and protect the nation’s soil from its adverse effects.

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In the 1930s, after years of unrestricted farming and grazing practices led to massive soil erosion in the Great Plains, strong winds blew the exposed topsoil into powerful dust storms that reached as far as the Eastern Seaboard.¹ For nine years, the Dust Bowl brought ecological crises to an already-suffering US economy and was later called “the worst drought in North America in 300 years.”² That hardship led to the implementation of comprehensive conservation measures designed to prevent a similar catastrophe in the future.³ Today, however, the increased temperatures associated with climate change could expose the US agricultural system to ecological conditions far worse than the Dust Bowl.⁴ This issue is particularly

1. See Kimberly Amadeo, *How the Dust Bowl Environmental Disaster Impacted the US Economy*, BALANCE (Apr. 20, 2017), <https://www.thebalance.com/what-was-the-dust-bowl-causes-and-effects-3305689> [<http://perma.cc/S99Q-YUZ3>].

2. *Id.*

3. See discussion *infra* Part I.A.1.

4. See, e.g., Kukil Bora, *California Drought of 2012–2014 Is the Worst in 1,200 Years: Study*, INT’L BUS. TIMES (Dec. 6, 2014, 4:41 AM), <http://www.ibtimes.com/california-drought-2012-2014-worst-1200-years-study-1737522> (“Record high temperatures and very low rainfall in California between 2012 and 2014 have led to the worst drought conditions in 1,200 years, according to a new study[.]”).

salient for the conservation of the United States' agricultural operations, due to its impact on soil.⁵

Soil is relevant to climate change for two primary reasons. First, soil acts as a carbon sink, which can mitigate the risks of climate change by absorbing carbon dioxide emissions.⁶ Second, the effects of climate change may decrease soil moisture and increase its temperature, consequently harming microbes and vegetation that rely on healthy soil to survive.⁷ Harm to such vegetation could therefore trigger a cascading effect, endangering all members of the food chain—including humans. Additionally, dry soil is more susceptible to degradation.⁸ This leads to erosion, which “involv[es] ‘the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity.’”⁹ Problematically, traditional agricultural practices remove soil's organic matter, thus increasing its erosion potential.¹⁰ The resulting agricultural runoff severely pollutes nearby waterways with fertilizers, animal waste, pesticides, sediments, and bacteria.¹¹ Similar runoff may result from climate change as heavier precipitation and warmer temperatures continue to alter soil chemistry.¹²

5. For example, researchers from the Center for Environmental Resource Management compared the Dust Bowl's “dramatic social, biological, and physical consequences” to the significant threat posed by the sedimentation and eutrophication of US reservoirs, contending that such a threat “demands corrective action based on sound science and practical affordable technologies.” William L. Hargrove et al., *From Dust Bowl to Mud Bowl: Sedimentation, Conservation Measures, and the Future of Reservoirs*, 65 J. SOIL & WATER CONSERVATION 14A, 14A (2010).

6. R. Lal, *Soil Carbon Sequestration to Mitigate Climate Change*, 123 GEODERMA 1, 4 (2004), http://eps413.wustl.edu/Lal2004_Geoderma.pdf [<https://perma.cc/5RRS-YV8E>].

7. *See id.* at 9.

8. *Id.*

9. Laurie Ristino & Gabriela Steier, *Losing Ground: A Clarion Call for Farm Bill Reform to Ensure a Food Secure Future*, 42 COLUM. J. ENVTL. L. 59, 65 (2016) (quoting *Erosion*, NAT. RESOURCES CONSERVATION SERV., <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/crops/erosion/> [<https://perma.cc/9T5S-KC5J>] (last visited Sept. 24, 2017)); *see* Lal, *supra* note 6, at 7 (defining soil degradation to encompass soil erosion).

10. *See* J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 277 (2000). Agricultural activities also *directly* emit methane and nitrous oxide, both of which are potent greenhouse gases (GHGs). *See* RENÉE JOHNSON, CONG. RESEARCH. SERV., RL33898, CLIMATE CHANGE: THE ROLE OF THE U.S. AGRICULTURE SECTOR AND CONGRESSIONAL ACTION 3–5, 7 (2009), <https://fas.org/sgp/crs/misc/RL33898.pdf> [<https://perma.cc/75W9-LTZ2>].

11. Ruhl, *supra* note 10, at 288.

12. E. Sinha, A.M. Michalak & V. Balaji, *Eutrophication Will Increase During the 21st Century as a Result of Precipitation Changes*, 357 SCI. 405 (2017), *quoted in* Tatiana Schlossberg, *Fertilizers, a Boon to Agriculture, Pose Growing Threat to U.S. Waterways*, N.Y. TIMES (July 27, 2017), <https://www.nytimes.com/2017/07/27/climate/nitrogen-fertilizers-climate-change-pollution-waterways-global-warming.html?mcubz=0> [<https://perma.cc/ZB79-92QY>].

Currently, the United States employs a myriad of land management tools to help conserve soil.¹³ For agricultural land, two such tools are particularly relevant to sediment control: land management practices and engineered conservation structures.¹⁴ Land management practices consist of contour farming, tillage, and crop rotation.¹⁵ Meanwhile, conservation structures include terraces, vegetative and riparian buffers, and stream bank protection.¹⁶ Implementation of these techniques contributes to a strong agricultural industry,¹⁷ but traditional conservation methods should be reevaluated in light of agricultural risks associated with climate change.

According to a 2003 study by the Soil and Water Conservation Society (SWCS), “[c]onservationists should be seriously concerned about the implications of climate change—as expressed by changes in precipitation patterns—for the conservation of soil and water resources in the United States.”¹⁸ The SWCS predicted that increased levels of precipitation alone could dramatically raise the risk of soil erosion, potentially causing “greater soil degradation, pollution of surface water, pollution of groundwater or a combination of all three.”¹⁹ Temperature increases would also create risks for agriculture.²⁰ A World Bank report estimated that an increase of 3°C could cause extended droughts that would stymie crop yields by 50 to 70 percent in some regions.²¹ The topsoil in that climate would present a greater risk of erosion and dwarf the environmental hazards existing in the 1930s Great Plains. Conservation techniques should, accordingly, be reevaluated to address the increased risks of severe climatic events.

13. See discussion *infra* Part I.A.

14. See Hargrove et al., *supra* note 5, at 15A.

15. See *id.*

16. See *id.*

17. See Ristino & Steier, *supra* note 9, at 65 (“With 17.3 million jobs in food production and agriculture, this sector contributes around \$985 billion annually, or only 5.7 percent of the U.S gross domestic product (‘GDP’).”).

18. SOIL & WATER CONSERVATION SOC’Y, CONSERVATION IMPLICATIONS OF CLIMATE CHANGE: SOIL EROSION AND RUNOFF FROM CROPLAND 17 (2003), http://www.swcs.org/documents/filelibrary/advocacy_publications_before_2005/Climate_changefinal_112904154622.pdf [<https://perma.cc/FE66-MN2X>].

19. *Id.* at 18.

20. See JOHN CHARMAN, UNITED NATIONS FOOD & AGRIC. ORG., METHODS AND MATERIALS IN SOIL CONSERVATION 7 (2005) (“Temperature, both seasonal and daily, together with rainfall influences the rate and type of weathering.”).

21. WORLD BANK GRP., TURN DOWN THE HEAT: CONFRONTING THE NEW CLIMATE NORMAL xix, xxiv–xxv, xxxi (2014), documents.worldbank.org/curated/en/317301468242098870/pdf/927040v20WP0000ull0Report000English.pdf [<https://perma.cc/LZ57-G8YA>].

The current legal regime cannot solve this problem. The federal system lacks any mandatory provisions for soil conservation, instead relying on voluntary participation and local initiatives.²² Moreover, the major environmental regulatory statutes include provisions that exclude agriculture—“the leading national cause of soil erosion”²³—from their coverage. Worse still, many politicians—including President Trump²⁴—are skeptical of climate change’s existence in the first place. In other words, federal government actors are unlikely to adopt effective improvements to soil conservation.²⁵ This may require conservationists to seek assistance from state governments and private actors, both of which retain important roles under the current legal regime.²⁶

Additionally, conservationists should look to legal tools used by other nations to curb future soil erosion. This Note recommends the adoption of environmental personhood, one such tool developed by at least two nations, because of its ability to bestow local communities—which stand to gain or lose the most from localized soil conservation methods—and climate change advocates with primary authority over land management practices. As used in this Note, the term “environmental personhood” refers to the notion of establishing a legal personality for natural objects, including the legal rights to contract and to own property.²⁷

22. See discussion *infra* Part I.

23. Ruhl, *supra* note 10, at 277; see discussion *infra* Part I.B.

24. See, e.g., Donald J. Trump (@realDonaldTrump), TWITTER (Nov. 6, 2012, 11:15 AM), <https://twitter.com/realdonaldtrump/status/265895292191248385?lang=en> [<https://perma.cc/GV7A-BP2F>] (“The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.”).

25. For example, one possible improvement would be to account for extreme weather events when determining long-term conservation plans—as opposed to using only annual averages. See SOIL & WATER CONSERVATION SOC’Y, *supra* note 18, at 20. This risk-based approach would provide helpful information to conservationists and industry alike, but the Natural Resources Conservation Service—the federal agency charged with encouraging soil conservation—currently examines only average weather patterns for its predictive erosion models. See NAT. RES. CONSERVATION SERV., U.S. DEPT OF AGRIC., 2012 NATURAL RESOURCES INVENTORY 8–7 (2015), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd396218.pdf [<https://perma.cc/6V36-H5ZG>].

26. See generally Michael P. Vandenbergh & Jonathan A. Gilligan, *Beyond Gridlock*, 40 COLUM. J. ENVTL. L. 217, 218 (2015) (remarking that “[p]rivate climate governance can achieve major [GHG] emissions reductions while governments are in gridlock”).

27. See generally Christopher D. Stone, *Should Trees Have Standing?—Toward Legal Rights for Natural Objects*, 45 S. CAL. L. REV. 450, 456 (1972) (“I am quite seriously proposing that we give legal rights to forests, oceans, rivers and other so-called ‘natural objects’ in the environment[.]”). As Professor Stone contends, this notion is no more controversial than the provision of legal rights to corporate entities. See *id.* at 452 (“We have become so accustomed to the idea of a corporation having ‘its’ own rights . . . for so many statutory and constitutional purposes, that we forget how jarring the notion was to early jurists.”).

Part I of this Note explains the development of soil conservation efforts by government entities and identifies the significant regulatory gaps in the current legal regime. Part II discusses additional conservation measures that could be adopted to promote healthy soil and maximize its capacity to mitigate climate change. Part III then introduces the concept of environmental personhood—a legal formulation analogous to the US corporate form—and analyzes the adoption of this concept as a conservation tool by other nations. It also advocates for environmental personhood’s viability under US law. Finally, Part IV identifies the practical benefits of environmental personhood for soil conservation.

I. WHY CURRENT SOIL CONSERVATION EFFORTS IN THE UNITED STATES ARE INSUFFICIENT

The United States lacked any comprehensive soil conservation plan until the 1930s.²⁸ Following the Dust Bowl, early conservation efforts focused primarily on reducing soil erosion.²⁹ Despite the promulgation of a comprehensive regulatory framework, major reductions were unsuccessful in part because the program’s success depended on the affirmative cooperation of private landowners.³⁰ Other tools, such as conservation easements, eventually provided incentives for some otherwise unwilling landowners to abstain from land-disturbing activities in return for tax benefits.³¹ States also enacted guidelines that proscribed certain land-disturbing activities,³² while the federal government imposed strict liability for unauthorized discharges of soil into the water or the ground.³³ This Part first examines the legal framework behind these programs and their limitations regarding soil conservation and then discusses the shortcomings of federal environmental statutes with respect to agriculture.

28. See Soil Conservation Act of 1935, Pub. L. No. 74-46, 49 Stat. 163 (1935) (codified as amended at 16 U.S.C. §§ 590a–590q-3 (2012)).

29. See J. William Futrell, *The IUCN Sustainable Soil Project and Enforcement Failures*, 24 PACE ENVTL. L. REV. 99, 103 (2007).

30. See 16 U.S.C. § 590b (2012).

31. See Julia D. Mahoney, *Perpetual Restrictions on Land and the Problem of the Future*, 88 VA. L. REV. 739, 751–52 (2002).

32. Futrell, *supra* note 29, at 108.

33. See, e.g., *United States v. Alcan Aluminum Corp.*, 315 F.3d 179, 184 (2d Cir. 2003) (remarking that the Comprehensive Environmental Response, Compensation, and Liability Act “is a strict liability statute” for releases of hazardous substances that contaminate the surrounding soil); *United States v. Hopkins*, 53 F.3d 533, 540 (2d Cir. 1995), *cert. denied*, 516 U.S. 1072 (1996) (interpreting the Clean Water Act’s criminal enforcement provision to be violated “even if the defendant was not aware of the proscription”).

A. *Early Conservation Efforts: Limited Participation and Restricted Adaptation*

Soil conservation incentives first developed at the federal level. These later spilled into state guidelines and private agreements. As evidenced below, these government-backed incentives and regulations suffer from significant shortcomings that preclude them from adequately addressing soil conservation amid the warming climate.

1. Federal Initiatives Lacked Significant Participation

The earliest federal legislation directed at soil conservation responded directly to environmental hazards arising from the Dust Bowl.³⁴ Congress passed the Soil Conservation Act of 1935 (SCA),³⁵ which established a national policy “to provide permanently for the control and prevention of soil erosion” and instructed the US Department of Agriculture (USDA) to implement that policy through the Natural Resources Conservation Service (NRCS).³⁶ The SCA instructed the NRCS to research “the character of soil erosion and the preventive measures needed” and to execute those preventive measures;³⁷ however, its scope was limited to lands “owned or controlled by the United States” unless it “obtain[ed] proper consent or the necessary rights” to proceed on private lands.³⁸ To that end, the SCA empowered the NRCS to contract with individuals and agencies alike and to purchase lands when necessary to accomplish the SCA’s policy goals.³⁹

Primarily, the NRCS provided technical assistance to farmers who consented to its assistance, urging them to adopt best management practices like contour plowing, crop rotations, and land management.⁴⁰ These practices were intended to reduce soil erosion,

34. Futrell, *supra* note 29, at 103.

35. Soil Conservation Act of 1935, Pub. L. No. 74-46, 49 Stat. 163 (1935) (codified as amended at 16 U.S.C. §§ 590a–590q-3 (2012)).

36. *Id.* § 590a; Futrell, *supra* note 29, at 103. The agency was originally named the Soil Conservation Service, but Congress renamed it in 1994. Compare Soil Conservation Act of 1935, Pub. L. No. 74-46, § 5, 49 Stat. 163, 164 (1935) (“The Secretary of Agriculture shall establish an agency to be known as the ‘Soil Conservation Service[.]’”), with 7 U.S.C. § 6962(a) (2012) (“The Secretary is authorized to establish and maintain within the Department a Natural Resources Conservation Service.”). To avoid confusion, this Note will refer to the agency only as the NRCS.

37. See 16 U.S.C. § 590a(1)–(2).

38. *Id.* § 590b.

39. *Id.* § 590a(3)–(4).

40. Futrell, *supra* note 29, at 103–04; see Richard L. Barnes, *The U.C.C.’s Insidious Preference for Agronomy over Ecology in Farm Lending Decisions*, 64 U. COLO. L. REV. 457, 506 (1993).

for the resulting sediment from cropland erosion “is the most significant pollutant by load measurements in surface waters.”⁴¹ For the rest of the twentieth century, the NRCS remained a prominent force for land stewardship by providing education to farmers for increasing the quality of their soil.⁴² However, the SCA’s threshold requirement of “obtaining proper consent” from private landowners necessarily restricted the NRCS’s influence on soil conservation.⁴³ Uncooperative landowners freely opted out of the NRCS’s conservation programs, and national legislators avoided a mandatory program for fear of political backlash and increased judicial scrutiny regarding agricultural regulation.⁴⁴ Thus, subsequent soil conservation efforts resided with state and private initiatives.

2. Local Solutions Unnecessarily Restrict Future Generations

Today, state and local governments undertake the majority of prevention efforts for soil degradation.⁴⁵ Those entities receive funding and assistance from the NRCS, which also encourages the use of conservation easements.⁴⁶ This legal framework, however, suffers from several gaps that must be addressed to combat the risks to soil associated with climate change.

Cooperative federalism is built into the NRCS’s operations.⁴⁷ To provide technical assistance, the agency since its inception coordinated with local conservation districts that set conservation priorities and established local needs, both of which cooperative landowners executed.⁴⁸ However, recognizing the federal government’s limited role—and having genuine concerns for environmental quality—the Council of State Governments published a

41. Barnes, *supra* note 40, at 506; *see also* Ruhl, *supra* note 10, at 288 (“Farms are the major source of nonpoint water pollution nationally[.]”).

42. *See* Futrell, *supra* note 29, at 104.

43. *See* 16 U.S.C. § 590b.

44. Futrell, *supra* note 29, at 104; *see also, e.g.*, *United States v. Butler*, 297 U.S. 1, 77 (1936) (holding that the Agricultural Adjustment Act of 1933 was an unconstitutional extension of Congress’s commerce power).

45. *See* Futrell, *supra* note 29, at 106–07.

46. *See* *Programs*, NAT. RESOURCES CONSERVATION SERV., <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/> [https://perma.cc/75X5-4WBZ] (last visited Sept. 23, 2017).

47. *See, e.g.*, 7 C.F.R. § 610.2 (2017) (declaring the USDA’s intent to facilitate conservation strategies for “individuals, groups, and units of government”); *id.* § 610.24 (providing for State Technical Committees to “provide information, analysis, and recommendations” to the USDA); *id.* § 610.32 (permitting assistance from the NRCS to help improve existing land resources and to ensure their long-term sustainability only upon “the request of the private grazing-land owner or manager”).

48. Barnes, *supra* note 40, at 505; *see* 7 C.F.R. § 610.24(a).

Model State Act to address soil erosion in 1973.⁴⁹ This Act required state soil and water conservation commissions to adopt guidelines to proscribe certain land-disturbing activities.⁵⁰ These guidelines contain conservation standards for various land uses, including criteria and techniques for restricting the resultant erosion from such activities.⁵¹ Local conservation districts—assisted by the federal government⁵²—may enforce the guidelines by prohibiting any land-disturbing project unless its plan receives approval from the district.⁵³ If a landowner ignores the guidelines, the district may unilaterally administer any necessary conservation measures to curb erosion and, subsequently, demand compensation from the uncooperative landowner.⁵⁴

In 1981, the publication of the Uniform Conservation Easement Act (UCEA) provided an additional legal tool for addressing the challenges of soil erosion.⁵⁵ The UCEA, adopted in most states,⁵⁶ superseded the common law's limited view of permissible nonpossessory interests, thus allowing landowners to sell or donate such interests—in the form of conservation easements—to the government or a nonprofit organization.⁵⁷ Upon this transfer of interest, the easement holder remains permanently restricted by the agreement's terms from using the land for nonconservation purposes.⁵⁸ In return, the landowners receive either immediate proceeds from a sale or long-term tax benefits from a donation.⁵⁹ Thus, the UCEA discourages owners of environmentally sensitive property from engaging in land-disturbing activities without abridging the enforcement of federal regulations.⁶⁰ Conservation easements,

49. Futrell, *supra* note 29, at 107–08.

50. *Id.* at 108.

51. *Id.*

52. See 7 C.F.R. § 610.2.

53. Futrell, *supra* note 29, at 108.

54. *Id.* at 109.

55. UNIF. CONSERVATION EASEMENT ACT §§ 1–6 (NAT'L CONFERENCE OF COMM'RS ON UNIF. STATE LAWS 1981).

56. Jess R. Phelps, *Reevaluating the Role of Acquisition-Based Strategies in the Greater Historic Preservation Movement*, 34 VA. ENVTL. L.J. 399, 424 n.129 (2016).

57. UNIF. CONSERVATION EASEMENT ACT § 1(2); Mahoney, *supra* note 30, at 749–50.

58. See Mahoney, *supra* note 31, at 750 (“At the core of the appeal of conservation easements is the promise that the land preservation decisions made today will endure perpetually.”).

59. *Id.* at 751–52.

60. *Id.* at 752; see also Ann Taylor Schwing, *Perpetuity Is Forever, Almost Always: Why It Is Wrong to Promote Amendment and Termination of Perpetual Conservation Easements*, 37 HARV. ENVTL. L. REV. 217, 226 (2013) (“[The UCEA] was clearly never intended to impose substantive law in conflict with federal law but rather to address procedural mechanics.”).

however, have been criticized for rigidly binding future generations from amending their terms.⁶¹ This is particularly problematic for adaptation to changes in nature, scientific knowledge, and culture.⁶²

B. Federal Environmental Statutes: Ineffective Deterrents for Soil Degradation

Conservationists cannot rely on the current federal regime to protect soil from the effects of climate change, or even to mitigate the resulting degradation from those effects. The principal federal statutes for environmental protection either apply too narrowly to appropriately address soil erosion or expressly exclude agricultural practices from their scope. In recent years, the Environmental Protection Agency (EPA)—charged with enforcing these statutes—has exercised broad jurisdiction that may indirectly impact soil conservation, but a shrinking budget and dependence on political shifts limit the EPA's enforcement role. This Section briefly describes the principal environmental statutes and identifies their shortcomings with respect to soil conservation.

1. The National Environmental Policy Act

Beginning in 1970, the federal government responded to increasing environmental concerns with comprehensive legislation.⁶³ The National Environmental Policy Act (NEPA)⁶⁴ was the first of these statutes, mandating procedures for all federal agencies to follow when proposing “major Federal actions significantly affecting the quality of the human environment.”⁶⁵ For such actions, any federal agency must prepare an environmental impact statement (EIS) that explains the action's purpose, describes the environment affected by that action, and compares its proposed action to other alternatives.⁶⁶ For any other action, NEPA still requires agencies to complete an environmental assessment (EA), which amounts to a concise version of

61. See, e.g., Jessica E. Jay, *When Perpetual Is Not Forever: The Challenge of Changing Conditions, Amendment, and Termination of Perpetual Conservation Easements*, 36 HARV. ENVTL. L. REV. 1, 28–29 (2012); Mahoney, *supra* note 31, at 753.

62. Mahoney, *supra* note 30, at 753.

63. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 94 (7th ed. 2013).

64. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321–47 (2012)).

65. *Id.* § 102(C), 42 U.S.C. § 4332(C) (2012); PERCIVAL ET AL., *supra* note 63, at 92.

66. PERCIVAL ET AL., *supra* note 63, at 953.

an EIS.⁶⁷ In either case, the agency must disclose its final decision to the public, providing concerned parties with the opportunity to scrutinize that decision.⁶⁸ Individuals, groups, or other government institutions may enjoin that federal agency from executing its proposal if it either failed to prepare an adequate EIS or ignored the EIS entirely.⁶⁹

Given the limited scope of its regulations, however, NEPA alone cannot control conservation problems. For one, it only imposes procedural guidelines, which agencies may ignore after complying with the Act's formalities.⁷⁰ Additionally, NEPA only restricts the decisions of *federal* agencies.⁷¹ Its provisions thus have no limiting effect on individuals or state actors. This means that state agencies may ignore NEPA's directives when making decisions that could implicate soil conservation efforts.

2. The Clean Water Act

Unlike NEPA, the Clean Water Act (CWA)⁷² represents one legislative effort that *does* restrict individuals and states. The CWA regulates pollution of "the waters of the United States" by criminalizing unpermitted pollution discharges.⁷³ While the CWA's scope initially appears restricted to *water*, the Supreme Court has interpreted the CWA to cover certain adjacent wetlands.⁷⁴ The CWA's

67. See *id.* at 932.

68. NEPA § 102(C), (G); see Ava Azad, *Remedies for Foreign Citizens Subjected to Outsourced Pollution: A Case Study of American Big Oil in the Ecuadorian Amazon*, 9 FLA. AGRIC. & MECHANICAL U. L. REV. 277, 301–02 (2014) ("The public nature of this process also serves to educate the public on problems with and alternatives to federal (and state, under the state counterparts to NEPA) actions affecting the environment.").

69. See, e.g., *Thomas v. Peterson*, 753 F.2d 754, 761 (9th Cir. 1985) (requiring the preparation of an EIS before the US Forest Service could approve a timber road proposal); *Sierra Club v. U.S. Army Corps of Engineers*, 701 F.2d 1011, 1031 (2d Cir. 1983) (holding that the Army Corps of Engineers violated NEPA by pursuing a highway proposal without considering pertinent data from its prepared EIS).

70. See PERCIVAL ET AL., *supra* note 63, at 904.

71. See NEPA § 102.

72. Clean Water Act, Pub. L. No. 92-500, 86 Stat. 816 (1972) (codified as amended at 33 U.S.C. §§ 1251–1388 (2012)).

73. *Id.* §§ 301(a), 502(7), 33 U.S.C. §§ 1311(a), 1362(7) (2012).

74. PERCIVAL ET AL., *supra* note 63, at 692; see *Rapanos v. United States*, 547 U.S. 715, 739–42 (2006) (distinguishing the CWA's coverage between wetlands adjacent to navigable and non-navigable waters). In 2015, the EPA attempted to further clarify its jurisdiction under the CWA with its "Waters of the United States" Rule, but President Trump recently signaled his administration's intent to dismantle that rule. See, e.g., Merrit Kennedy, *Trump Aims to 'Eliminate' Clean Water Rule*, NAT'L PUB. RADIO (Feb. 28, 2017), <http://www.npr.org/sections/thetwo-way/2017/02/28/517016071/trump-aims-to-eliminate-clean->

scope further distinguishes between direct pollution discharges from industrial point sources and agriculture discharges from nonpoint sources.⁷⁵ Agricultural runoff and soil erosion fall under this latter category.⁷⁶ While point source dischargers must use the best available technology to comply with the CWA's effluent standards—even if compliance costs would necessarily bankrupt some firms in the industry⁷⁷—nonpoint source dischargers, by contrast, avoid those costly regulations. Nonpoint sources may discharge into waters and wetlands without even obtaining a permit.⁷⁸

Nonpoint sources, moreover, are chiefly regulated by state-estimated total maximum daily loadings (TMDLs).⁷⁹ Under this scheme, states must first identify any jurisdictional waters with pollution levels that exceed their effluent limitations.⁸⁰ Next, the states must estimate the TMDL for each pollutant in those waters, which represents the maximum daily discharge for each pollutant.⁸¹ These estimations include *all* discharging sources—including nonpoint sources—and the EPA *must* establish TMDLs for states that fail to comply with either requirement.⁸²

Both the states and the EPA largely ignored this scheme until the 1990s, when interest in TMDLs rapidly increased as gains from effluent limitations for point sources plateaued.⁸³ But the application of TMDLs to waters *only* receiving nonpoint source discharges remains hotly contested.⁸⁴ The US Court of Appeals for the Ninth

water-rule [<https://perma.cc/6DC3-T432>]. This further illustrates the unreliability of depending on the federal government to enforce long-term conservation efforts.

75. Futrell, *supra* note 29, at 111; see CWA § 502(14) (defining “point source” to exclude “agricultural stormwater discharges and return flows from irrigated agriculture”).

76. See sources cited *infra* note 91.

77. PERCIVAL ET AL., *supra* note 63, at 727.

78. See CWA § 402(l) (“The Administrator shall not require a permit . . . for discharges composed entirely of return flows from irrigated agriculture[.]”); see also *id.* § 402(a) (requiring point source dischargers to obtain a permit prior to discharge).

79. Futrell, *supra* note 29, at 112; see CWA § 303(d); see also *id.* § 319 (establishing nonpoint source management programs).

80. PERCIVAL ET AL., *supra* note 63, at 767–68. “Effluent limitations” here refer to those requiring point source dischargers to use “the best practicable control technology” before discharging pollutants into the water. See CWA §§ 301(b)(1), 303(d)(1)(A).

81. PERCIVAL ET AL., *supra* note 63, at 768.

82. *Id.*; Futrell, *supra* note 29, at 112.

83. PERCIVAL ET AL., *supra* note 63, at 768; Futrell, *supra* note 29, at 112–13.

84. See PERCIVAL ET AL., *supra* note 63, at 768 (“The most contentious issue involving TMDLs is the question whether section 303(d)’s TMDL requirements apply to nonpoint sources.”); see also *Pronsolino v. Nastri*, 291 F.3d 1123, 1139 (9th Cir. 2002) (“So, at least in blended waters, TMDLs must be calculated with regard to nonpoint sources of pollution; otherwise, it would be impossible ‘to implement the applicable water quality standards,’ which do not differentiate sources of pollution.”).

Circuit has held that the CWA permits the regulation of “waters impaired *only* by nonpoint sources of pollution” through Section 303(d)’s TMDL requirements, but it is the only federal appellate court to have addressed this issue.⁸⁵ Agriculture interest groups and environmentalists continue to litigate the TMDL requirements’ scope in other jurisdictions, but in the meantime, nonpoint sources remain major sources of water pollution with limited regulation.⁸⁶

3. The Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act

Water pollution is not the only concern regarding soil degradation, however, for not all landowners dispose of their sediment into rivers, lakes, and streams. Indeed, two federal initiatives primarily regulate the treatment and disposal of solid waste. First, the Resource Conservation and Recovery Act (RCRA)⁸⁷ addresses the accumulation of solid waste in the environment if deemed a “hazardous waste.”⁸⁸ Second, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)⁸⁹ imposes strict liability upon contributors to hazardous spills, thus incentivizing waste reduction and careful waste management.⁹⁰ These statutes overlap, both regulating “solid waste” as defined by RCRA.⁹¹ But like the CWA’s definition of “point source,” the definition of “solid waste” excludes agricultural runoff.⁹² Thus, neither RCRA nor CERCLA applies to soil erosion.

Soil erosion therefore remains outside the direct scope of the major federal regulatory sphere, though the EPA has used its

85. *Pronsolino*, 291 F.3d at 1140–41 (emphasis added).

86. Futrell, *supra* note 29, at 112–13.

87. Resource Conservation and Recovery Act, Pub. L. No. 94-580, 90 Stat. 2795 (1976) (codified as amended at 42 U.S.C. §§ 6901–92k (2012)).

88. PERCIVAL ET AL., *supra* note 63, at 361.

89. Comprehensive Environmental Response, Compensation, and Liability Act, Pub. L. No. 96-510, 94 Stat. 2767 (1980) (codified as amended at 42 U.S.C. §§ 9601–75 (2012)).

90. PERCIVAL ET AL., *supra* note 63, at 413.

91. CERCLA defines “hazardous substance” to mean, *inter alia*, “any hazardous waste . . . under or listed pursuant to . . . [42 U.S.C. § 6921].” CERCLA § 101(14), 42 U.S.C. § 9601(14) (2012). This provision refers to RCRA’s definition for “hazardous waste.” See RCRA § 3001, 42 U.S.C. § 6921. RCRA further defines “hazardous waste” to be a subset of “solid waste.” See *id.* § 1004(5), 42 U.S.C. § 6903(5).

92. RCRA § 1004(27) (excluding “solid or dissolved materials in irrigation return flows or industrial discharges” from its regulatory scope); see CWA § 502(14), 33 U.S.C. § 1362(14) (2012) (defining “point source” to exclude “agricultural stormwater discharges and return flows from irrigated agriculture”).

authority under CERCLA to remove hazardous spills from some contaminated soils.⁹³ This feature is highly successful at restoring contaminated soil,⁹⁴ but preventing comprehensive soil degradation only through indirect measures is difficult. Successful conservation thus requires additional measures, and the next Part discusses several of them at length.

II. HOW ADDITIONAL CONSERVATION MEASURES CAN BENEFIT AGRICULTURE WHILE MITIGATING CLIMATE CHANGE

A. Importance of Soil Conservation for Climate Mitigation

Soil conservation resides at the heart of the US agricultural system. As Professor Laurie Ristino observed, “[a]griculture is a key contributor to climate change and is, at the same time, fundamentally impacted by it.”⁹⁵ A 2009 Congressional Research Service (CRS) report confirms the first half of Ristino’s observation, noting that agricultural activities account for 7 percent of total US annual greenhouse gas (GHG) emissions.⁹⁶ Over two-thirds of those emissions arise from agriculture soil management.⁹⁷ As for the second half of Ristino’s observation, several climate models predict the occurrence of severe droughts and floods as global temperatures continue to increase.⁹⁸ Increased temperatures lead to soil degradation,⁹⁹ which adversely affects soil quality, crop productivity, and water and air quality.¹⁰⁰ In other words, the agricultural sector needs healthy soil because “degraded soils turn into dirt.”¹⁰¹

Climate scientists anticipate that severe weather effects will proliferate as global temperatures continue to rise. Notably, droughts and floods—both of which can lead to soil erosion—have increased over the last century.¹⁰² During the twentieth century, average

93. Futrell, *supra* note 29, at 114.

94. *Id.*

95. Ristino & Steier, *supra* note 9, at 77.

96. See JOHNSON, *supra* note 10, at 2. The bulk of these emissions (over 90 percent) are due to methane and nitrous oxide, both of which are considered “significant contributors to atmospheric warming” because of their increased potency over other GHGs, such as carbon dioxide. See *id.* at 3–4.

97. See *id.* at 5.

98. See, e.g., JANE A. LEGGETT, CONG. RESEARCH SERV., RL33849, CLIMATE CHANGE: SCIENCE AND POLICY IMPLICATIONS 34 (2007), <https://fas.org/sgp/crs/misc/RL33849.pdf> [<https://perma.cc/5SWN-NYLY>]; SOIL & WATER CONSERVATION SOC’Y, *supra* note 18, at 17.

99. Lal, *supra* note 6, at 9.

100. Ristino & Steier, *supra* note 9, at 66.

101. *Id.* at 72.

102. See LEGGETT, *supra* note 98, at 13–15.

annual precipitation in the United States increased by 6.1 percent, while “extreme precipitation events” increased by 3 percent per decade.¹⁰³ Meanwhile, almost 15 percent of the last century was marred by “strong and extensive droughts,”¹⁰⁴ and other severe droughts have already been observed in the last ten years.¹⁰⁵ Climate models predict that, by mid-century, tropical areas may experience an annual runoff increase between 10 and 40 percent, while dry regions could suffer a corresponding decrease.¹⁰⁶ Climate scientists thus expect droughts to increase in both severity and frequency, possibly leading to the extinction of certain vegetative species.¹⁰⁷ Accordingly, the United States should redouble its soil conservation efforts to account for these increased risks.

For an additional (and more uplifting) point, soil conservation efforts have the potential to *mitigate* the risks associated with climate change. Indeed, soil is considered the second largest carbon sink, after the ocean,¹⁰⁸ allowing it to offset GHG emissions by trapping carbon within its organic matter.¹⁰⁹ As of 2009, soil sequestration offsets less than 1 percent of total annual emissions in the United States, but many agriculture groups claim that the industry has the potential to store as much as a *quarter* of total US annual emissions.¹¹⁰ Long-term estimates from the USDA and EPA predict that carbon sequestration in the agricultural sector could achieve between 590 and 990 million metric tons of carbon dioxide equivalents per year.¹¹¹ Carbon sequestration in that range would offset between 8 and 14 percent of total annual GHG emissions of the United States, more than offsetting the emissions of the entire agriculture sector.¹¹²

Unfortunately, the carbon-offset market relies on the preexisting implementation of a cap-and-trade system, which the United States has never adopted nationwide. In 2009, the House of

103. *Id.* “Extreme precipitation events” are those lasting from one to seven days. *Id.* at 15.

104. *See id.* at 13.

105. *See, e.g.,* Ristino & Steier, *supra* note 9, at 60.

106. *See* LEGGETT, *supra* note 98, at 37.

107. *Id.* at 37–38.

108. Nicholas A. Fromherz, *The Case for a Global Treaty on Soil Conservation, Sustainable Farming, and the Preservation of Agrarian Culture*, 39 *ECOLOGY L.Q.* 57, 70 (2012).

109. JOHNSON, *supra* note 10, at 9.

110. *Id.* at 12. It is possible that some percentage of this value comes from preexisting sequestration efforts from other sectors. *Id.*

111. *Id.* Carbon dioxide equivalents are intended to represent all GHG emissions as the amount of carbon dioxide emissions “that could have a similar impact on global temperature.” *Id.* at 2 n.5.

112. *Id.* at 12.

Representatives passed the Waxman-Markey bill¹¹³ to implement a national cap-and-trade program for GHGs. This bill was not perfect—for example, it lacked any mandatory cap for the agricultural industry’s activities¹¹⁴—but it would have produced a national market for carbon offsets.¹¹⁵ Meanwhile, several states have established in-state or regional carbon-offset markets, including the California Cap-and-Trade Program¹¹⁶ and the Regional Greenhouse Gas Initiative (RGGI).¹¹⁷ But establishing a national cap-and-trade system appears unlikely for the near future.¹¹⁸

B. Additional Land Management Tools: Benefits to Climate Mitigation and Obstacles for Implementation

1. Land Management Practices

Even without a national carbon-offset market, the US agricultural industry could employ additional conservation techniques to mitigate the effects of climate change and prevent any accompanying soil degradation. The CRS, in a 2010 report, specifically suggested five land management techniques that could assist carbon sequestration: (1) land retirement, (2) conversion to nonagricultural land, (3) conservation tillage practices, (4) soil erosion

113. American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009) (as passed by House, June 26, 2009), https://www.c2es.org/docUploads/hr2454_house.pdf [<https://perma.cc/J5NS-ZCX6>].

114. See JOHNSON, *supra* note 10, at 26.

115. H.R. 2454 § 732(a) (ordering the EPA to “promulgate regulations establishing a program for the issuance of offset credits in accordance with” the bill’s requirements).

116. See *Cap-and-Trade Program*, CAL. AIR RESOURCES BOARD, <https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm> [<https://perma.cc/JU4P-65Q6>] (last visited Mar. 3, 2017); see also *Cal. Chamber of Commerce v. State Air Res. Bd.*, 216 Cal. Rptr. 3d 694, 700 (Ct. App. 2017) (upholding California’s implementing regulations against state constitutional claims).

117. See *Welcome*, REGIONAL GREENHOUSE GAS INITIATIVE, <https://www.rggi.org/> [<https://perma.cc/Z4XA-7B9P>] (last visited Feb. 19, 2017) [hereinafter RGGI] (establishing a mandatory market-based system to reduce GHG emissions in the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont).

118. Compare Bob Sussman, *The Return of Cap and Trade Is Good News for U.S. Climate Policy*, BROOKINGS (Oct. 21, 2015) <https://www.brookings.edu/blog/planetpolicy/2015/10/21/the-return-of-cap-and-trade-is-good-news-for-u-s-climate-policy/> [<https://perma.cc/LFY5-SVCB>] (predicting that “[t]he biggest boost to cap and trade in the U.S. will come from the [Clean Power Plan]”), with Juliet Eilperin & Steven Mufson, *Trump to Roll Back Obama’s Climate, Water Rules Through Executive Action*, WASH. POST (Feb. 20, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/02/20/trump-to-roll-back-obamas-climate-water-rules-through-executive-action/?utm_term=.a06b28443f45 [<https://perma.cc/5WGY-4YC6>] (discussing President Trump’s intent to rewrite or repeal the Clean Power Plan).

controls, and (5) biofuel production and substitution.¹¹⁹ Widespread adoption of these measures could significantly benefit soil conservation efforts.

Importantly, conservationists should consider the opportunity costs for adopting carbon-offsetting techniques. Conservation tillage practices provide a helpful illustration. The plowing associated with traditional tillage practices can release GHGs from the ground—much like erosion can—by disturbing the soil.¹²⁰ Conservation tillage (or even the use of no till), by contrast, reduces that disturbance “while maintaining crop yields and quality,”¹²¹ thus preventing GHG release and incorporating cover crops into the rotation cycle.¹²² However, traditional tilling also reduces weed growth, so the farmers who rarely till tend to use more herbicide.¹²³ Many herbicides are harmful air pollutants, and they also release potent GHGs of their own.¹²⁴ Mitigating one set of GHGs while simultaneously facilitating another is termed “leakage.”¹²⁵ Therefore, soil conservationists should be mindful of the total net emissions associated with adopting certain carbon-offsetting techniques.

Any carbon offset is inherently subject to other challenges that also merit attention. These challenges include (1) measuring the amount of carbon sequestered, (2) verifying that an offset actually occurred, (3) monitoring and enforcement of the offset’s continued operation, (4) additionality,¹²⁶ and (5) establishing a permanent

119. ROSS W. GORTE & RENÉE JOHNSON, CONG. RESEARCH SERV., RS22964, MEASURING AND MONITORING CARBON IN THE AGRICULTURAL AND FORESTRY SECTORS 8–16 (2010), <http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RS22964.pdf> [<https://perma.cc/25E3-3B5A>]; see also JOHNSON, *supra* note 10, at 15–16 (listing land retirement and conversion, conservation tillage, soil management, cropping techniques, grazing management, biofuel substitution, and energy conservation to help mitigate the effects of climate change). Other conservation measures include high-diversity crop rotations, sub-irrigation, and integrated pest management. Lal, *supra* note 6, at 10 tbl.7.

120. See Lal, *supra* note 6, at 11.

121. JOHNSON, *supra* note 10, at 7.

122. *Id.*; see also Lal, *supra* note 6, at 11 (stating that growing cover crops increases the soil’s biodiversity and that “ecosystems with high biodiversity sequester more [GHG] than those with reduced biodiversity”).

123. Lauren Bernadett, Comment, *Agricultural Soil Carbon Sequestration Offset Programs: Strengths, Difficulties, and Suggestions for Their Potential Use in AB 32’s Cap and Trade Program*, 31 UCLA J. ENVTL. L. & POL’Y 198, 223–24 (2013).

124. See *id.* at 224–25.

125. See GORTE & JOHNSON, *supra* note 119, at 6.

126. “Additionality” refers to the double counting of activities that generate carbon offsets which either would have occurred without those activities or can be attributed to other environmental programs. *Id.* In other words, a single parcel of land might generate only a single carbon offset, but it could be erroneously counted as an offset for multiple conservation programs—thus artificially inflating the offset’s actual impact.

offset.¹²⁷ Of the techniques assessed in the 2010 CRS report, only land retirement avoids most of these challenges.¹²⁸ Land retirement, as defined in the CRS report, is the purchase of land from private individuals “to secure the social benefits of environmentally critical lands.”¹²⁹ According to that report, additionality can only be avoided if participating landowners are not receiving benefits from other land retirement programs.¹³⁰

The remaining carbon-offset techniques each suffer from one or more implementation difficulties, but chief among them are the uncertainty of verifying an offset and the risk of additionality due to existing federal assistance programs. The conversion of agricultural land to rangeland, for example, lacks straightforward verification and monitoring procedures for carbon offsets.¹³¹ Those issues stem from the fact that such land “is still actively used,” which risks overgrazing and requires “specific expertise” in overseeing the continued adherence to the offset.¹³² Converting land also runs into the same additionality problems experienced by retiring land.¹³³

Adequate verification is similarly difficult for tillage practices because the land “is still actively used” and, while established verification standards do exist, they are variably implemented and managed due to the site-specific use of tillage practices in the agricultural industry.¹³⁴ Additionality is a further problem here because the USDA currently employs multiple working lands assistance programs.¹³⁵

127. See *id.*

128. See *id.* at 10.

129. Jeremy K. Lusk, Comment, *The Struggle for Water: How One Irrigation District Seeks Water Supplies*, 13 SAN JOAQUIN AGRIC. L. REV. 67, 78 (2003); see also Mahoney, *supra* note 31, at 743–44 (explaining that the use of conservation easements is one discrete example of land retirement programs).

130. GORTE & JOHNSON, *supra* note 119, at 10; see, e.g., *Conservation Reserve Program*, FARM SERV. AGENCY, <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/> [<http://perma.cc/M5PY-69NL>] (last visited Feb. 19, 2017) (“In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality.”).

131. GORTE & JOHNSON, *supra* note 119, at 11.

132. *Id.*

133. See *id.*

134. *Id.* at 13.

135. *Id.*; see, e.g., *Environmental Quality Incentives Program*, NAT. RESOURCES CONSERVATION SERV., <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/> [<https://perma.cc/Q3C5-LYQ8>] (last visited Mar. 3, 2017) (“[EQIP] is a voluntary program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices that improve soil . . . on agricultural land[.]”).

As for soil erosion controls, the variability of weather and soil conditions inhibits the verification of their successful implementation, and the USDA's same assistance programs create a risk of additionality.¹³⁶ Notably, the primary difference between soil erosion controls and tillage practices is that the former possesses relatively more consistent verification standards and an "established knowledge-base" for quantifying carbon offsets.¹³⁷

Finally, biofuel substitution requires "a full accounting of farm-level energy use" before an interested party can design and adopt adequate verification standards.¹³⁸ This obstacle has not prevented the federal government from issuing targets for automotive biofuel content, but the government's renewable fuel standards could face repeal under the new presidential administration.¹³⁹ Moreover, biofuel production would face additionality hurdles if implemented under the USDA's working lands assistance programs or through use of the agency's loan or grant programs.¹⁴⁰

2. Conservation Structures

Conservation practices, while important, cannot effectively combat soil erosion alone.¹⁴¹ According to the United Nations Food and Agriculture Organization, "it is essential that engineering and vegetation specialists work together" because, for example, the former's absence can result in mechanically unstable riverbank slopes, while the latter's omission might lead to unconsidered soil erosion outside the engineering site.¹⁴² Three common structures are particularly relevant to supplementing land management practices: terracing, vegetation cover, and geotextiles.

136. See GORTE & JOHNSON, *supra* note 119, at 14.

137. See *id.*

138. *Id.* at 16.

139. See, e.g., Thomas Johnson, *EPA Issues 2017 Renewable Fuel Targets amid RINs Market's Uncertain Future*, VAND. J. ENT. & TECH. L. BLOG (Dec. 8, 2016), <http://www.jetlaw.org/2016/12/08/epa-issues-2017-renewable-fuel-targets-amid-rins-markets-uncertain-future/> [<https://perma.cc/7C94-LCER>]; see also *Ams. for Clean Energy v. EPA*, 864 F.3d 691, 704 (D.C. Cir. 2017) (upholding the EPA's decision not to consider carryover renewable identification numbers (RINs) as a supply source for its renewable fuel standards).

140. GORTE & JOHNSON, *supra* note 119, at 16.

141. See Hargrove et al., *supra* note 5, at 15A ("The most effective system to reduce soil erosion . . . from agricultural fields often involves using a combination of conservation structures and management practices.").

142. CHARMAN, *supra* note 20, at 98.

Significantly, comprehensive research indicates that terracing reduces soil erosion “to very low levels if not zero.”¹⁴³ Terracing’s effectiveness in this regard primarily arises from its ability to mitigate erosion from rainfall and runoff.¹⁴⁴ Terraces often include structural embankments that greatly reduce water erosion.¹⁴⁵ That in turn conserves rainwater and increases both moisture and nutrient levels in soil, which ultimately enhances plant growth.¹⁴⁶ Terraces must be adequately maintained, however, for terrace abandonment—due to shifts in rural economies and limited accessibility—and insufficient upkeep together account for nearly 70 percent of global terrace failures.¹⁴⁷ These failures specifically result from inadequate vegetation cover and from improper maintenance of the most fragile parts of terraces.¹⁴⁸

Indeed, “it is the combination of terracing and maintaining vegetation cover” that, under many circumstances, best reduces soil erosion.¹⁴⁹ Vegetation protects soil from atmospheric conditions and influences the transfer of water from the atmosphere to soil and groundwater.¹⁵⁰ Its introduction to soil therefore “provide[s] rapid protection . . . from erosion and degradation.”¹⁵¹ By its nature, however, physically incorporating vegetation onto soil requires time to develop sufficient characteristics (i.e., root systems) to protect and stabilize the soil.¹⁵² Accordingly, vegetation is best utilized in combination with engineering designs.¹⁵³

One such design is the geotextile.¹⁵⁴ Geotextiles perform three functions that benefit soil conservation: (1) slope protection for

143. Antony G. Brown & Kevin Walsh, *Societal Stability and Environmental Change: Examining the Archaeology-Soil Erosion Paradox*, 32 *GEOARCHAEOLOGY* 23, 31–32 (2017); see also Wei Wei et al., *Global Synthesis of the Classifications, Distributions, Benefits and Issues of Terracing*, 159 *EARTH-SCI. REVS.* 388, 396 (2016) (“Other studies even reported that terracing could reduce over 90% of the total soil loss.”).

144. See Wei et al., *supra* note 143, at 397.

145. *Id.*

146. *Id.*

147. See *id.* at 400; see also Brown & Walsh, *supra* note 143, at 32 (“Terrace abandonment has been shown to cause massive soil loss.”).

148. Wei et al., *supra* note 143, at 400.

149. Brown & Walsh, *supra* note 143, at 32.

150. CHARMAN, *supra* note 20, at 10.

151. *Id.* at 99.

152. *Id.* at 98.

153. See *id.* at 13.

154. See Werner W. Müller & Fokke Saathoff, *Geosynthetics in Geoenvironmental Engineering*, 16 *SCI. & TECH. ADVANCED MATERIALS* 1, 3 (2015) (explaining geotextiles are permeable textiles that, once filled with sand or other material, may be used as filter layers or structural components to mitigate floods and other forms of water encroachment on land); see

vegetation, (2) use as separators to prevent soils from mixing, and (3) soil reinforcement to increase soil's shear loading capacity.¹⁵⁵ Because riverbanks without vegetation cover are susceptible to erosion from the wind and water, geotextiles can protect newly placed vegetation as it roots itself to the bank.¹⁵⁶ Other situations require a boundary between newly placed soil and the underlying poorer quality material to prevent any soil loss.¹⁵⁷ There, geotextiles can act as separators that hold the high-quality soil while facilitating the precise drainage of low-quality materials.¹⁵⁸ Finally, geotextiles may be layered throughout native soils to stabilize slopes and remediate landslides.¹⁵⁹ Those layers increase the soil's tensile strength, which both reduces the soil's shear force and increases its shearing resistance.¹⁶⁰ Accordingly, geotextiles provide a helpful supplement to land management efforts—although their peak effectiveness occurs when reinforcing a preexisting soil structure, such as vegetation cover.¹⁶¹

As evidenced above, both land management practices and conservation structures suffer from their respective challenges. Below, this Note assesses how environmental personhood could remedy the challenges of verification and additionality of carbon offsets.¹⁶² It also explains how environmental personhood can address the challenges of terrace abandonment.¹⁶³ Prior to that assessment, however, the next Part examines the existing approaches to establishing environmental personhood in the first instance.

III. ENVIRONMENTAL PERSONHOOD: ITS ADOPTION IN OTHER NATIONS AND VIABILITY UNDER US LAW

Two foreign nations—Ecuador and New Zealand—recently adopted proposals for environmental personhood,¹⁶⁴ and these

also CHARMAN, *supra* note 20, at 87 (explaining that geotextiles, when used to augment an existing soil structure, can improve that slope's mass stability).

155. See CHARMAN, *supra* note 20, at 85–86.

156. *Id.* at 88.

157. See *id.* at 91.

158. *Id.*

159. *Id.*

160. *Id.*; see also Müller & Saathoff, *supra* note 154, at 10 fig.17 (stating higher shear forces can exacerbate soil displacement but increased shearing resistance correspondingly reduces such displacement; hence, increased tensile strength reduces soil erosion).

161. See CHARMAN, *supra* note 20, at 87.

162. See discussion *infra* Part IV.

163. *Id.*

164. See CONSTITUCIÓN DE LA REPÚBLICA DEL ECUADOR [CONSTITUTION] Oct. 20, 2008, arts. 71–74, translated in *Republic of Ecuador Constitution of 2008*, GEO. U. POL. DATABASE AMS., [hereinafter ECUADORIAN CONSTITUTION]

proposals could substantially benefit the United States' soil conservation system. Establishing environmental rights in the United States has been suggested before,¹⁶⁵ for such rights would arguably be no less unorthodox than the legal rights afforded to corporations by statute and common law.¹⁶⁶ Federal standing requirements are certainly relevant to the adoption of environmental personhood,¹⁶⁷ but this Note only addresses the conservation benefits that could be afforded even without federal justiciability. This Part examines the development of environmental personhood in Ecuador and New Zealand and discusses the viability of each country's approach under US law.

A. Ecuador's Approach: Constitutional Amendment

In 2008, Ecuador amended its Constitution to regard nature, or "Pacha Mama," as its own entity with separate legal rights from the property rights of individuals,¹⁶⁸ making Ecuador the first nation to constitutionalize such rights.¹⁶⁹ Article 71 of the Ecuadorian Constitution establishes nature's rights to exist and to have its structure and functions maintained and regenerated.¹⁷⁰ It further provides a right of action for "[a]ll persons, communities, peoples and nations [to] call upon public authorities to enforce the rights of nature."¹⁷¹

<http://pdba.georgetown.edu/Constitutions/Ecuador/english08.html> [https://perma.cc/D3JZ-YPPK] (last updated Jan. 31, 2011); Tūtohu Whakatupua, *Between Whanganui Iwi and the Crown* [2012] (signed 30 Aug. 2012, entered into force 30 Aug. 2012) (N.Z.) [hereinafter Whanganui River Agreement], http://www.wrmtb.co.nz/new_updates/TuutohuWhakatupuaFinalSigned.pdf [https://perma.cc/KP7A-4DJG].

165. See, e.g., *Sierra Club v. Morton*, 405 U.S. 727, 741 (1972) (Douglas, J., dissenting) (arguing for "a federal rule that allowed environmental issues to be litigated before federal agencies or federal courts in the name of the inanimate object about to be despoiled, defaced, or invaded"); Hope M. Babcock, *A Brook with Legal Rights: The Rights of Nature in Court*, 43 *ECOLOGY L.Q.* 1, 43–44 (Apr. 1, 2016) (suggesting that Article III standing should expand to include environmental entities if it expanded to include corporate ones); Stone, *supra* note 27, at 456 ("I am quite seriously proposing that we give legal rights to forests, oceans, rivers and other so-called 'natural objects' in the environment[.]").

166. See, e.g., DEL. CODE ANN. tit. 8, § 122 (2016) (listing legal personhood among the rights of any corporation created in Delaware); Gwendolyn Gordon, *Culture in Corporate Law or: A Black Corporation, a Christian Corporation, and a Māori Corporation Walk into a Bar...*, 39 *SEATTLE U. L. REV.* 353, 354–55 (2016) (noting that corporations now possess political opinions, racial identities, and religious affiliations due to recent judicial precedents).

167. See, e.g., Stone, *supra* note 27, at 464–73.

168. ECUADORIAN CONSTITUTION, *supra* note 164, arts. 71–74.

169. Azad, *supra* note 68, at 297.

170. ECUADORIAN CONSTITUTION, *supra* note 164, art. 71.

171. *Id.*

Article 72 prescribes nature's right to be restored, requiring the national government to achieve such restoration with "the most effective mechanisms" and to adopt adequate mitigation measures in "cases of severe or permanent environmental impact, including . . . exploitation of nonrenewable natural resources."¹⁷² Article 73 addresses biodiversity protection through imposition of "preventive and restrictive measures on activities that might lead to the extinction of species" and forbids the introduction of "organic and inorganic material that might definitively alter the nation's genetic assets."¹⁷³ Finally, Article 74 grants individuals, communities, and other nations the right to benefit from the environment and its natural resources.¹⁷⁴ The Ecuadorian government adopted these Rights of Nature at the behest of national environmentalists and as a reaction to the "citizen's revolution" that embodied the country's "larger movement toward progressivism."¹⁷⁵

Notably, these amendments were applied in the Vilcabamba River Case.¹⁷⁶ That case involved a provincial government's road-widening operations, which incidentally increased the nearby Vilcabamba River's flow "to unprecedented levels" because the government deposited large amounts of rocks and excavation materials into the river.¹⁷⁷ That increased flow adversely affected neighboring communities, so two residents filed a protective action—designed to remedy "a violation of rights that has already occurred"—against the government.¹⁷⁸ As noted above, such an action is possible under Article 71's prescription "to enforce the rights of nature."¹⁷⁹ In its opinion, the court first referenced the "democracy of the earth," recognizing, *inter alia*, that nature has "a value of its own" and that human rights must harmonize with the rights of nature.¹⁸⁰

172. *Id.* art. 72.

173. *Id.* art. 73; Azad, *supra* note 68, at 298.

174. ECUADORIAN CONSTITUTION, *supra* note 164, art. 74.

175. Melissa Arias, *Conversation with Natalia Greene About the Rights of Nature in Ecuador*, YALE CTR. FOR ENVTL. L. & POL'Y (Mar. 9, 2015), <http://environment.yale.edu/envirocenter/post/conversation-with-natalia-greene-about-the-rights-of-nature-in-ecuador/> [<https://perma.cc/W79L-CQ4B>].

176. See Joel Colón-Ríos, Comment, *The Rights of Nature and the New Latin American Constitutionalism*, 13 N.Z. J. PUB. & INT'L L. 107, 111–12 (2015) (citing Corte Provincial de Justicia de Loja [Loja Provincial Court of Justice] Mar. 30, 2011, No. 11121-2011-0010 (Ecuador)).

177. *Id.* at 111.

178. *Id.*

179. See ECUADORIAN CONSTITUTION, *supra* note 164, art. 71.

180. Colón-Ríos, *supra* note 176, at 111.

Those declarations reflected the Ecuadorian Constitution's establishment of nature's rights to exist and to be restored.¹⁸¹

As for the case's outcome, the court found that the government's actions "resulted in a violation of nature's rights."¹⁸² Specifically, the court determined that the government failed to prove that widening the road did not harm the Vilcabamba River.¹⁸³ As a result, the court ordered the government "to put in place a number of corrective actions directed at stopping the river's contamination," but that order has not received full compliance from the government.¹⁸⁴

B. New Zealand's Approach: Bilateral Settlement

Contrasting with Ecuador's general constitutional reforms, New Zealand instead used the flexibility of a settlement agreement between the country's original inhabitants and its national government. On October 14, 1990, the Māori Trust Board—on behalf of the Whanganui aboriginal tribes—filed a claim of rightful possession over the Whanganui River, ultimately establishing that the Crown wrongfully seized the riverbed before vesting control to local authorities.¹⁸⁵ Subsequent settlement discussions led to a preliminary agreement—signed by both parties on August 30, 2012—that set forth several key elements.¹⁸⁶ These elements included (1) statutory recognition of the Whanganui River¹⁸⁷ as an entity with legal standing, (2) vesting of the Crown's ownership of the Whanganui riverbed to the river, (3) appointment of a legal guardian¹⁸⁸ to represent the river's interests, and (4) development and legal recognition of "a Whole of River Strategy."¹⁸⁹ On August 5, 2014, the

181. See ECUADORIAN CONSTITUTION, *supra* note 164, arts. 71–72.

182. Colón-Ríos, *supra* note 176, at 112.

183. *Id.*; see also ECUADORIAN CONSTITUTION, *supra* note 164, art. 397(1) (placing the burden of proving "the absence of potential or real danger" to the environment on "the operator of the activity"); Colón-Ríos, *supra* note 176, at 111 (noting that the Vilcabamba River Case requires the defendant (here, the government) to show that its activities did not result in the alleged harm).

184. Colón-Ríos, *supra* note 176, at 112.

185. See Whanganui River Agreement, *supra* note 164, at 3–4.

186. See *id.* at 14–16.

187. The Agreement used the term "Te Awa Tupua," which means "an indivisible and living whole, incorporating all [the river's] physical and meta-physical elements." Te Awa Tupua (Whanganui River Claims Settlement) Bill 2016 (129-2) (select committee report) at 14 (N.Z.). In other words, the term refers to the Whanganui River's own "legal personality." *Id.* at 2.

188. The Agreement used the term "Te Pou Tupua," which literally means "Guardian of the River," and here refers to two persons of high standing "to represent the interests and act on behalf and in the name of [the Whanganui River]." Whanganui River Agreement, *supra* note 164, at 9, 12.

189. *Id.* at 9.

parties incorporated these and other elements into the Whanganui River's deed of settlement.¹⁹⁰

First, the settlement declared that the Whanganui River, its tributaries, and its physical and metaphysical elements are an indivisible and living whole.¹⁹¹ Following that declaration, the settlement bestowed a legal personality to the Whanganui River, including “the rights, powers, duties and liabilities of a legal person,” which shall be exercised and maintained by the legal guardian.¹⁹²

Second, the Crown agreed to transfer its ownership rights in the Whanganui riverbed to the newly established legal personality.¹⁹³ The settlement provided that any conservation area, reserves, or national parks that were previously established on those lands would cease to exist upon the transfer.¹⁹⁴ Meanwhile, preexisting rights of the public to access and use the Whanganui River, and of private citizens to own, fish, or build on other surrounding lands remain unaffected.¹⁹⁵

Third, the settlement established the legal guardian as “the face and voice of [the Whanganui River].”¹⁹⁶ That guardian is comprised of two appointees charged with acting in the river's interests—which include an enumerated set of values—“and *for no other purpose*.”¹⁹⁷ These appointees must “act jointly and by agreement” in carrying out their functions,¹⁹⁸ which include promoting

190. See Ruruku Whakatupua: Te Mana o Te Awa Tupua, Between Whanganui Iwi and the Crown [2014] (signed 5 Aug. 2014, entered into force 5 Aug. 2014) at 0, 4 (N.Z.) [hereinafter Whanganui River Settlement], <https://www.govt.nz/dmsdocument/5947.pdf> [<https://perma.cc/BFL5-M2EQ>].

191. *Id.* at 6.

192. *Id.*

193. See *id.* at 29. This transfer included “any pakohe, gravel, sand and shingle,” but excluded legal roads, existing structures, and any parts of the riverbed either held under the Public Works Act of 1981 or located in the marine or coastal area. *Id.* at 29–30. Because the Crown believes that water cannot be owned, this conveyance further excluded the waters of the Whanganui River, see *id.* at 45, as well as all wildlife except for any plants physically attached to the riverbed, *id.* at 46.

194. *Id.* at 29.

195. *Id.* at 31. Similarly, it excluded liability to the Whanganui River for any contamination sites or activities that existed in the affected lands prior to the conveyance. *Id.* at 33–34.

196. *Id.* at 10. The settlement also provided that the Whanganui River would be eligible for status as a charitable organization. *Id.* at 16.

197. *Id.* at 11–13 (emphasis added). Those values consisted of sustaining the river's natural resources and the health of its surrounding communities; maintaining an inalienable interconnection between the Whanganui tribes and the river; and declaring that the river is a singular entity comprised of several communities that work toward the river's health and wellbeing. See *id.* at 7.

198. *Id.* at 13.

and protecting the Whanganui River's health and wellbeing; exercising landowner functions with respect to the river's real estate holdings; reporting to the Whanganui tribes and, if necessary, to the public or government agencies on matters relating to the river; and participating in relevant statutory processes.¹⁹⁹ Not unlike a board of directors, the appointees also enjoy limited liability in their administrative capacities while acting lawfully and in good faith.²⁰⁰

Fourth, the settlement outlined a strategy "to address and advance the environmental, social, cultural and economic health and wellbeing of [the Whanganui River]."²⁰¹ It envisioned a working group that would identify issues related to the river's health and, upon seeking input from the interested public, approve a recommended strategy to address those issues.²⁰² That group would then review its recommendations every ten years and, if necessary, amend them.²⁰³ Additionally, the Crown agreed to pay \$30 million to the Whanganui River to establish a fund for supporting the entity's health and wellbeing.²⁰⁴ Complete enforcement of this settlement requires legislative ratification, and such a bill is progressing through the New Zealand Parliament.²⁰⁵

C. Adoption of Environmental Personhood Under US Law

Of the two approaches discussed above, New Zealand's is a more viable option in the United States. Following Ecuador's approach would require a constitutional amendment, which is highly impracticable under the US Constitution's framework—even assuming the presence of a similar grassroots movement to

199. *Id.* at 10–11. Additionally, the Crown agreed to pay the legal guardian \$200,000 per year for twenty years as a contribution to the costs of performing its functions. *Id.* at 14.

200. *See id.* at 13; *cf.* *Smith v. Van Gorkom*, 488 A.2d 858, 872 (Del. 1985) (describing the business judgment rule for a corporation's directors as a presumption that they "acted on an informed basis, in good faith and in the honest belief that the action taken was in the best interests of the company").

201. Whanganui River Settlement, *supra* note 190, at 17.

202. *See id.* at 17–18.

203. *Id.* at 19. Such amendments may be subject to public input if the strategy group determined that material alterations to its recommendations are required. *Id.* at 17–19.

204. *Id.* at 35. The legal guardian would administer the fund, which must be allocated consistently with the river's interests. *See id.* at 35–36.

205. *See generally* Te Awa Tupua (Whanganui River Claims Settlement) Bill 2016 (129-2) (N.Z.). For more context regarding the Whanganui River Settlement's adoption, see Catherine J. Iorns Magallanes, *Maori Cultural Rights in Aotearoa New Zealand: Protecting the Cosmology that Protects the Environment*, 21 WIDENER L. REV. 273, 310–13 (2015).

Ecuador's.²⁰⁶ If accomplished, such an approach could have a permanent effect,²⁰⁷ but ratification procedures would require the federal government to overwhelmingly support the measure—a condition that cannot easily be fulfilled while climate change remains a divisive issue in Congress. Direct replication of New Zealand's settlement would face the same obstacle, for it required representations by the Crown and the enactment of national statutes to bind the agreement.²⁰⁸ However, a similar result could be accomplished on a state level without the federal government's involvement.

The UCEA provides a practical illustration of this concept. States developed the UCEA to uniformly apply conservation law in every state and “to remove common law impediments to conservation easements.”²⁰⁹ Certain federal laws restricted its provisions, but the resulting state legislation provided interested parties with tremendous freedom to contract for particularized easement terms and conditions.²¹⁰

Environmental personhood could be adopted using a similar framework. For example, a uniform statute could be drafted that (1) permits recognition of land as an entity with legal standing under *state* constitutions,²¹¹ (2) vests ownership of the land to that entity, (3) establishes procedures to appoint and maintain a legal guardian that represents the land's evolving interests, and (4) prescribes strategies to advance those interests in light of environmental and economic concerns.²¹² These guiding principles would allow interested parties—including local communities and climate change

206. See U.S. CONST. art. V (requiring two-thirds of Congress or the state legislatures to propose amendments and further requiring three-fourths of the state legislatures to ratify the amendments).

207. See George Mader, *Binding Authority: Unamendability in the United States Constitution—A Textual and Historical Analysis*, 99 MARQ. L. REV. 841, 843 (2016).

208. See discussion *supra* Part III.B.

209. Jay, *supra* note 61, at 26.

210. See Schwing, *supra* note 60, at 226 n.45 (explaining that the UCEA's tax incentives would be barred if construed more broadly than US Treasury regulations); Mahoney, *supra* note 31, at 752 (“[C]onservation easements are enviably malleable, affording contracting parties a wide variety of options.”).

211. Significantly, many state constitutions provide more permissive standing requirements than their federal counterpart, some even permitting the legislature to confer standing on new classes of individuals. See Kenneth Charette, Comment, *Standing Alone?: The Michigan Supreme Court, the Lansing Decision, and the Liberalization of the Standing Doctrine*, 116 PA. ST. L. REV. 199, 208–09 (2011); see also *ASARCO Inc. v. Kadish*, 490 U.S. 605, 617 (1989) (“[T]he constraints of Article III do not apply to state courts . . . even when they address issues of federal law . . .”).

212. Cf. Whanganui River Agreement, *supra* note 164, at 9 (listing similar provisions to adopt environmental personhood in New Zealand).

advocates—to freely contract for land’s natural rights, much like the Whanganui tribes in New Zealand or conservation easement holders in the United States.

Unlike the inflexible application of conservation easements, however, environmental personhood would establish a legal guardian charged with the good-faith administration of the land’s evolving interests.²¹³ Those interests should expressly include the adoption of soil conservation techniques, the effective implementation of which could adapt as conservation technologies continue to advance. Moreover, the land’s interests could be enforced in state courts, which already interpret the necessary contract and real property principles that would inform environmental personhood’s implementation.²¹⁴ Not all states might participate at first, but at least some have signaled an interest in mitigating climate change through cap-and-trade programs.²¹⁵ Those same states could pave the way for environmental personhood as well.²¹⁶ Additionally, legislatures could include tax benefits and other incentives to encourage landowners to consent to environmental personhood—much like the UCEA did for conservation easements.²¹⁷

IV. HOW ENVIRONMENTAL PERSONHOOD ASSISTS SOIL CONSERVATION EFFORTS

In the absence of effective conservation efforts at the federal level, state and local initiatives will retain a necessary role for soil conservation and climate change mitigation. The land management practices described above should assist in that regard, but they face verification and additionality challenges.²¹⁸ Conservation structures—particularly terracing—similarly suffer from challenges regarding their proper implementation and maintenance.²¹⁹ This Part explains how environmental personhood can account for those challenges.

213. See *supra* notes 196–200 and accompanying text.

214. Additionally, states already possess the power to define the scope of *corporate* personalities, Rebecca Bratspies, *Do We Need a Human Right to a Healthy Environment?*, 13 SANTA CLARA J. INT’L L. 31, 65 (2015), so they could borrow from corporate law when defining the scope of environmental personhood.

215. See, e.g., *Cap-and-Trade Program*, *supra* note 116; *Welcome*, *supra* note 117.

216. Cf. Mahoney, *supra* note 31, at 750 (remarking that Massachusetts and California established conservation easements twenty years before the drafting of the UCEA).

217. See *supra* notes 55–62 and accompanying text.

218. See discussion *supra* Part II.B.1.

219. See discussion *supra* Part II.B.2.

First, environmental personhood could address the verification of carbon offsets as one of the guardian's functions. The primary obstacles for verification are establishing adequate standards, enforcing existing ones, and accounting for certain variables.²²⁰ A land parcel's legal guardian might consist of appointees who possess either the expertise required to establish verification standards or the skills to continuously enforce existing ones.²²¹ Such experts could also account for variable soil content and management practices because, unlike the federal government, they would focus their resources and knowledge base on the care of a single land parcel. The experts' compensation may even draw from existing federal programs, government grants, and private donations.

Second, provisions in the document that transfers ownership to the land could account for additionality concerns. The chief concern in the 2010 CRS report was that the same landowners employing conservation practices were also benefiting from USDA programs.²²² Because the new "landowner" under environmental personhood is the land itself, legal guardians could easily obviate additionality by forgoing any preexisting USDA programs in the document of transfer.²²³ That same document may also include provisions that emphasize the avoidance of additionality as one of the land's interests.

Third, the guardian's role in adapting land to changing uses could prevent terrace abandonment. Terrace abandonment, as described above, results from both inadequate vegetation cover and improper maintenance.²²⁴ However, the environmental personhood framework would charge guardians with sustaining and maintaining the land's natural resources,²²⁵ which should include the soil within terraces. In the event that any terraces would necessitate abandonment—perhaps to allow a better use of the affected land—the

220. See GORTE & JOHNSON, *supra* note 119, at 13–19.

221. Nonexpert appointees could also commission experts as consistent with the land's interests. Such experts could draw from preexisting verification standards used by other entities. See, e.g., *Carbon Offset Verification*, SCS GLOBAL SERVS., <https://www.scsglobalservices.com/carbon-offset-verification> [<https://perma.cc/7C8B-9GJS>] (last visited Mar. 4, 2017).

222. See GORTE & JOHNSON, *supra* note 119, at 13–19.

223. Cf. *supra* notes 193–94 and accompanying text (noting that the Whanganui River Settlement provides that preexisting conservation areas would cease to exist upon transfer of ownership).

224. Wei et al., *supra* note 143, at 400; see discussion *supra* Part II.B.2.

225. Cf. Whanganui River Settlement, *supra* note 190, at 7 (charging the Whanganui River's guardian with sustaining the river's natural resources and the health of its surrounding communities).

guardian's promise to act in the land's interests would further require it to dismantle such terraces with care.²²⁶

V. CONCLUSION

Additional soil conservation efforts are essential to mitigating the effects of climate change and preserving the United States' agricultural sector. Because current government incentives are either too weak to incentivize widespread participation or too restrictive to ensure future adaptability as new conservation technologies are discovered and the climate continues to change, other legal tools must be considered. Environmental personhood could utilize the same incentives as conservation easements to encourage participation while also providing legal guardians with more flexibility to adapt to future changes than conservation easement holders. Establishing this legal concept by state statute is just as viable as the UCEA's provisions, and implementation at the state level would likely occur more quickly than a new federal initiative. This facilitates the implementation of additional conservation techniques while humans remain able to mitigate climate change.

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226. Otherwise, even a previously maintained terrace will not reduce soil erosion if depopulation leads to its abandonment. See Brown & Walsh, *supra* note 143, at 32.

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