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**REGULATING WHAT CAN'T BE MEASURED: REVIEWING
THE CURRENT STATE OF ANIMAL AGRICULTURE'S AIR
EMISSIONS REGULATION POST-*WATERKEEPER ALLIANCE*
*V. EPA***

*Kyle K. Weldon**

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INTRODUCTION

If the wind blows from the right direction in Amarillo, Texas, there is a distinctive odor that the locals affectionately refer to as the “smell of money.” The “smell” they are referring to originates from the manure at the many cattle feedlots southwest of town, a major industry in the Texas Panhandle.¹ This aroma has reached all the way to Washington D.C. In April of 2017, the D.C. Circuit Court of Appeals issued a ruling that encumbered these feedlots with regulatory uncertainty—a place no regulated industry wants to be.² While confined animal feeding operations (CAFOs) are normally exempt from federal environmental regulations, in *Waterkeeper Alliance v. EPA* the CAFOs were unable to sidestep the D.C. Circuit’s application of two federal statutes.³

Under *Waterkeeper Alliance v. EPA*, CAFOs, such as the Panhandle feedlots, are required by federal law to report to national, state, and local emergency agencies if their operations release a certain amount of hazardous substances in a twenty-four hour period.⁴ While CAFOs do emit

1. Amarillo Magazine, *Reason No. 8: Because we Live in the Beef Capital of the World*, AMARILLO.COM (Feb. 22, 2013, 8:14 PM) <http://amarillo.com/national/2013-02-22/reason-no-8-because-we-live-beef-capital-world> [<https://perma.cc/79CF-2R5Y>].

2. See *Waterkeeper All. v. Env'tl. Prot. Agency*, 853 F.3d 527, 537–38 (D.C. Cir. 2017) (holding that the EPA acted erroneously when exempting CAFOs from environmental reporting requirements for notice of hazardous substance releases).

3. See e.g., Linda M. Thompson, *A Breath of Fresh Air: Methods and Obstacles for Achieving Air Pollution Reduction in Washington Factory Farm Communities*, 1 WASH. J. ENVTL. L. & POL'Y 130, 141–49 (2011) (discussing various federal environmental statutes and exemptions for CAFOs).

4. *Waterkeeper All.*, 853 F.3d at 535–36.

hazardous substances (ammonia and hydrogen sulfide), there is a catch-22—the EPA does not know how to accurately estimate or measure these emissions.⁵ The *Waterkeeper Alliance* decision was originally stayed until May 1, 2018, meaning that AFO operators who failed to report when the stay was lifted would risk potential lawsuits from environmental groups and civil penalties.⁶ However, on March 23, 2018, Congress enacted the Consolidated Appropriations Act, 2018, (“Omnibus Bill”) which exempts the reporting of “air emissions from animal waste at farms.”⁷ The inclusion of this exemption in this legislation has been seen as a massive victory for the agriculture industry.⁸

While the Omnibus Bill may now provide CAFOs with a shield from reporting requirements, this article reviews the history behind production agriculture’s air emissions regulation challenges and why this issue still matters moving forward. Part I provides an overview of today’s modern animal agricultural industry, looking at how CAFOs have grown in size in recent years and the potential air pollution issues that stem from that growth. Part II analyzes the current state of federal air emissions regulations impacting CAFOs, focusing on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA).⁹ Part III examines the EPA’s final rule from 2008 that exempted CAFOs from the reporting requirements under CERCLA, and the Agency’s reasons for this exemption.¹⁰ Part IV reviews *Waterkeeper Alliance v. EPA*, the D.C. Circuit’s recent decision that vacated the EPA’s 2008 final rule and requires CAFOs to comply with the reporting requirements under both CERCLA and EPCRA.¹¹ Part V discusses the aftermath of the *Waterkeeper Alliance* decision, the EPA’s attempt at providing guidance for the agriculture industry to comply with the rule, and Congress’s eleventh hour action that

5. *Id.* at 531.

6. *CERCLA and EPCRA Reporting Requirements for Air Releases of Hazardous Substances from Animal Waste at Farms*, ENVTL. PROTECTION AGENCY <https://www.epa.gov/epcra/cercla-and-epcra-reporting-requirements-air-releases-hazardous-substances-animal-waste-farms> [https://perma.cc/D8X5-SAD6] (last updated Aug. 30, 2018) [hereinafter EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT].

7. Consolidated Appropriations Act, 2018, H.R. 1625, 115th Cong. (2d Sess. 2018).

8. Burt Rutherford, *Trump Signs Omnibus Spending Bill, Ag Approves*, BEEF (Mar. 23, 2018) <http://www.beefmagazine.com/business/trump-signs-omnibus-spending-bill-ag-approves> [https://perma.cc/CA2F-KP3S].

9. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9603 (2012); Emergency Planning and Community Right-to-Know Act, 42 U.S.C. § 11004 (2010).

10. CERCLA/EPCRA Administrative Reporting Exemption for Air Releases of Hazardous Substances from Animal Waste at Farms, 73 Fed. Reg. 76,948, 76,948 (Dec. 18, 2008).

11. *Waterkeeper All.*, 853 F.3d at 537–38.

provides CAFOs with an exemption from reporting.¹² Finally, Part VI considers the questions and options moving forward for the agriculture industry in the wake of these air emissions decisions.

I. OVERVIEW OF TODAY'S MODERN ANIMAL AGRICULTURAL INDUSTRY

A. The Development of the CAFO

Over the past half-century there has been a notable shift in Americans' connection with the production of the food they consume.¹³ Historically, agricultural production has been land and "labor intensive, [taking] place on many small, diversified farms in rural areas where more than half of the U.S. population lived."¹⁴ In contrast, today's agricultural production industry consists of a smaller number of larger, more "specialized farms in rural areas where less than a fourth of the U.S. population lives."¹⁵ In 2012, less than one percent of the U.S. population participated in agriculture.¹⁶ Yet, as the number of individuals who raise and grow our nation's food and fiber have decreased, modern agricultural production practices have allowed the livestock agriculture industry to remain a significant portion of the U.S. economy.¹⁷ The average size of livestock production operations increased in the aggregate because of the expanded use of technologies, growing international demand, and vertical integration within species production.¹⁸

These more modern and larger scale livestock feeding operations, such as feedlots, dairies, and commercial pork and poultry farms, are generally

12. EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT, *supra* note 6.

13. See generally INST. OF MED. AND NAT'L RES. COUNCIL, A FRAMEWORK FOR ASSESSING THE EFFECTS OF THE FOOD SYSTEM 32, 42 (Malden C. Nesheim et al. eds., 2015) (discussing shifts in agricultural practices in the last 50 years); Michelle B. Nowlin, *Sustainable Production of Swine: Putting Lipstick on a Pig*, 37 Vt. L. Rev. 1079, 1081–83 (2013) (providing an overview of the evolution of production agriculture); Linda M. Thompson, *supra* note 3, at 130, 132 (describing the change in agricultural production techniques since World War II).

14. *Farming and Farm Income*, ECON. RES. SERV., U.S. DEP'T. OF AGRIC., <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/> [<https://perma.cc/CB9M-KVET>] (last updated Aug. 30, 2018).

15. *Id.*

16. See U.S. DEP'T OF AGRIC., ACH12-3, FARM DEMOGRAPHICS (2014) https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Farm_Demographics/ [<https://perma.cc/QE7U-KPLA>] (stating there were 3.2 million farmers in the United States in May 2014); U.S. and World Population Clock, U.S. CENSUS BUREAU, <https://www.census.gov/popclock/> [<https://perma.cc/4HZX-GDFM>] (last visited July 24, 2018) (stating that the estimated total U.S. population was 318 million in May 2014).

17. See NAT'L RESEARCH COUNCIL, AIR EMISSIONS FROM ANIMAL FEEDING OPERATIONS: CURRENT KNOWLEDGE, FUTURE NEEDS 26 (2003) (discussing the role of livestock agriculture as a driver of the agricultural economy).

18. *Id.* at 29–30.

referred to as AFOs. An AFO is defined as an operation that “(1) raise[s] animals in a confined situation for a total of 45 days or more during a 12-month period and (2) brings feed to the animals rather than having the animals graze or seek feed in pastures and fields or on rangeland.”¹⁹ Today, there are “approximately 450,000 AFOs in the United States.”²⁰ CAFOs are simply larger AFOs.²¹ The EPA defines a CAFO as an operation that houses over “1000 head of beef cattle, 700 dairy cows, 2500 swine weighing more than 55 [pounds], 125 thousand broiler chickens, or 82 thousand laying hens or pullets[] confined on site for more than 45 days during the year.”²²

B. Sources of Pollution from CAFOs

Unlike other industries, agricultural operations have traditionally been exempted under numerous federal environmental laws.²³ Both state and federal governments have tended to spend most of their efforts regulating polluters that are more visible—“factories, waste treatment plants, motor vehicles—than on smaller and more dispersed sources such as farms.”²⁴ In addition (and unlike the aforementioned sources of pollution), the majority of CAFOs are open-air systems, which makes monitoring and measuring actual releases of pollutants into the environment extremely difficult.²⁵ Also, air emissions that stem from livestock and poultry production “are generally more complex than those from industrial sources because of the numerous biological processes involved.”²⁶

19. U.S. GOV'T ACCOUNTABILITY OFF. GAO-08-944 CONCENTRATED ANIMAL FEEDING OPERATIONS: EPA NEEDS MORE INFORMATION AND A CLEARLY DEFINED STRATEGY TO PROTECT AIR AND WATER QUALITY FROM POLLUTANTS OF CONCERN 1 (2008) [hereinafter GOA-08-944] (citing to 40 C.F.R. § 122.23(b) (2017)).

20. NAT. RESOURCES CONSERVATION SERV., U.S. DEP'T AGRIC., ANIMAL FEEDING OPERATIONS, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/livestock/afo/> [https://perma.cc/LXJ2-QE5V] [hereinafter AFOs] (last visited Feb. 9, 2018).

21. GOA-08-944, *supra* note 19.

22. AFOs, *supra* note 20.

23. See generally J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 *ECOLOGY L.Q.* 263, 267 (2000) (“Congress has actively ...[decided] to exclude farms and farming from the burdens of federal environmental law.”).

24. CLAUDIA COPELAND, CONG. RES. SERV., RL 32948, AIR QUALITY ISSUES AND ANIMAL AGRICULTURE: A PRIMER 7 (2014) [hereinafter COPELAND, PRIMER].

25. N.A. COLE ET AL., U.S. DEP'T AGRIC., AUDITING AND ASSESSING AIR QUALITY IN CONCENTRATED FEEDING OPERATIONS 2 (2008), (“Measuring atmospheric emissions is difficult and entails 2 major challenges: 1) measuring the concentration; and 2) estimating the flux to the atmosphere based on direct measurement or on a flux model that describes or simulate the turbulent dispersion of gases and particulates.”).

26. *Id.* at 4.

However, as CAFOs grow in size, the concern of their potential adverse effects on the environment grows as well, leading many to argue that CAFOs should be subject to environmental regulation.²⁷ For many years, the primary focus on environmental impacts from CAFOs has been on protecting water resources under the Clean Water Act (CWA).²⁸ However, the potential effects of livestock operations on air quality are an area of growing concern. Air emissions from CAFOs include dust, odor, airborne pathogens, ammonia, hydrogen sulfide, particulate matter, volatile organic compounds, and greenhouse gases (GHGs) such as methane and carbon dioxide.²⁹ Quantifying livestock emissions is difficult as they vary tremendously from operation to operation.³⁰ These variations are a result of differences in animals' digestive systems [e.g., monogastric digestion in swine versus ruminant digestion in cattle], the diets fed [e.g., forages versus grains], and manure handling and storage.³¹

Considering that CAFOs raise a large number of animals in a confined area, they produce and must manage a large amount of manure.³² "Manure" is a broadly defined term that includes any combination of fecal matter, urine, and other materials that are mixed with manure, such as bedding material, excess feed, or wash water, and may be in a solid or liquid state.³³ Furthermore, the state of the manure often dictates the management practices and the degree that pollutants are emitted.³⁴ Solid manure is typically stored in uncovered storage stockpiles, which exhibit emissions from both aerobic and anaerobic processes over time.³⁵ Liquid manure is usually stored in earthen impoundments (e.g., anaerobic lagoons).³⁶ Emissions from these storage sites will depend primarily on the length of the storage period and temperature of the manure.³⁷ The most common use

27. See, e.g., MEGAN STUBBS, CONG. RES. SERV., R41622, ENVIRONMENTAL REGULATION AND AGRICULTURE 2 (2014) (identifying environmental groups as a party expressing support for regulation to protect public health and the environment).

28. CLAUDIA COPELAND, CONG. RES. SERV., RL 31851, ANIMAL WASTE AND WATER QUALITY: EPA REGULATION OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs) 5 (2010) (explaining that EPA regulations under the CWA have defined CAFOs as point sources subject to CWA permitting requirements).

29. COLE ET AL., *supra* note 25, at 1.

30. *Id.*

31. *Id.* at 4.

32. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 19, at 18.

33. 40 C.F.R. § 122.23(b)(5) (2017).

34. COLE ET AL., *supra* note 25, at 4.

35. ENVTL. PROT. AGENCY, NON-WATER QUALITY IMPACT ESTIMATES FOR ANIMAL FEEDING OPERATIONS 1-2, 1-10 (2002), https://www3.epa.gov/npdes/pubs/cafo_nonwaterquality.pdf [<https://perma.cc/44J8-WVD6>].

36. *Id.*; see also Nowlin, *supra* note 13, at 1084 (describing the function and design of the lagoons).

37. ENVTL. PROT. AGENCY, *supra* note 35, at 1-2.

of collected manure after storage is as a fertilizer source on cropland and pastures.³⁸

C. Air Emissions of Ammonia and Hydrogen Sulfide from Animal Waste

Under current federal environmental regulations, the “hazardous” substances that may be emitted from CAFOs and trigger federal oversight are ammonia and hydrogen sulfide.³⁹ Before discussing the statutory schemes that require CAFOs to report releases of these sources, the next subsections examine the biological processes that form both substances. The biological processes are essential to understand the potential difficulty of measuring, managing, and minimizing these greenhouse gas emissions.

1. Ammonia

Ammonia is a colorless gas that has a very noticeable odor at concentrations above 50 ppm.⁴⁰ Various industries (fertilizer and coke manufacturing, fossil fuel combustion, and refrigeration methods) are known to emit ammonia; however, the EPA estimates that animal agriculture accounts for 50 to 85 percent of total man-made ammonia volatilization in the United States.⁴¹ Although livestock facilities can generate odors that may be offensive to neighboring residents, the EPA states that ammonia odors are not toxic to humans.⁴²

Nitrogen, a constituent of crude protein in feedstuffs, is excreted in the urine and feces of livestock and poultry in the form of urea, uric acid, ammonia, and organic nitrogen.⁴³ Urea and uric acid are converted to ammonia almost immediately after they are excreted; this volatilization continues throughout the manure handling, storage, and land application.⁴⁴ Ammonia can be emitted from animal housing, open dry lots, stockpiles, lagoons, and land applications of manure as a fertilizer source.⁴⁵ The

38. NAT. RESOURCES CONSERVATION SERV., U.S. DEP'T AGRIC., *Animal Manure Management*, (Dec. 1995) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/rca/?cid=nrcs143_014211 [https://perma.cc/2PNT-ELPS].

39. 40 C.F.R. § 116.4 (2017).

40. Env'tl. Prot. Agency, Pub. No. EPA-456/R-95-002, *Control and Pollution Prevention Options for Ammonia Emissions 1* (1995).

41. SUSAN W. GAY & KATHARINE F. KNOWLTON, VA. COOPERATIVE EXTENSION, PUB. NO. 442-110, *AMMONIA EMISSIONS AND ANIMAL AGRICULTURE 1* (2009).

42. Env'tl. Prot. Agency, *supra* note 40, at 43.

43. GAY & KNOWLTON, *supra* note 41, at 3.

44. COLE ET AL., *supra* note 25, at 4.

45. ENVTL. PROT. AGENCY, *supra* note 35, at 1-2.

concentrated ammonia emissions may be affected by many factors, “including diet (protein quantity and degradability, carbohydrate degradability, acid-base balance), pen surface, retention pond, or lagoon conditions (total ammonia concentration, pH, temperature, moisture, solids), weather, ventilation rate, manure storage method, and animal age.”⁴⁶

While odor complaints may be a common issue with ammonia emissions, more pressing are the potential negative impacts for the environment. Atmospheric ammonia that travels via wind patterns may become a nutrient source when it is deposited onto neighboring soils and water bodies.⁴⁷ In ecologically sensitive areas, such as a water body with a high concentration of phosphorus, ammonia deposits may provide an oversupply of nitrogen for the native flora, resulting in potentially deleterious modifications of the native ecosystem.⁴⁸

2. Hydrogen Sulfide

Hydrogen sulfide is a colorless gas that is known for a distinctive “rotten egg” smell.⁴⁹ Human industrial sources responsible for the release of hydrogen sulfide include: wastewater treatment plants, landfills, kraft paper mills, petroleum refineries, natural gas plants, coke ovens, and food processing plants.⁵⁰ Hydrogen sulfide emissions from CAFOs occur as a result of the fermentation “by sulfate-reducing bacteria” in manure managed as liquids or slurries.⁵¹ Sulfur is a common ingredient in animal diets (sulfur amino acids contained in the feed and inorganic sulfur compounds from trace mineral supplements), and manure that is stored in a liquid state magnifies the emissions because of the pH, temperature, and biological oxygen demand.⁵²

Hydrogen sulfide emissions from lagoons and retention ponds “occur episodically when sufficient hydrogen sulfide gas, produced from nutrients or sludge on the bottom of the pond, accumulates to overcome the surface tension of the water and rise to the pond surface.”⁵³ As noted above, the

46. COLE, *supra* note 25, at 5.

47. GAY & KNOWLTON, *supra* note 41, at 2.

48. COLE ET AL., *supra* note 25, at 4–5; *see also* Thompson, *supra* note 3, at 132 (discussing the harmful effects ammonia has on aquatic life).

49. Thompson, *supra* note 3, at 132–33; AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, DEP’T HEALTH AND HUMAN SERV., PUBLIC HEALTH STATEMENT: HYDROGEN SULFIDE (2016).

50. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, *supra* note 49.

51. COLE ET AL., *supra* note 25, at 5.

52. *Id.*

53. *Id.*

emission rates appear to be greater from facilities that store manure in a liquid state than from open-air management, such as methods used in feedyard pens.⁵⁴ Unlike ammonia, the biggest concern with hydrogen sulfide is not the potential for deleterious impacts on the environment; rather, it is the more localized risk of human exposure to toxic concentrations.⁵⁵

3. Greenhouse Gases

Due to the current state of federal regulations, this article focuses on ammonia and hydrogen sulfide emissions from CAFOs; however, a brief discussion on greenhouse gas emissions, specifically methane, from CAFOs may be helpful. As climate change science and awareness “heats up,” understanding the sources of GHGs (e.g., carbon dioxide, methane, and nitrous oxide) are important. In 2015, animal agriculture accounted for over 30% of man-made sources of methane emissions in the United States—enteric fermentation (25% of total methane emissions) and manure management (9% of total methane emissions).⁵⁶ Given the large percentage of emissions that animal agriculture is responsible for, some argue that methane emissions from CAFOs should be regulated.⁵⁷ While some of this methane is a byproduct of ruminant digestion (enteric fermentation), like ammonia and hydrogen sulfide, GHGs are also emitted from the decomposition of manure.⁵⁸ Part VI of this paper details practices (such as improvements in manure storage facilities or diet modifications) that may be used to reduce ammonia and hydrogen sulfide emissions from CAFOs. Perhaps future regulation of GHGs coming from CAFOs, specifically including increased requirements for manure management, may create parallel opportunities for the reduction of ammonia and hydrogen sulfide emissions.⁵⁹

54. COLE ET AL, *supra* note 25, at 5.

55. ENVTL. PROT. AGENCY, *supra* note 35, at 1-4 (stating that manure as a liquid or slurry has the potential to emit hydrogen sulfide under anaerobic conditions); *see also* AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, *supra* note 49 (emphasizing the risk of human exposure versus environmental harms).

56. *See* ENVTL. PROT. AGENCY, EPA 430-P-17-001, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2015, ES-6, ES-14 to -15 (2017) (dividing the total methane emissions by emissions from manure management).

57. *See e.g.*, John Verheul, Note, *Methane As a Greenhouse Gas: Why the EPA Should Regulate Emissions from Animal Feeding Operations and Concentrated Animal Feeding Operations Under the Clean Air Act*, 51 NAT. RESOURCES J. 163, 165 (2011) (arguing that in light of climate change, the EPA should regulate methane emissions from AFOs and CAFOs).

58. COPELAND, PRIMER, *supra* note 24, at 2.

59. *See, e.g.*, Jordi Domingo et al., Comm. on Agric. and Rural Dev., *Measures at Farm Level to Reduce Greenhouse Gas Emissions from EU Agriculture*, EUR. PARL. DOC. PE 513.997, at 31

II. CURRENT REGULATION OF CAFOS UNDER FEDERAL AIR EMISSIONS STANDARDS

For the most part, current federal environmental law is not well suited to regulate air emissions from agricultural activities. The Clean Air Act (CAA) provides a comprehensive framework for regulating stationary and mobile sources of air pollution.⁶⁰ The CAA focuses on “controlling ‘major sources’ that emit more than threshold quantities of regulated pollutants.”⁶¹ However, because air emission quantities from CAFOs are either not the category of pollutant covered by the CAA or do not emit enough to trigger permitting requirements, they generally are not regulated under the CAA.⁶² However, agriculture does not completely fly under the radar. Two provisions of federal law, sections of CERCLA and EPCRA, both require reporting whenever a certain quantity of a hazardous substance is released into the environment.⁶³ At first glance, one might assume that these statutes only handle the cleanup of hazardous waste that is radioactive or from lead smelters and mining operations. However, importantly for CAFOs, the EPA has classified both ammonia and hydrogen sulfide as hazardous or reportable substances under both CERCLA and EPCRA with the reportable quantity (RQ) for each at 100 pounds per day.⁶⁴

A. Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA authorizes “federal cleanup of releases of hazardous substances, pollutants, or contaminants that may present an imminent and substantial danger to the public health or welfare . . . and impos[es] strict liability for cleanup and damages to natural resources from releases of hazardous substances.”⁶⁵ A facility that releases certain hazardous substances must provide notification of these releases to the National Response Center (NRC) if the release exceeds the substance’s RQ.⁶⁶ Specifically, CERCLA requires that:

(Jan. 2014) (offering regulatory recommendations for manure management focused on reducing methane and ammonia).

60. COPELAND, PRIMER, *supra* note 24, at 9.

61. *Id.*

62. *Id.*

63. *Id.* at 16.

64. 40 C.F.R. § 302.4 (2017); 40 C.F.R. § 355 app. A (2017).

65. COPELAND, PRIMER, *supra* note 24, at 17.

66. 42 U.S.C. § 9603(a) (2012).

Any person in charge of . . . an onshore facility shall, as soon as he has knowledge of any release (other than a federally permitted release) of a hazardous substance from such . . . facility in quantities equal to or greater than those determined pursuant to section 9602 of this title, immediately notify the National Response Center. . . .⁶⁷

Of note, CERCLA does provide exclusions for “the normal application of fertilizer” from the definition of release.⁶⁸

B. Emergency Planning and Community Right-to-Know Act

Congress enacted EPCRA in 1986 as part of the amendments to CERCLA, and this statute “establishes a framework of state, regional and local agencies designed to inform the public about the presence of hazardous and toxic chemicals, and to provide for emergency response in the event of health-threatening release.”⁶⁹ Like CERCLA, EPCRA requires the owner or operator of a facility to report to state and local authorities and emergency responders any releases greater than the RQ of substances deemed hazardous under CERCLA or extremely hazardous under EPCRA.⁷⁰ Hydrogen sulfide and ammonia are hazardous substances under EPCRA with RQs of 100 pounds per day.⁷¹ Additionally, EPCRA also excludes from the definition of hazardous chemicals any substance that is “used in routine agricultural operations.”⁷²

C. Continuous Releases Under CERCLA and EPCRA

Both CERCLA and EPCRA allow for reduced reporting requirements for “continuous releases” of hazardous substances that exceed the RQ.⁷³ This is important for CAFOs, as it alleviates the requirement for potential daily notification to the NRC and state and local authorities into an annual reporting system.⁷⁴ The EPA defines a continuous release of a hazardous

67. *Id.*

68. 42 U.S.C. § 9601(22)(D) (2012).

69. *Steel Co. v. Citizens for a Better Env't*, 523 U.S. 83, 86 (1998).

70. 42 U.S.C. § 11004(a)(1)–(2) (2012).

71. 40 C.F.R. § 302.4 (2017).

72. 42 U.S.C. § 11021(e)(5) (2012).

73. 42 U.S.C. § 9603(f)(2) (stating that no additional notification of release is required as long as the release is continuous, stable, and the facility has already given notification of the initial release of the substance).

74. *See* 40 C.F.R. § 302.8(a) (2017) (explaining that no notification is required for continuous releases).

substance as one “that is continuous and stable in quantity and rate.”⁷⁵ The EPA interprets “continuous” to mean a “release that occurs without interruption or abatement that is routine, anticipated, and intermittent during normal operation or treatment process.”⁷⁶ Furthermore, the term “stable in quantity and rate” means “predictable and regular in amount and rate of emission.”⁷⁷

D. Enforcement and Potential Liabilities Under CERCLA and EPCRA

Both CERCLA and EPCRA contain provisions that empower the EPA to assess civil penalties (up to \$27,500 per day) if releases that exceed the RQ go unreported.⁷⁸ The EPA has used these provisions against AFOs in at least two separate cases.⁷⁹ In 2001, the EPA and the Department of Justice (DOJ) entered into a civil settlement with two large Missouri pork producers, Premium Standard Farms, Inc., and Continental Grain Company, Inc., for alleged CWA, CAA, CERCLA, and EPCRA violations.⁸⁰ Five years later, in 2006, the EPA and DOJ entered into a similar consent decree with Seaboard Foods LP and PIC USA, Inc., pork producers with operations in Oklahoma, Kansas, Texas, and Colorado.⁸¹ In this settlement, Seaboard was required to pay a civil penalty of \$205,000 for failing to comply with the CWA, CAA, CERCLA, and EPCRA.⁸²

These statutes also allow for enforcement through citizen lawsuits, permitting “any person to commence a civil action against” either the entity who violates the reporting requirement or against the EPA for failure to enforce the requirement.⁸³ The Sierra Club successfully brought lawsuits

75. *Id.*

76. 40 C.F.R. § 302.8(b).

77. *Id.*

78. CLAUDIA COPELAND, CONG. RESEARCH SERV., RL 33691, ANIMAL WASTE AND HAZARDOUS SUBSTANCES: CURRENT LAWS AND LEGISLATIVE ISSUES 2 (2014) (hereinafter COPELAND, LAWS AND LEGISLATIVE ISSUES).

79. *Id.* at 3.

80. See Press Release, Env'tl. Prot. Agency, Nation's Second Largest Hog Producer Reaches Settlement with U.S. & Citizen's Group (Nov. 20, 2001), <https://www.epa.gov/enforcement/reference-news-release-nations-second-largest-hog-producer-reaches-settlement-us> [<https://perma.cc/37TE-T9EV>] (describing that the two companies violated the CAA and CWA as well as other laws that may include CERCLA and EPCRA).

81. Press Release, Env'tl. Prot. Agency, Government Reaches Settlements with Seaboard Foods and PIC USA (Sept. 15, 2006), https://archive.epa.gov/epapages/newsroom_archive/newsreleases/3933bb91f85c53fd852571ea0059b7f4.html [<https://perma.cc/MW5L-DMKV>].

82. *Id.*

83. COPELAND, LAWS AND LEGISLATIVE ISSUES, *supra* note 78, at 2–3.

under the citizen suit provisions against Tyson Foods in 2003 and against Seaboard Farms in 2004.⁸⁴

III. THE 2008 EXEMPTION FOR CAFOS

The poultry industry petitioned the EPA in 2005 to create an exemption for agricultural operations from the reporting requirements under EPCRA and CERCLA; they claimed these releases of ammonia and hydrogen sulfide posed “little or no risk to public health, while reporting imposes an undue burden on the regulated community and government responders.”⁸⁵ In response to this petition, the EPA released a proposal in December 2007 to exempt CAFOs from reporting under both statutes.⁸⁶ The EPA, supported by the agriculture industry and government responders, reasoned that CERCLA and EPCRA’s “reports are unnecessary because, in most cases, a federal response is impractical and unlikely.”⁸⁷ In making this determination, the EPA “considered whether the Agency would ever take a response action, as a result of such notification, for releases of hazardous substances to the air that meet or exceed their RQ from animal waste at farms.”⁸⁸ The EPA detailed that at the time of rulemaking, the EPA had “not initiated a response to any NRC notifications of ammonia, hydrogen sulfide, or any other hazardous substances released to the air where animal waste at farms is the source of that release.”⁸⁹ Moreover, the EPA could “not foresee a situation where the Agency would initiate a response action as a result of such notification.”⁹⁰

However, in response to the large number of comments “expressing the desire to receive information regarding releases from large . . . (CAFOs),” the EPA amended the proposed rule to only exempt reporting under CERCLA and certain livestock facilities under EPCRA.⁹¹ Under EPCRA, the EPA exempted farms that release hazardous substances from animal waste to the air that meet or exceed their RQ from reporting under section

84. *Sierra Club v. Tyson Foods*, F. Supp.2d 693, 693 (W.D. Ky. 2003) (holding that farms are not exempt from reporting requirements under CERCLA and EPCRA); *Sierra Club v. Seaboard Farms Inc.*, 387 F.3d 1167, 1176 (10th Cir. 2004) (holding that the term “facility” as used in CERCLA’s § 101(9)(A) and (B) encompasses the farm as a whole and does not refer to individual barns or lagoons on the property).

85. COPELAND, LAWS AND LEGISLATIVE ISSUES, *supra* note 78, at 4.

86. *Id.* at 5; Thompson, *supra* note 3, at 147.

87. CERCLA/EPCRA Administrative Reporting Exemption for Air Releases of Hazardous Substances from Animal Waste at Farms, 73 Fed. Reg. 76,948, 76,956.

88. *Id.* at 76,953.

89. *Id.*

90. *Id.*

91. *Id.* at 76,950.

304 if the farms stable or confine less than a certain number of animal species.⁹² Any CAFO that housed more than these numbers had to report.⁹³ The EPA's Final Rule became effective in January 2009 and exempted agricultural operations that annually sell at least \$1,000 of agricultural products from CERCLA reporting requirements for releases of hazardous substances to the air from animal waste.⁹⁴ In addition, the Final Rule provided that any farms already participating and in compliance with the EPA's Animal Feeding Operation Air Compliance Agreement⁹⁵ were exempt from reporting requirements.⁹⁶

IV. *WATERKEEPER ALLIANCE V. EPA*

The ink barely had time to dry on the EPA's Final Rule before it was challenged.⁹⁷ Several environmental groups, including Waterkeeper Alliance, Sierra Club, the Humane Society of the United States, Environmental Integrity Project, and the Center for Food Safety (collectively "Waterkeeper Alliance"), challenged that neither CERCLA nor EPCRA permitted the EPA to grant reporting exemptions.⁹⁸ Rather, Waterkeeper Alliance argued that both statutes required a report anytime there was a release that exceeded the RQ and that the Final Rule was arbitrarily treating animal waste from CAFOs more favorably than those from other industries.⁹⁹

The D.C. Circuit Court, using a *Chevron* analysis to interpret the Final Rule, found that the EPA unreasonably interpreted CERCLA and EPCRA's

92. *Id.* at 76,952 (showing the thresholds for exemption from EPCRA section 304 reporting that "(1) 700 mature dairy cows, whether milked or dry; (2) 1,000 veal calves; (3) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs; (4) 2,500 swine each weighing 55 pounds or more; (5) 10,000 swine each weighing less than 55 pounds; (6) 500 horses; (7) 10,000 sheep or lambs; (8) 55,000 turkeys; (9) 30,000 laying hens or broilers, if the farm uses a liquid manure handling system; (10) 125,000 chickens (other than laying hens), if the farm uses other than liquid manure handling system; (11) 82,000 laying hens, if the farm uses other than a liquid manure handling system; (12) 30,000 ducks (if the farm uses other than a liquid manure handling system); (13) 5,000 ducks (if the farm uses a liquid manure handling system)").

93. *Id.* at 76,953–54.

94. *Id.* at 76,956.

95. Animal Feeding Operations Consent Agreement and Final Order, 70 Fed. Reg. 4,958 (Jan. 31, 2005).

96. EPA, CERCLA/EPCRA Reporting Requirements for Air Releases of Hazardous Substances from Animal Waste at Farms, *supra* note 6.

97. See *Waterkeeper All. v. Env'tl. Prot. Agency*, 853 F.3d 527, 530 (D.C. Cir. 2017) (discussing that the EPA was immediately sued by environmental groups after issuing a final rule that generally exempted farms from reporting requirements under CERCLA and EPCRA).

98. *Id.*

99. *Id.* at 532.

requirements in creating the Final Rule.¹⁰⁰ Reading the statutes together, the court found that the statutory provisions set forth a straightforward reporting requirement for any non-exempt release.¹⁰¹ The EPA and agricultural industry intervenors argued that the EPA was exercising its *de minimis* power, maintaining that the Final Rule “minimize[s] the burden on both regulated entities and government response agencies.”¹⁰²

In analyzing the use of the *de minimis* doctrine, the court reiterated that the doctrine cannot be used “to create an exception where application of the literal terms would provide benefits, in the sense of furthering the regulatory objectives, but the agency concludes that the acknowledged benefits are exceeded by the costs.”¹⁰³ While the court recognized the importance of efficiency—it was concerned with the cost and burden on both the regulated and governmental agencies—Congress did not provide any reasons under the statute that allowed an agency to create such an exemption as included in the Final Rule.¹⁰⁴ Furthermore, even though the EPA “could ‘not foresee a situation where the Agency would initiate a response action as a result of such notification,’” the court accepted the concerns that commenters made during the EPA’s rulemaking process:

They put before the EPA a good deal of information . . . suggesting scenarios where the reports could be quite helpful in fulfilling the statutes’ goals. Specifically, commenters explained that when [manure] pits are agitated for pumping, hydrogen sulfide, methane, and ammonia are rapidly released from the manure and may reach toxic levels or displace oxygen, increasing the risk to humans and livestock.¹⁰⁵

While the court acknowledged the possibility that these risks could be outweighed by the substantial costs estimated by the EPA, the court ultimately concluded that these comments undermined the primary purpose of the “*Final Rule*—namely, that notifications of animal waste-related releases serve no regulatory purpose because it would be ‘impractical or unlikely’ to respond to such a release.”¹⁰⁶

100. *Id.* at 534 (citing to *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837(1984)).

101. *Id.* at 535.

102. *Id.*

103. *Id.* (citing *Ala. Power v. Costle*, 636 F.2d 323, 360–61 (D.C. Cir. 1979)) (internal quotation marks omitted).

104. *Waterkeeper All.*, 853 F.3d. at 535 (citing 73 Fed. Reg. at 76,958).

105. *Id.* (citing 73 Fed. Reg. at 76,957/2) (internal quotation marks omitted).

106. *Id.* at 537 (citing 73 Fed. Reg. at 76,950/1).

In sum, the court ruled to vacate the Final Rule “[b]ecause the EPA’s action [was not] justified either as a reasonable interpretation of any statutory ambiguity or implementation of a *de minimus* exception.”¹⁰⁷

V. AFTERMATH OF THE *WATERKEEPER ALLIANCE V. EPA* DECISION

The *Waterkeeper Alliance* decision sent shock waves across the agricultural industry after it was released in April 2017.¹⁰⁸ The court granted the EPA’s motion to stay the ruling until May 1, 2018, in order to allow the EPA time to develop guidance documents to assist CAFOs across the country in understanding the new reporting requirements under CERCLA.¹⁰⁹

On May 25, 2017, 28 U.S. Senators sent a letter to EPA Administrator Scott Pruitt asking him to challenge the D.C. Circuit’s opinion and “to provide America’s farmers and ranchers with regulatory relief through agency directive and rulemaking.”¹¹⁰ In this letter, the Senators said that, “left unchecked,” the expanded reporting requirement resulting from *Waterkeeper Alliance* means that “up to 100,000 farms and ranches across the country will face enormous uncertainty and potential liability if they do not submit an emissions report.”¹¹¹

On October 26, 2017, the EPA released guidance documents to assist agricultural operations with understanding the reporting requirements under CERCLA.¹¹² The stay on the D.C. Circuit’s ruling was set to end on November 14, 2017, meaning that any agricultural operation that may fall under CERCLA would need to comply with the reporting requirements by that deadline or face the uncertain potential for civil lawsuits and fines under the statute.¹¹³ The reports require good-faith estimates of the

107. *Id.*

108. CAFOs Ordered to Report Hazardous Pollution, *WATERKEEPER ALL.* (Apr. 11, 2017), <https://waterkeeper.org/cafos-ordered-to-report-hazardous-pollution/> [<https://perma.cc/8J5B-9NWK>] (explaining how the decision closed a loophole in reporting requirements).

109. Press Release, Env’tl. Prot. Agency, EPA Releases Guidance on Reporting Air Emissions of Hazardous Substances from Animal Waste at Farms (Oct. 26, 2017), <https://www.epa.gov/newsreleases/epa-releases-guidance-reporting-air-emissions-hazardous-substances-animal-waste-farms> [<https://perma.cc/K6BK-AUHP>]; *see also* EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT, *supra* note 6 (explaining that the court extended the stay until May 1, 2018).

110. Press Release, Miss. Senator Urges Appeal of D.C. Circuit Decision That Would Create Undue Burdens for America’s Farmers & Ranchers, Roger Wicker U. S. for Miss. (May 26, 2017), <https://www.wicker.senate.gov/public/index.cfm/2017/5/wicker-opposes-senseless-epa-reporting-requirements-for-farmers> [<https://perma.cc/8ZGW-YWCL>].

111. *Id.*

112. Press Release, Env’tl. Prot. Agency, *supra* note 109.

113. EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT, *supra* note 6.

reportable emissions and can be based on best professional judgment.¹¹⁴ While agricultural operators are required to report, the EPA has given them considerable discretion in determining how they estimate emission releases from their operation.¹¹⁵ Agricultural operators are encouraged to “coordinate with . . . trade associations or . . . land-grant universities, [and] may establish estimated quantities of releases by relying on: (1) past release data, (2) engineering estimates, (3) your knowledge of the facility’s operations and release history, or (4) your best professional judgment.”¹¹⁶ Actual data on emissions from the individual operation is not required.¹¹⁷ On February 1, 2018, the D.C. Circuit granted the EPA’s motion to further stay the mandate until May 1, 2018.¹¹⁸ As a result, CAFOs would not be required to submit their initial continuous release notifications until that date.¹¹⁹

For all the backlash, confusion, and anxiety, a little over a month before the D.C. Circuit was set to vacate the 2008 Final Rule, Congress finally stepped in. On March 23, 2018, President Trump signed the Omnibus Bill, and tucked within this massive appropriations bill is Title XI, called the “Fair Agricultural Reporting Method Act” or “FARM Act.”¹²⁰ The FARM Act amends Section 103(e) of CERCLA to no longer apply to “air emissions from animal waste (including decomposing animal waste) at a farm.”¹²¹ Animal waste includes “feces, urine, or other excrement, digestive emission, urea, or similar substances emitted by animals (including any form of livestock, poultry, or fish).”¹²²

VI. QUESTIONS AND OPTIONS MOVING FORWARD

While the eleventh-hour actions by Congress in passing the Omnibus Bill have prevented CAFO operators from having to comply with reporting requirements and potential penalties under CERCLA, the conflict between environmental groups and a modern agriculture industry remains.¹²³ Congress may have saved the day on this matter, but *Waterkeeper Alliance* is a good example of the predicament production agriculture is in for many environmental issues. What might happen if Congress does not act as

114. *Id.*

115. *Id.*

116. *Id.*

117. *Id.*

118. *Id.*

119. *Id.*

120. Consolidated Appropriations Act, 2018, H.R. 1625, 115th Cong. (2d Sess. 2018).

121. *Id.*

122. *Id.*

123. *Id.*

quickly next time, or a different administration refuses to sign the bill? The following will provide a look at some of the questions asked and options available to the involved parties prior to the passage of the Omnibus Bill.

Following the D.C. Circuit's opinion, the EPA was left with limited options beyond its issuance of guidance for the agriculture industry, and the aftermath of *Waterkeeper Alliance* left many questions unanswered. An industry that enjoyed exemption for years went from blissful ignorance to very quickly being told—via a red box on the EPA's webpage—to report emissions that the regulating agency is not sure how to measure.¹²⁴ Even the best land-grant universities in the country could only provide estimates for determining values.¹²⁵ Beyond the statutory requirements that our legal system has said is the law, what does it actually mean to implement these regulations? They add time and expense to agricultural operations and a fear of litigation at some point in the future by an NGO or environmental group that may disagree with modern production feeding operations. Operators of CAFOs likely have two key questions regarding these laws: first, what is the actual purpose behind these reporting requirements? And second, how can they accurately and confidently determine whether an operation emits an amount of ammonia or hydrogen sulfide that would subject them to the reporting requirements?

A. Does Reporting Really Matter?

Even though the expert agency that manages both programs stated that these “reports were unnecessary because, in most cases, a federal response is impractical and unlikely,” the D.C. Circuit in *Waterkeeper Alliance* seemed to defer to the Final Rule commenters, who expressed concern for the possibility of these releases.¹²⁶ These commenters and proponents of stricter air regulations on CAFOs put forward unfortunate cases where farmers “have become seriously ill or even died” as the result of manure (specifically when pumping liquid manure from pits) as evidence of the need for the reporting.¹²⁷ As terrible as these cases are, agricultural groups

124. *Id.*

125. *See id.* (providing estimates of emissions based on studies from universities like Iowa State University, Texas A&M University, and the University of Nebraska).

126. CERCLA/EPCRA Administrative Reporting Exemption for Air Releases of Hazardous Substances from Animal Waste at Farms, 73 Fed. Reg. at 76,956; *see also* *Waterkeeper All. v. Env'tl. Prot. Agency*, 853 F.3d 527, 535 (D.C. Cir. 2017) (according great weight to the comments in the Final Rule).

127. *Waterkeeper All. v. Env'tl. Prot. Agency*, 853 F.3d 527, 536 (D.C. Cir. 2017); *see also* J. Nicholas Hoover, *Can't You Smell That Smell? Clean Air Act Fixes for Factory Farm Air Pollution*, 6 STAN. J. ANIMAL L. & POL'Y 1, 2 (2013) (discussing a deadly event involving multiple people with regards to a manure pit).

may well be skeptical in looking for the actual reasons environmental groups are pushing for these reports. Neither CERCLA nor EPCRA impose actual reductions of emissions from hazardous substances; however, because these statutes currently contain mechanisms that allow for citizen suits against CAFOs, environmental groups may pursue lawsuits against animal agriculture under the low-hanging fruit of these provisions with the hopes of future implementation of broader CAA regulation of CAFOs.¹²⁸ The CAA has technology-forcing measures that would make CERCLA and EPCRA reporting standards look easy.¹²⁹ While Congress has acted to remove this burden for now, the potential for future regulation under other environmental laws is something that is not overlooked by those opposed to the exemption; rather, it may be argued that this legislation only delays “an inevitable reckoning with pollution caused by [an] enormously consolidated agricultural system.”¹³⁰

B. How to Accurately Measure Emissions

If CAFOs must report, how does a farmer or rancher accurately determine if he or she is required to report? The short answer is that no one is quite sure. Unfortunately for CAFOs, the lack of reliable science is not a reason to exempt animal production facilities from the reporting requirements of EPCRA and CERCLA.¹³¹ Animal agriculture has previously argued that “there is no generally accepted methodology or model for estimating” an emission from CAFOs, but that argument was unsuccessful.¹³² Furthermore, neither party in *Waterkeeper Alliance* argued that daily emissions of commercial farms fell below the reporting threshold under both CERCLA and EPCRA.¹³³

128. Danielle M. Purifoy, *EPCRA: A Retrospective on the Environmental Right-to-Know Act*, 13 YALE J. OF HEALTH POL’Y 375, 377–78 (2013) (stating that beyond planning and reporting requirements in EPCRA, “industries have no express obligations under the statute to mitigate releases or to reduce risks to their employees and their surrounding communities. Nevertheless . . . this ‘toothless’ statute has been instrumental not only in improvements in industry transparency to its neighbors and the larger public. Also, and perhaps unexpectedly, in increased self-policing by many industries of their emissions, both to appease investment stakeholders and to prevent costly waste from inefficiencies at their facilities.”); see also 42 U.S.C. § 9659(a) (2012) (explaining the citizens suit provision of CERCLA); 42 U.S.C. § 11046(a)(1) (2012) (explaining the citizens suit provision of EPCRA).

129. See ROBIN KUNDIS CRAIG, ENVIRONMENTAL LAW IN CONTEXT: CASES AND MATERIALS 667 (4th ed. 2016) (“The EPA regulates stationary sources through technology-based emissions limitations.”).

130. Laurie Ristino, *Congress Just Gave Big Agriculture the Pollution Green Light*, THE HILL (Mar. 23, 2018, 02:20 PM) <http://thehill.com/opinion/energy-environment/379971-congress-just-gave-big-agriculture-the-pollution-green-light> [https://perma.cc/2G7U-ESQD].

131. *Sierra Club, Inc. v. Tyson Foods, Inc.*, 299 F.Supp.2d 693, 705 (W.D. Ky. 2003).

132. *Id.* at 706.

133. *Waterkeeper All. v. Env’tl. Prot. Agency*, 853 F.3d 527, 531 (D.C. Cir. 2017).

Although the argument “we cannot measure it” may not fly in a D.C. Circuit Court, understanding the difficulties of actually measuring emissions in the feedlot or dairy over 1,600 miles away from benches in Washington, D.C., is important. Uncertainty in accurately determining if you may be subject to large fines and citizen suits is a serious matter facing CAFO operators and managers across the country. The issue is not that the CAFO managers cannot or refuse to do mathematical estimates. The concern becomes whether the estimates are accurate, and accurately estimating emissions is no easy task—the EPA has spent over eleven years researching this very issue and still cannot provide a clear answer.¹³⁴ Likewise, states have, for the most part, avoided regulating CAFO emissions for this very reason.¹³⁵

In order to better understand the difficulty of actually estimating these emissions, a brief overview of the EPA’s attempts to quantify these air components over the last ten years may be helpful.¹³⁶ In 2005, the EPA and the dairy, swine, and poultry industries found some middle ground in which they hoped to make progress with quantifying and reporting air emissions by entering into a voluntary consent agreement known as the Animal Feeding Operations Consent Agreement (the Air Compliance Agreement).¹³⁷ The AFOs were seeking to address the recent lawsuits brought under CERCLA and EPCRA, and the EPA needed funding and cooperation from the agricultural industry to better develop the emissions-measuring methodologies.¹³⁸ Under this Air Compliance Agreement, participating AFOs provided the funding for a two-year, nationwide emissions-monitoring study (National Air Emissions Monitoring Study or NAEMS) of animal confinement structures and manure storage and treatment units in the broiler, egg-layer, swine, and dairy industries.¹³⁹ The goal of this study was to gather accurate emissions data that the EPA could use to develop emissions-estimating methodologies (EEMs).¹⁴⁰ Using these estimates of daily and annual emissions would aid the EPA’s regulation of

134. ENVTL. PROT. AGENCY, EPA 17-P-0396, ELEVEN YEARS AFTER AGREEMENT, EPA HAS NOT DEVELOPED RELIABLE EMISSION ESTIMATION METHODS TO DETERMINE WHETHER ANIMALS FEEDING OPERATIONS COMPLY WITH CLEAN AIR ACT AND OTHER STATUTES 2 (2017).

135. COPELAND, PRIMER, *supra* note 24, at 15.

136. See Amanda Peterka, *EPA Study of CAFO Emissions Grinds on with No End in Sight*, E&E NEWS (June 25, 2014), <https://www.eenews.net/stories/1060001938> [<https://perma.cc/T65M-4EQE>] (“U.S. EPA’s nine-year effort to document air pollution at livestock operations is likely still many years from completion and unlikely to be as useful as industry and environmental groups had hoped.”).

137. Animal Feeding Operations Consent Agreement and Final Order, 70 Fed. Reg. 4,958, 4,959 (Jan. 31, 2005).

138. *Id.* at 4,958, 4,963.

139. *Id.* at 4,961.

140. *Id.*

AFOs under the CAA, CERCLA, and EPCRA.¹⁴¹ Over 2,500 AFOs, representing nearly 14,000 facilities, received the EPA's approval to participate in the Air Compliance Agreement.¹⁴² Notably, all AFOs that "chose to participate in the Air Compliance Agreement and [met] all its conditions [received] . . . a limited release and covenant not to sue from liability for certain past and ongoing CAA, CERCLA and EPCRA violations."¹⁴³ The Air Compliance Agreement raised over \$14 million to fund NAEMS.¹⁴⁴

With the EPA's oversight and monitoring, NAEMS began in the summer of 2006.¹⁴⁵ The study was implemented at 27 representative broiler, egg-layer, swine, and dairy operations in ten states (California, Indiana, Iowa, Kentucky, New York, North Carolina, Oklahoma, Texas, Washington, and Wisconsin).¹⁴⁶ Interestingly, beef production, which accounts for the largest recoverable nitrogen percentage of all livestock and poultry species, was markedly not represented in these studies.¹⁴⁷ In February of 2012, the EPA released a draft version of the results from NAEMS and asked the Science Advisory Board (SAB), a board made up of some of the top scientists, engineers, and professors from universities all across the country, to review and provide advice on scientific issues associated with development of the EEMs.¹⁴⁸

In April of 2013, the SAB produced a review of the EEMs and ultimately concluded that the EPA's statistical models would have "a limited ability to accurately predict emissions" beyond the small number of farms in the dataset and that the "models used in the current EEMs were not suitable for use outside the range of parameter values in the current data."¹⁴⁹ In July of 2013, the EPA responded to the SAB's review and stated that the EPA would continue to "work diligently in the coming

141. See U.S. ENVTL. PROT. AGENCY, EPA-SAB-13-003, SAB REVIEW OF EMISSIONS-ESTIMATING METHODOLOGIES FOR BROILER ANIMAL FEEDING OPERATIONS AND FOR LAGOONS AND BASINS AT SWINE AND DAIRY ANIMAL FEEDING OPERATIONS 11 (2013), (describing that a limited sample in developing EEMs may not be effective in controlling emissions more broadly).

142. *Id.* at A-3.

143. Animal Feeding Operations Consent Agreement and Final Order, 70 Fed. Reg. at 4,959.

144. U.S. ENVTL. PROT. AGENCY, *supra* note 134, at 6.

145. NAEMS: National Air Emissions Monitoring Study, PURDUE UNIVERSITY <https://engineering.purdue.edu/~odor/NAEMS/index.htm> [<https://perma.cc/SZ46-TA9P>] (2006).

146. U.S. ENVTL. PROT. AGENCY, *supra* note 134, at 7.

147. See U.S. ENVTL. PROT. AGENCY, ANIMAL FEEDING OPERATIONS – 2012 MONITORED AFOs, 1 <https://archive.epa.gov/airquality/afo2012/web/html/index.html> [<https://perma.cc/NTG9-MGRG>] (last updated on July 11, 2016) (identifying pork, broiler chickens, egg-laying operations, and dairies as categories of animal feeding operations included the study, with the noticeable absence of beef production).

148. *Id.*; U.S. ENVTL. PROT. AGENCY, SAB REVIEW OF EMISSION, *supra* note 141, at A-1.

149. U.S. ENVTL. PROT. AGENCY, SAB REVIEW OF EMISSION, *supra* note 141, at 2.

months to develop appropriate emissions-estimating methodologies for animal-feeding operations throughout the U.S.”¹⁵⁰ This appears to be the most recent update on this matter.

In sum, over ten years have passed since NAEMS began, and there still appears to be challenges to determining the best way to accurately measure emissions from CAFOs.¹⁵¹ In defense of the EPA, the Agency has diligently worked to find a solution to the emissions-measuring issues; however, a reliable and accurate formula that can be applied to fit a certain species, in a certain part of the country, fed a certain diet, and with a certain manure-management system has yet to be found.¹⁵² Because of this uncertainty, the CERCLA rule that went into effect on January 22, 2018, offers CAFOs a range of options in selecting a formula that fits them.¹⁵³

C. What Can Be Done in the Long Term with These Reporting Requirements?

In analyzing the situation post-*Waterkeeper Alliance v. EPA*, the agricultural industry is at an important crossroads. “Two roads diverged in a yellow wood” for production agriculture, and the path it decides to travel down may very well impact its future regulatory burden, the future viability of the industry, and its footprint on the environment.¹⁵⁴

1. Forced Regulation Through Litigation

This is the road that production agriculture is currently on. Environmental groups, through expensive and time-consuming court cases, have slowly chipped away at the exemptions that agriculture has enjoyed under environmental regulations.¹⁵⁵ These groups are often active, well-

150. Letter from Bob Perciasepe, Acting Admin., Env'tl. Prot. Agency, to David T. Allen, Chairman, Science Advisory Bd. (July 15, 2013), [https://yosemite.epa.gov/sab/SABPRODUCT.NSF/81e39f4c09954fcb85256ead006be86e/08A7FD5F8BD5D2FE85257B52004234FE/\\$File/EPA-SAB-13-003_Response_07-15-2013.pdf](https://yosemite.epa.gov/sab/SABPRODUCT.NSF/81e39f4c09954fcb85256ead006be86e/08A7FD5F8BD5D2FE85257B52004234FE/$File/EPA-SAB-13-003_Response_07-15-2013.pdf) [<https://perma.cc/9D95-SFC8>].

151. EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT, *supra* note 6 (“EPA recognizes that it will be challenging for farmers to estimate releases from animal wastes because there is no generally accepted methodology for estimating these emissions at this time.”).

152. EPA, CERCLA/EPCRA 2018 GUIDANCE DOCUMENT, *supra* note 6.

153. ENVTL. PROT. AGENCY, FACT SHEET NO: 520-F-17-001, CERCLA AND EPCRA REPORTING REQUIREMENTS FOR AIR RELEASES OF HAZARDOUS SUBSTANCES FROM ANIMAL WASTE AT FARMS 1 (2018).

154. Robert Frost, *The Road Not Taken*, POETRY FOUNDATION, <https://www.poetryfoundation.org/poems/44272/the-road-not-taken> [<https://perma.cc/U4SP-NR9G>] (last visited Feb. 3, 2018).

155. Shannon L. Ferrell & Tiffany D. Lashmet, *One If By Land, Two If By Sea, Three If By Air: The Changing Face of Environmental Regulation of Production Agriculture*, in STATE BAR OF

funded, and not afraid of an agriculture industry that refuses to acknowledge them as an opponent worth meddling with. However, but for commenters who participated in the EPA's rulemaking process for the 2008 Final Rule and cases like *Waterkeeper Alliance v. EPA*, production agriculture would likely still be exempt from reporting its emissions.¹⁵⁶

Furthermore, because the federal statutory scheme currently does not fit these environmental groups' goals in regard to regulating CAFOs, it is likely they will continue to attempt to try to "fit a square emission into a round regulation."¹⁵⁷ Ammonia and hydrogen sulfide may just be the beginning. While this paper has focused solely on these two pollutants, enteric fermentation and manure management are two of the top four sources of methane, a GHG, in the United States.¹⁵⁸ The next four years may provide a short respite from new climate and environmental regulations in the United States; however, the rest of the world is moving forward with attempts (such as the Paris Agreement) to find solutions to mitigate future climate impacts.¹⁵⁹ The question is no longer whether such external pressures from climate and environmental regulations should be applied to agriculture; rather, it is when these pressures will be applied to agriculture and how. If agriculture is unwilling to take a proactive seat at the table when the United States begins to implement similar climate regulations, it is unlikely that the application of such regulations will be favorably applied to the industry.

2. Congressional Amendments to CERCLA and EPCRA

This route attempts to revert the regulatory situation back to the status quo and is the easiest in terms of actual management practices at CAFOs.

TEXAS, 10TH ANNUAL JOHN HUFFAKER AGRICULTURAL LAW COURSE 7 (2016) (stating that agriculture exemptions are continuing to be eroded "by pressure from a number of sectors" and discussing the *Waterkeeper* case).

156. See *Waterkeeper All. v. Env'tl. Prot. Agency*, 853 F.3d 527, 536 (D.C. Cir. 2017) (discussing that public comments on the Final Rule issued by the EPA undercut the EPA's justification for exempting farms from reporting emissions).

157. Ferrell & Lashmet, *supra* note 155, at 7. (discussing how EPCRA was not designed to regulate byproduct emission from livestock operations and that agriculture should take a proactive approach to assist in finding a "right tool for the job").

158. See EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2015, *supra* note 56, at ES-6 (identifying enteric fermentation, natural gas systems, landfills, and manure management as the top four sources of methane).

159. See Philip Rucker & Jenna Johnson, *Trump Announces U.S. Will Exit Paris Climate Deal, Sparking Criticism at Home and Abroad*, WASH. POST (June 1, 2017), https://www.washingtonpost.com/politics/trump-to-announce-us-will-exit-paris-climate-deal/2017/06/01/fbcb0196-46da-11e7-bcde-624ad94170ab_story.html [https://perma.cc/8L64-3KAN] (discussing how pulling out from the Paris Climate Agreement will take four years—slightly longer than President Trump's first term).

This option is the one that eventually took the prize (for now), as the Omnibus Bill exempts CAFOs from reporting “air emissions from animal waste at a farm.”¹⁶⁰ However, this was never a guaranteed option. On at least two occasions (2004 and 2017), dozens of Senators wrote to the EPA Administrator either to ask the Agency to clarify the reporting requirements of CERCLA and EPCRA or to limit the reporting requirements under these two laws for livestock and poultry operations.¹⁶¹ These letters demonstrate that Congress is aware that livestock producers face uncertainty and may be targeted for enforcement actions under these laws.¹⁶² However, asking the executive branch to find a way to lessen the regulatory burden of Congress’s legislation on the agriculture industry, especially in the aftermath of the D.C. Circuit’s decision in *Waterkeeper Alliance*, is an unlikely strategy to create real change. The EPA is only given so much deference by the courts, and the second highest court in the land struck down the EPA’s actions to create an exception in its 2008 rule.¹⁶³

Nevertheless, the Senators are not limited to writing letters if they truly want to provide relief to the agriculture industry under these regulations. In 2011, both the House and the Senate introduced bills that would amend CERCLA in order “to clarify that manure is not considered a hazardous substance, pollutant, or contaminant under the Act.”¹⁶⁴ The amendments failed to gain the needed traction.¹⁶⁵ However, if Congress would like to see CAFOs exempt from CERCLA and EPCRA reporting requirements, it will have to, again, attempt to amend and exclude animal production facilities from these reporting requirements.¹⁶⁶ Congress clearly knew how to exempt certain items under CERCLA and EPCRA as demonstrated by the fertilizer exclusion, which exempts “the normal application of fertilizer” from the definition of release.¹⁶⁷ With the FARM Act’s inclusion within the Omnibus Bill, this exemption has been expanded to also apply to animal waste as well.

160. Consolidated Appropriations Act, 2018, H.R. 1625, 115th Cong. (2d Sess. 2018).

161. Press Release, Miss. Senator Urges Appeal of D.C. Circuit Decision That Would Create Undue Burdens for America’s Farmers & Ranchers, *supra* note 110.

162. COPELAND, LAWS AND LEGISLATIVE ISSUES, *supra* note 78, at 7.

163. *Waterkeeper All. v. Env’tl. Prot. Agency*, 853 F.3d 527, 537–38 (D.C. Cir. 2017).

164. H.R. 2997, 112th Cong. (2011) (amending CERCLA to provide an exception for manure); S. 1729, 112th Cong. (2011) (amending CERCLA to clarify manure’s status under the regulation).

165. *H.R. 2997 (112th): Superfund Common Sense Act*, GOVTRACK, <https://www.govtrack.us/congress/bills/112/hr2997/details> [<https://perma.cc/VWL8-QXAK>] (last visited Mar. 19, 2018) (explaining that no vote on the bill ever took place).

166. *See Sierra Club v. Tyson Foods*, F. Supp. 2d 693, 705–06 (W.D. Ky. 2003) (explaining that courts interpret the fact that animal production facilities are not excluded from regulations as evidence that Congress did not intend to exclude such facilities).

167. COPELAND, LAWS AND LEGISLATIVE ISSUES, *supra* note 78, at 2.

Congress is making a similar push to exempt animal waste from the Resource Conservation and Recovery Act (RCRA), an act that governs the treatment, storage, and disposal of solid and hazardous waste.¹⁶⁸ While unsuccessful, the Farm Regulatory Certainty Act was introduced in the U.S. House in 2016 to amend RCRA to clarify that RCRA does not “govern animal waste, manure, or fertilizer, or constituents derived from such sources, or the ways in which they are managed, stored, handled, or applied by agricultural operations.”¹⁶⁹ As the Omnibus Bill demonstrates, congressional amendments to these statutes will tremendously reduce the regulatory burden on agriculture.

3. A Proactive Approach by the Agriculture Industry

Today’s modern agriculture is more innovative and efficient than ever, even as the demand for its products and outside pressures continue to increase.¹⁷⁰ The American farmer and rancher does more with less today than ever before, and it is this type of spirit and drive that may be the answer to helping find solutions to emissions problems from animal agriculture.¹⁷¹ Rather than continuing to play defense against environmental groups or waiting for the legislature to amend laws in order to provide preferential exemptions, production agriculture can take “the bull by the horns” and proactively work with the EPA to find solutions for its emissions. Such voluntary efforts by animal agriculture to define for itself the best ways to manage and regulate emissions will likely be more industry friendly and feasible than any rule created through litigation with the Sierra Club or the Animal Legal Defense Fund. While a lofty goal, the Air Compliance Agreement is an example of previous cooperation in this area.¹⁷²

168. See 42 U.S.C. § 6901(a) (2012) (explaining RCRA’s coverage of solid waste and exemption of animal waste).

169. Farm Regulatory Certainty Act, H.R. 5685, 114th Cong. (2016).

170. See Maarten Elferink & Florian Schierhorn, *Global Demand for Food Is Rising. Can We Meet It?*, HARV. BUS. REV. (Apr. 7, 2016), <https://hbr.org/2016/04/global-demand-for-food-is-rising-can-we-meet-it> [https://perma.cc/9Q76-3G4R] (identifying rising population, climate change, and deforestation as pressures of modern agriculture).

171. See U.S. FARMERS & RANCHERS ALL., AGRICULTURE IN AMERICA SUSTAINABILITY REPORT 11 (2017) (“As consumers’ demand for sustainably-grown food intensifies, farmers and ranchers in the U.S. are using data and technology to become more efficient, nimble, and more equipped to protect the planet’s resources while producing food.”).

172. Animal Feeding Operations Consent Agreement and Final Order, 70 Fed. Reg. 4,958 (Jan. 31, 2005) (offering animal feed operations the chance to comment and sign a consent agreement to avoid time consuming litigation. The Air Compliance Agreement offers agency help to lower the cost of measuring emissions).

Cooperative efforts will require the development of best management practices to help manage and mitigate emissions, and they may take on several different forms and vary industry by industry within production agriculture. Some of these best management practices can be split into either “pre-excretion strategies” or “post-excretion strategies.”¹⁷³ Pre-excretion strategies can include diet manipulation where the use of feed additives and accurate feeding of dietary protein and amino acids (as well as sulfur) can be used to minimize the amount of nitrogen and sulfur (and thus ammonia and hydrogen sulfide) that may end up in urine and manure.¹⁷⁴ For instance, modification of the diet of feedlot cattle, through altering diet digestibility or the inclusion of additives, can change ammonia and methane emissions by 20-50%.¹⁷⁵

Post-excretion strategies focus on ways to manage and treat the manure in order to minimize emissions.¹⁷⁶ For example, application of chemicals to manure may help reduce the amount of ammonia that is released.¹⁷⁷ Furthermore, covering the facilities that store manure may help minimize the amount of ammonia released, and the use of more dry storage techniques, compared with wet storage, may reduce the amount of hydrogen sulfide released.¹⁷⁸ For facilities that house livestock and poultry inside, ventilation systems can be equipped with filters or treatment systems that may capture emissions from being released into the air outside the building.¹⁷⁹ Compared with surface manure application, sub-surface manure application with injectors has been shown to limit ammonia losses.¹⁸⁰ Finally, as the technology improves and becomes more economical, anaerobic digesters may prove to be the most promising solution for reducing emissions. Anaerobic digesters are closed systems that utilize an anaerobic process to break down animal waste to produce biogas, which can then be used to fuel the system.¹⁸¹ This system can help reduce odors and emissions of GHGs, ammonia, and hydrogen sulfide while providing a CAFO a source of renewable energy.¹⁸²

173. GAY & KNOWLTON, *supra* note 41, at 4.

174. NAT'L RESEARCH COUNCIL, *supra* note 17, at 36–38.

175. Cole, *supra* note 25, at 4.

176. GAY & KNOWLTON, *supra* note 41, at 4.

177. *Id.*

178. *Id.*

179. *Id.*

180. *Id.*

181. ENVTL. PROT. AGENCY, AGSTAR, RECOVERING VALUE FROM WASTE: ANAEROBIC DIGESTER SYSTEM BASICS 1 (2011).

182. *Id.*

CONCLUSION

America's modern animal agriculture is no longer the industry it was 50 years ago. It is more advanced, more confined, and more efficient than ever while continuing to provide the safest and most affordable source of quality protein for the world to enjoy. However, these advancements have not remained unnoticed by environmental groups, which have established a desire to end the preferential treatment under federal environmental regulations from which production agriculture benefits. While most of this regulation has dealt with water quality, *Waterkeeper Alliance v. EPA* demonstrates that courts will not provide an exemption for air emissions for animal agriculture unless Congress creates one. Livestock and poultry operations may argue that CERCLA and EPCRA were never intended to apply to the air coming off rural farms and that the reporting requirements from these operations are not useful in protecting the environment. However, this position is a precarious one, as the same argument was made unsuccessfully in applying the CAA to GHGs in *Massachusetts v. EPA*.¹⁸³ These arguments aside, production agriculture is at a crossroads. Regulations are only going to increase in the coming years. Agriculture can either choose to take a proactive approach to help find workable solutions to these difficult issues, or it can continue to believe it is above the law and watch idly from the sidelines as the courts and interest groups set these regulations for it.

183. *Massachusetts v. Env'tl. Prot. Agency*, 549 U.S. 497, 528–30 (2007).

CONSERVATION IN TEXAS: BRIDGING THE GAP BETWEEN PUBLIC GOOD AND PRIVATE LANDS USING LANDOWNER INCENTIVE PROGRAMS

*Hope C. Shelton **

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INTRODUCTION

In Texas, more than ninety-five percent of land is privately owned.¹ Eighty-three percent of the State's land is considered "working lands."² Working lands are farms, ranches, and forests that are privately owned.³ The amount of privately held land poses a challenge for conserving the State's natural resources in the interest of the public. The effects from conservation practices, or lack of, on private lands will be felt by the public.⁴ As one scholar states, "Any truly effective effort at protecting the environment on private lands will undoubtedly need to rely to a substantial extent on the individual actions of private landowners."⁵

Why would landowners be concerned with conservation on their own lands when the cost of conservation is high and the effects are not rewarding enough to outweigh the cost? This is where the government or private organizations like land trusts are tasked with stepping in and bringing conservation to private lands. There are many ways the government can achieve this, but this Article focuses on educating landowners about conservation and tipping the scales to balance the cost to the landowner. In Part I, the Article discusses the need for conservation; Part II discusses present and future conservation funding; Part III discusses the types of programs in place; and Part IV concludes by proposing improvements to the programs generally.

1. Tex. A&M Inst. of Renewable Nat. Res., *Status Update and Trends of Texas Rural Working Lands*, 1 TEX. LAND TRENDS 1, 3 (Oct. 2014).

2. *Id.* at 4.

3. *Id.* at 3.

4. *Id.*

5. Peter M. Morrisette, *Conservation Easement and the Public Good: Preserving the Environment on Private Lands*, 41 NAT. RESOURCES. J. 373, 379 (2001).

I. CONSERVATION IS A NECESSITY

More than 80% of Americans live in urban environments and spend an average of 11 hours a day on electronic devices.⁶ In recognizing this, President Obama established the America's Great Outdoors Initiative with one goal: "reconnect Americans, especially children, to America's rivers and waterways, landscapes of national significance, ranches, farms and forests"⁷ But why would the average American care about connecting to the natural environment, much less conserving it? Most people want clean air to breathe, clean water to drink, and a harmonious planet to live on. Therefore, the average American should be very concerned with conservation because the environment is a public good enjoyed by everyone. But what does that mean exactly? How can national parks charge an entry fee to enjoy a "public good"? How can a landowner exclude trespassers if the environment is a "public good"?

A. *What is a Public Good?*

A "public good" is an economic term for something that provides widespread, non-rival benefits to the public.⁸ There are two characteristics of a public good. First, the good can be used by many people without diminishing the quality of the good for other people. Second, it is impracticable to exclude non-payers from using the good⁹ or to charge for its benefit.¹⁰ Clean air is an example of a public good.¹¹ When your neighbor breathes air cleaned by the trees on your property, he is not taking clean air from you. It would be impractical to charge your neighbor for breathing clean air simply because you have trees on your land.

Public good should not be confused with public trust. With variance between states, the public trust doctrine is the idea that states hold land as a trustee for the public who are the beneficiaries.¹² An important public trust case, *Illinois Central Railroad Co. v. Illinois*, held that state lands beneath

6. BLUE RIBBON PANEL, THE FUTURE OF AMERICA'S FISH AND WILDLIFE FINAL REPORT AND RECOMMENDATIONS 3 (2016).

7. Presidential Memorandum: A 21st Century Strategy for America's Great Outdoors, 75 Fed. Reg. 20,767, 20,768 (April 16, 2010).

8. Alison Burrell, Evaluating Policies for Delivering Agri-environmental Public Goods, Keynote Address at the OECD Workshop on the Evaluation of Agri-environmental Policies 2 (June 20, 2011).

9. JAN G. LAITOS ET AL., NATURAL RESOURCES LAW 24 (West, 2d ed. 2012).

10. A. DAN TARLOCK ET AL., WATER RESOURCE MANAGEMENT 28 (7th ed. 2013).

11. Burrell, *supra* note 8, at 5.

12. Richard M. Frank, *The Public Trust Doctrine: Assessing Its Recent Past & Charting Its Future*, 45 U.C. DAVIS L. REV. 665, 667 (2012).

navigable waterways are for the benefit of the State's citizens to navigate, engage in commerce, and fish.¹³ This has been greatly expanded in some states to include water, dry sand beaches, wetlands, parks, and wildlife.¹⁴ For example, in 2012, a Texas District Court ruled that the public trust extends beyond public waterways and incorporates "all natural resources of the State including the air and atmosphere."¹⁵ In Texas, it appears the public trust and environmental public good overlap: the public trust includes things that are public goods, but public goods are not limited to public trust.

The services our rural environment provides are public goods.¹⁶ A healthy environment purifies the air we breathe and the water we drink, sustains the plants and animals that are directly or indirectly consumed, and supports a \$646 billion outdoor recreation economy.¹⁷ Worldwide, ecosystem services such as "clean air and water, food, fiber, medicine, storm protection, soil retention, carbon storage, pollination, recreation and other attributes" are valued minimally at \$18 trillion per year.¹⁸ Natural resource conservation should concern every American who appreciates clean air and water, pollinated plants, healthy animals, and a thriving economy.¹⁹ Unfortunately, conservation is not as simple as choosing energy efficient appliances or recycling.²⁰

B. Mismatched Scales in Conservation

To further complicate conservation, there is a problem of mismatched scales in environmental protection.²¹ Because the environment is a large organism that blends cause and effect, the producer of a negative effect may not actually feel the harm, and the producer of a positive effect may not

13. Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 435 (1892).

14. LAITOS, *supra* note 9, at 326.

15. Bonser-Lain v. Tex. Comm'n on Envtl. Quality, No. D-1-GN-11-002194, slip op. at 1 (Tex. Dis. Ct. Aug. 2, 2012).

16. Burrell, *supra* note 8, at 4–5.

17. THE FUTURE OF AMERICA'S FISH AND WILDLIFE FINAL REPORT AND RECOMMENDATIONS, *supra* note 6, at 3.

18. *Id.* at 5.

19. See generally S. Blair Hutchison, *Bringing Resource Conservation into the Main Stream of American Thought*, 9 NAT. RESOURCES J. 518, 518–19 (1969) (discussing that United States resource conservation practices, or lack thereof, lead to environmental problems that affect human health and wellbeing).

20. See generally Paul E. Hughes, *A Primer on Being Green*, 27 DEL. LAW. 10, 10–11 (2009) (demonstrating the intricacies of being green by highlighting some of the top return on investment upgrades and renovations).

21. Graeme S. Cumming et al., *Scale Mismatches in Social-Ecological Systems: Causes, Consequences, and Solutions*, 11 ECOLOGY & SOC'Y 1, 1 (2006).

actually feel the benefit.²² For example, in the Great Plains, giant potholes naturally fill with water and then drain, which benefits farmers, but negatively affects birds that migrate from Mexico to Canada.²³ Similarly, CO₂ emissions may not concern a coal-fired plant in Montana, but may cause extreme concern for someone in Miami, Florida, threatened by rising sea levels.²⁴

This idea of mismatched scales can be applied to a smaller, state level as well. The landowner who decides to clear-cut a forest on his land could negatively affect surrounding lands by: (1) reducing the air-purifiers (i.e., trees); (2) eliminating animal habitats which could push animals into neighboring lands; (3) destroying a natural wind break which could affect the lands in many ways; or (4) by taking the natural flood controls which could cause his neighbor's land to flood during heavy rains. Who will truly feel the effect of this clear-cut? Will it be the neighbor whose yard floods when it rains? Will the local community be invaded by forest animals searching for food and shelter? Will the State see a slight difference in air quality? Regardless of who is impacted, is the right to clear-cut land something the government should interfere with for the public's sake?

The idea of mismatched scales should be acknowledged to truly understand the need for incentive programs. Incentive programs, when designed correctly, should tip the scales in favor of the land owner for the public benefit. When the landowner has the option of clear-cutting his land for profit, the incentive programs should provide the landowner the knowledge of why his forested land is important for the environment and a monetary incentive to refrain from exercising his right to clear-cut.

C. Land Fragmentation and Biodiversity

Labelling natural resources as "common pool resources" implies that nature is a depletable and non-excludable resource.²⁵ Thus, recognizing that nature can be destroyed if left unmanaged is important to emphasize for the purposes of conservation.²⁶ There are major threats to the environment that must be combatted with the help of private landowners. Land

22. See generally JAMES SALZMAN & BARTON H. THOMSON, ENVIRONMENTAL LAW AND POLICY 25 (4th ed. 2014) (describing the potential effects of imposing the cost of environmental protection on the polluting party).

23. *Id.* at 25–26.

24. *Id.* at 25.

25. Jonathan D. Rosenbloom, *Defining Nature as a Common Pool Resource*, in ENVIRONMENTAL LAW AND CONTRASTING IDEAS OF NATURE: A CONSTRUCTIVE APPROACH 47 (Keith H. Hirokawa ed., 2014).

26. *Id.* at 57.

fragmentation—“the reduction in total landscape area and an apportionment of the remaining area into isolated pieces”—is what many conservation biologists call the most serious threat to biodiversity preservation.²⁷ Land fragmentation disrupts many wildlife species in their requirements for food, water, shelter, and space.²⁸ For example, white tail deer require a minimum of one square mile to survive a year.²⁹ Small, isolated areas of land typically have a single habitat type or lack diverse plant species, making such areas less capable of supporting diverse wildlife populations.³⁰

Another threat to the environment is the lack of biodiversity.³¹ “Biodiversity,” or “biological diversity,” is “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part”³² There are three levels to biodiversity—genetic diversity within species, diversity of species, and diversity of ecosystems—and each level is important for maintaining a healthy ecosystem.³³

Creating large ecosystem reserves is the best strategy to protect biodiversity,³⁴ but this is made difficult because of the “deep-rooted tension between the public and private sectors” in environmental protection.³⁵ When the private sector provides a conservation benefit a concern that “the public interest may not be adequately protected or that the action may not be in the public interest at all” arises.³⁶ This concern develops from the belief that private-sector actors are too self-interested to engage in environmental conservation because conservation is ultimately a public interest.³⁷ But, the solution to conservation may be the opposite of public action—that is, maybe the solution is private action. Private landowners may be in the best position to promote environmental protection because “both secure property rights

27. Morrisette, *supra* note 5, at 398.

28. Jim Dillard, *Before You Buy: Purchasing Small Acreages for Wildlife Habitat in the Cross Timbers and Prairies Region of North Texas*, TEX. PARKS & WILDLIFE, https://tpwd.texas.gov/publications/pwdpubs/media/pwd_lf_w7000_1150.pdf [<https://perma.cc/48SM-VHF2>] (last visited Feb. 23, 2018).

29. Matt Wagner, *Land Fragmentation in Texas: Meeting the Challenge*, TEX. PARKS & WILDLIFE, https://tpwd.texas.gov/publications/pwdpubs/media/pwd_lf_w7000_1155.pdf [<https://perma.cc/3QQW-NHGR>] (last visited Feb. 23, 2018).

30. Dillard, *supra* note 28, at 4.

31. Stephanie Stern, *Encouraging Conservation on Private Lands: A Behavioral Analysis of Financial Incentives*, 48 ARIZ. L. REV. 541, 542, 545 (2006).

32. Nelia J. Robbi, *The Modern Domestic Deer Hunter: Managing Wildlife or Wreaking Havoc on Biodiversity*, 37 ST. B. TEX. ENVTL. L.J. 150, 150 (2007).

33. *Id.*

34. Morrisette, *supra* note 5, at 398.

35. *Id.* at 377.

36. *Id.*

37. *Id.* at 377–78.

and effective environmental protection share a common goal—the enhancement of the total social well-being, both private and public.”³⁸

D. Recognizing a Common Goal

Congress and the executive branch are starting to recognize common goals between private landowners and the public good. President Obama’s America’s Great Outdoors Initiative created the Working Lands for Wildlife, a partnership between the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and United States Fish and Wildlife Service (USFWS). The Initiative provides technical guidance and financial assistance to multiple agencies to fight the decline of seven keystone wildlife species.³⁹ This partnership encourages landowners to use their land for conserving the habitat of these species while still using the lands for farming or ranching.⁴⁰ This partnership was said to be “a model for a more efficient, more effective, and more cooperative way to improve the health and diversity of working landscapes while strengthening local economies.”⁴¹

President Obama recognized the growing disconnect between the public and nature; through America’s Great Outdoors Initiative, he enacted several national holidays meant to encourage the public to step away from the screens and step outside.⁴² President Obama declared September 2016 Wilderness Month and invited “all Americans to visit and enjoy our wilderness areas, to learn about their vast history, and to aid in the protection of our precious national treasures.”⁴³ In addition to Wilderness Month, National Public Lands Day is held on September 24, 2016, and provides free access to all federally managed public lands and waters.⁴⁴ President Obama also created Every Kid in the Park, which gave fourth grade students and their families free admission to all National Parks and Federal lands for an entire year.⁴⁵

Once we recognize that conservation is both a public and private concern, the tools for implementing conservation become more accessible and

38. *Id.* at 377 n.15.

39. AMERICA’S GREAT OUTDOORS: 2012 PROGRESS REPORT 20 (2012), https://obamawhitehouse.archives.gov/sites/default/files/ago_2012_progress_report.pdf.

40. *Id.*

41. *Id.*

42. Presidential Memorandum: A 21st Century Strategy for America’s Great Outdoors, 75 Fed. Reg. 20,767 (April 16, 2010).

43. National Wilderness Month, 81 Fed. Reg. 61,979, 61,980 (Aug. 31, 2016).

44. National Public Lands Day, 81 Fed. Reg. 66,787 (Sept. 23, 2016).

45. Hannah Malvin, *Every Kid in a Park Program Extended; 4th Graders Get Free Park Admission*, WILDERNES.ORG (July 28, 2017), <https://wilderness.org/blog/every-kid-park-program-extended-4th-graders-get-free-park-admission> [<https://perma.cc/AMF7-M5KE>].

efficiently implemented. When this occurs, we will not need to rely on the government to strong arm private citizens into cooperation; and instead, we can work together to create lasting behavioral change—including places where the majority of land is privately held.

II. CONSERVATION FUNDING—PRESENT AND FUTURE

Once we recognize that conservation is critical to our nation's health, that landowners have a crucial role in conservation, and that the government has a duty to provide assistance to landowners because conservation provides a public good, we will realize the importance of government funding.⁴⁶ As our nation continues to develop and grow, our need for conservation is rising; however, the funding for conservation remains stagnant.⁴⁷ For example, there are only three major conservation funding avenues.⁴⁸

A. Pittman–Robertson Wildlife Restoration Act

Spurred by the decline in many wildlife species, Congress created the Federal Aid in Wildlife Restoration Act in 1937, also known as the Pittman–Robertson Act.⁴⁹ The Act places an excise tax on firearms and ammunition and gives it to state wildlife agencies for conservation.⁵⁰ There is an 11% tax set on the wholesale price of long-guns and ammunition and a 10% tax on the wholesale price for handguns.⁵¹ States use these funds to restore and manage habitat for game and non-game species, and to fund research projects

46. *Blue Ribbon Panel on Sustaining America's Diverse Fish & Wildlife Resources: Frequently Asked Questions*, ASS'N FISH & WILDLIFE AGENCIES, https://www.fishwildlife.org/application/files/7715/1382/2284/BRP-FAQ_expanded-updated_9-7-16.pdf [<https://perma.cc/3DH8-8KNN>] (last visited Feb. 22, 2018) [hereinafter *Blue Ribbon Panel*].

47. *See generally Securing Funds for Conservation*, NAT'L WILDLIFE FED'N, <https://www.nwf.org/Our-Work/Wildlife-Conservation/Policy/Funding> [<https://perma.cc/JNL5-JHR8>] (last visited Feb. 22, 2018) (discussing conservation agencies' budget cuts).

48. *See generally Pittman–Robertson Excise Tax Fast Facts*, NAT'L SHOOTING SPORTS FOUND., <https://www3.nssf.org/share/factsheets/PDF/PittmanRobertsonFacts.pdf> [<https://perma.cc/59XZ-NEMZ>] (last visited Feb. 22, 2018) (discussing the Pittman–Robertson Excise Tax); *see also Sport Fish Restoration (Dingell–Johnson Act)*, MISS. WILDLIFE, FISHERIES, & PARKS, <https://www.mdwfp.com/conservation/who-pays-for-it/dingell-johnson-act.aspx> [<https://perma.cc/H72H-FRLJ>] (last visited Feb. 22, 2018) (discussing the Dingell–Johnson Act); *About LWCER*, LAND WATER CONSERVATION FUND, <https://www.lwcfcoalition.com/about-lwcf/> [<https://perma.cc/9NR2-G7L7>] (last visited Feb. 22, 2018) (discussing the Land and Water Conservation Fund).

49. *Pittman–Robertson Excise Tax Fast Facts*, *supra* note 48.

50. *Id.*

51. M. LYNNE CORN & JANE G. GRAVELLE, CONG. RES. SERV., R42992, GUNS, EXCISE TAXES, AND WILDLIFE RESTORATION 1 (2013).

for habitat management practices.⁵² For example, in 2016, Texas received \$32,144,324 from the Wildlife Restoration Act.⁵³

B. Dingell–Johnson Sportfish Recreation Act

In 1950, the fishing industry mimicked the Pittman–Robertson Act with the Sport Fish Restoration Program, also known as the Dingell–Johnson Act.⁵⁴ The Act places an excise tax on “fishing tackle such as rods and reels, line, hooks and sinkers, all types of artificial lures, electric motors, import duties on boats, sailboats and yachts, and a motorboat fuel tax on gasoline.”⁵⁵ Under the Dingell–Johnson Act, the revenue gained from the excise tax matches state funding for sport fishing and boating related activities; usually a federal to state ratio of 75:25, with the state paying 25%.⁵⁶ State-funded activities include stocking fish in public ponds, fish hatcheries, youth fishing programs, boat ramps, piers, fish cleaning stations, and comfort stations on public waters.⁵⁷ Activities like these are self-improving; stocking public ponds and providing access to fishing will likely increase equipment purchases, and thus, excise tax revenue. That, in turn, increases the funds available for conservation activities. Again using Texas as an example, Texas received \$18,053,855 from the Sport Fish Restoration Program for the fiscal year 2016.⁵⁸

C. Land and Water Conservation Fund

In 1965, Congress created the Land and Water Conservation Fund (LWCF) to “safeguard natural areas, water resources, and our cultural heritage.”⁵⁹ Funding for the LWCF comes from royalties on oil and gas drilling on the Outer Continental Shelf.⁶⁰ Every year, \$900 million is put in the fund and LWCF receives about one-third of the money.⁶¹ The program is divided into two areas, federal and state.⁶² In the federal area, funding goes to protect

52. *Id.*

53. U.S. FISH & WILDLIFE SERVICES, 2016 FISCAL YEAR TOTAL (2016), <https://www.fws.gov/home/feature/2016/pdfs/PRDJ-TotalsFY2016.pdf> [<https://perma.cc/CMS4-WGNZ>] (last visited Feb. 22, 2018).

54. *Sport Fish Restoration (Dingell–Johnson Act)*, *supra* note 48.

55. *Id.*

56. *Id.*

57. *Id.*

58. U.S. FISH & WILDLIFE SERVICES, *supra* note 53.

59. THE LAND & WATER CONSERVATION FUND COALITION, *supra* note 48.

60. *Id.*

61. *Id.*

62. *Id.*

national parks, forests, wildlife refuges, and Bureau of Land Management (BLM) lands.⁶³ In the state area, funding goes towards an assistance program where the LWCF matches grants to help states and local communities.⁶⁴ The LWCF also funds the Forest Legacy Program, which assists states and private forest owners through grants for permanent conservation easements and fee acquisitions.⁶⁵

For the last 50 years, Texas has received a total of approximately \$570.8 million with the breakdown as follows: Federal programs \$334.3 million, State programs \$177.3 million, Forest Legacy Program \$7.9 million, and Habitat Conservation Grants \$51.3 million.⁶⁶ In 2017, the Fish and Wildlife Service requested funds for two projects: the Lower Rio Grande Valley National Wildlife Refuge and the Neches River National Wildlife Refuge.⁶⁷ The funds requested are \$2.5 million and \$1.6 million, respectively.⁶⁸

D. Future Funding Challenges & Possible Solutions

1. Cost of Protecting Endangered Species

The Endangered Species Act (ESA) is designed to protect species that have become threatened or endangered, despite the high cost.⁶⁹ If plants and animals could be protected before they become threatened, the “emergency room” cost of the ESA could be avoided.⁷⁰ In 2005, states created State Wildlife Action Plans, which identified 12,000 species that need conservation before they become listed.⁷¹ The goal is to reduce the overall cost by funding conservation projects to help preserve these plant and animal

63. *Id.*

64. *Id.*

65. THE LAND AND WATER CONSERVATION FUND, OUR LAND, OUR WATER, OUR HERITAGE AMERICA DEPENDS ON THE LAND AND WATER CONSERVATION FUND (2017), <https://static1.squarespace.com/static/58a60299ff7c508c3c05f2e1/t/59e762decf81e09f0caf5396/1508336350810/Forest+Legacy+Program+Factsheet+8.21.17.pdf> [<https://perma.cc/TTU6-5KJX>].

66. THE LAND AND WATER CONSERVATION FUND, OUR LAND, OUR WATER, OUR HERITAGE: LCWF IN TEXAS (2017), <https://static1.squarespace.com/static/58a60299ff7c508c3c05f2e1/t/59973847be65944314b6ea93/1503082567592/Texas+fact+sheet+8.16.17.pdf> [<https://perma.cc/TS96-MNEB>].

67. *Id.*

68. *Id.*

69. See generally John R. Platt, *How Much Did the U.S. Spend on the Endangered Species Act in 2012?*, SCIENTIFIC AMERICAN BLOG (Nov. 1, 2013), <https://blogs.scientificamerican.com/extinction-countdown/how-much-did-the-us-spend-on-the-endangered-species-act-in-2012/> [<https://perma.cc/3MKB-48AE>] (explaining that the state and federal cost of the ESA has increased from \$1.45 billion to \$1.7 billion in 2012).

70. See ROCKY BARKER, SAVING ALL THE PARTS 229 (1993) (explaining that the FWS at the University of Idaho spent millions of dollars to protect listed wild condors).

71. BLUE RIBBON PANEL, *supra* note 6, at 6.

species before they become listed as threatened, which increases the cost to preserve through drastic measures such as moratoriums.⁷²

Nearly 1,600 species of plants and animals are listed as threatened or endangered.⁷³ “Approximately half of all the threatened or endangered species reside entirely on private lands and three-fourths use private lands for habitat, food, or breeding [sic] grounds.”⁷⁴ Businesses are impacted through project delays and by complying with endangered species regulations.⁷⁵ Taxpayers pay hundreds of millions of dollars each year to restore threatened and endangered species.⁷⁶ Through the Wildlife Action Plans, states have recognized the cost of waiting until a species becomes listed, but without more funding and cooperation with landowners, businesses and taxpayers will continue to pay for the restoration of these species.⁷⁷

2. Broadening LWCF to Fund State-Private Partnerships

Although the LWCF is urging Congress for more of the \$900 million in the fund, the money allotted for conservation is going to government programs and lands.⁷⁸ While there are still many government-owned lands that need funding, as demonstrated by the 2017 funding requests, there are many more private lands that need conservation practices instilled.⁷⁹ To meet this need, the LWCF could provide funds to state agencies for partnerships with private landowners. This type of resource protection in larger ecosystems or watersheds is important.⁸⁰ The Bush administration pushed for something similar in which federal land managers partnered with private

72. U.S. GEOLOGICAL SURVEY, *A National Look at Species of Greatest Conservation Need As Reported in State Wildlife Action Plans*, CORE SCIENCE, ANALYTICS, SYNTHESIS, AND LIBRARIES – STATE WILDLIFE ACTION PLANS (SWAP) (last modified Feb. 8, 2018), <https://www1.usgs.gov/csas/swap/> [<https://perma.cc/69CD-2HLU>]; see Kenneth Jost, *Protecting Endangered Species: Does Law Work? Is It too Costly?*, 6 CQ RESEARCHER 337, 337-60 (1996), <http://library.cqpress.com/cqresearcher/document.php?id=cqresrre1996041900> [<https://perma.cc/S3Z3-UB3T>] (explaining that increased costs could lead to a moratorium as seen during the Clinton administration).

73. BLUE RIBBON PANEL, *supra* note 6, at 6.

74. Nathan Paulich, *Increasing Private Conservation Through Incentive Mechanisms*, 3 STAN. J. ANIMAL L. & POL’Y 106, 124 (2010).

75. BLUE RIBBON PANEL, *supra* note 6, at 6.

76. *Id.*

77. *Id.*

78. Josie, *Businesses Urge Congress to Take Action*, THE CONSERVATION ALLIANCE (Sept. 3, 2014), <http://www.conservationalliance.com/businesses-urge-congress-to-take-action/> [<https://perma.cc/9TMD-XFNR>].

79. U.S. DEP’T OF AGRIC. & U.S. DEP’T OF THE INTERIOR, THE LAND AND WATER CONSERVATION FUND: 2017 BUDGET REQUEST, https://www.doi.gov/sites/doi.gov/files/uploads/LWCF_2017_BudgetInBrief_FINAL.pdf [<https://perma.cc/AU7A-66DM>] (last visited Feb. 8, 2018).

80. *Id.*

landowners to protect natural resources.⁸¹ However, the groups that traditionally receive funds expressed concern about these partnerships, in fear they might receive less funds for acquiring federal land or for the state grant programs.⁸²

3. HR.5650 to Amend the Pittman-Robertson Act

States have already recognized species living within their borders that are in need of conserving and identified the steps needed to conserve those species in the long term.⁸³ However, the states lack funding.⁸⁴ Under the Wildlife and Sportfish Restoration Program, Congress created the permanently authorized but unfunded Wildlife Conservation Restoration Program.⁸⁵ States created Wildlife Action Plans to guide conservation of fish, wildlife, and their habitat as a requirement under the program.⁸⁶ The Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources (Blue Ribbon Panel) is proposing a bill to refund this program and help conserve the nation's fish and wildlife.⁸⁷ The Blue Ribbon Panel recommends taking 10% of existing federal royalties from energy and mineral development that are currently being used for general government services and reallocate the money into the current unfunded restoration program.⁸⁸ This would bring \$1.3 billion⁸⁹ to conservation without charging the American people with a new tax.⁹⁰ As already implemented, states would have to match at least 25% of the federal funds with monetary or in-kind contributions.⁹¹

81. *Environment: Protecting Our Nation's Environment*, THE WHITE HOUSE, <https://georgewbush-whitehouse.archives.gov/infocus/environment/> [<https://perma.cc/YL9V-F2XD>] (last visited Mar. 2, 2018).

82. Carol Vincent, *Land and Water Conservation Fund: Overview, Funding History, and Current Issues*, CONG. RES. SERV. 1, 8–12 (Oct. 21, 2014).

83. *Blue Ribbon Panel*, *supra* note 46.

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.*

88. *Id.*

89. *Id.* (“A national survey determined that each state needs an average of \$26 million in new funding annually (\$1.3 billion collectively) to effectively implement State Wildlife Action Plans to prevent species from becoming threatened or endangered.”).

90. *Blue Ribbon Panel*, *supra* note 46.

91. *Id.*

III. A CRITICAL ANALYSIS OF PROGRAMS IN PLACE ON PRIVATE LANDS

The federal, state, and local government could implement regulations, but the regulatory approach is not the most favorable approach for three reasons. First, based on the amount of private land ownership, there are inadequate resources for enforcement.⁹² Second, regulations tend to create a negative stigma surrounding conservation and environmentally friendly actions.⁹³ Finally, regulations create a financial incentive to avoid the restriction imposed by the regulation.⁹⁴ For example, the ESA is often criticized for incentivizing the elimination of any endangered species or its habitat to avoid compliance with the burdensome regulations.⁹⁵ However, “effective long-term environmental protection on private lands will depend on the private actions of individual landowners as well as government regulation.”⁹⁶ Therefore, this could place a burden of conservation on a private landowner so that the public may enjoy a healthy ecosystem and its services.

Instead of using regulations, agencies can use incentive programs. Incentive programs are a way to help increase conservation and public benefit without infringing on a landowner’s right to voluntarily do as he or she wishes on their land.⁹⁷ Additionally, incentives motivate landowners to volunteer information about the ecological value of their land, which helps the state in the effort to culminate data.⁹⁸

Incentives can “take the form of tax deductions and credits, full or partial payment for conservation projects, low-interest loans, or tradable credits.”⁹⁹ Incentives can also come in the form of free expert knowledge or an increased authority to state chattel, such as the Managed Land Deer Permit program.¹⁰⁰ This Program gives additional bag limits to landowners who voluntarily engage in the program.¹⁰¹

92. Stern, *supra* note 31, at 547.

93. *Id.* at 548.

94. *Id.* at 547.

95. *The Endangered Species Act and Incentives for Private Landowners: Hearing on S HRG 109-914 Before the H. Comm. Fisheries, Wildlife, and Water*, 109th Cong. (2005).

96. Morrisette, *supra* note 5, at 378.

97. LAND TR. ALL., USING THE CONSERVATION TAX INCENTIVE 1 (2016).

98. Stern, *supra* note 31, at 543.

99. *Id.* at 542.

100. See Stern, *supra* note 31, at, 543, 562 (explaining that education, though not as effective as financial incentives, are still offered by federal agencies as an incentive); see Macy Ledbetter, *The Managed Lands Deer Permit Program Explained*, HILL COUNTRY PASSPORT (Jan. 30, 2015, 11:15PM), <http://www.hillcountrypassport.com/article/12299/> [<https://perma.cc/R3WX-EGSF>] (discussing that the Managed Land Deer Permit program is an incentive based program).

101. TEX. PARKS AND WILDLIFE, MANAGED LANDS DEER PROGRAM INFORMATION 2017-2018 1, 5 (2017).

Conservation programs can educate the landowner on what their land can offer the community. This gives a sense of authority to the landowners.¹⁰² The programs within these agencies may show the landowners that their land is part of a larger landscape.¹⁰³ In doing so, it helps them realize they have an obligation “to both the natural and human community to protect the functions performed by their land as part of that landscape.”¹⁰⁴

But, environmentally-friendly behaviors are costly in terms of time, convenience, information-gathering, and project investment.¹⁰⁵ Additionally, if these environmentally-friendly actions are not exposed publicly for social affirmation or if the community is not pro-environment, then monetary incentives can help balance the cost-benefit to encourage environmentally beneficial behavior.¹⁰⁶ Participants in incentive programs tend to show a rapid behavioral change, but participation is typically low and even when participation is voluntary, those who actually perform the behavior can be low.¹⁰⁷ This could be due to lack of publicity about the programs or that the incentives may be too low to motivate participation.¹⁰⁸

This Article categorizes types of programs available and discusses how these programs function and the criticisms of each. While there are more programs available, this Article focuses on conservation easements, term easements, tax incentives, and cost share programs.

A. Conservation Easements

An easement is generally an agreement between two landowners where one landowner agrees to do or not do something on the property that would otherwise be legal to do for the benefit of the other landowner’s property.¹⁰⁹ Easements can be either in gross or appurtenant.¹¹⁰ An easement in gross is connected to the benefited party and gives the property right to whoever owns the benefited land.¹¹¹ An easement appurtenant is connected to the land and

102. Stern, *supra* note 31, at 543.

103. See *id.* (discussing that the landowners land can benefit the public and restore habitat for rare species).

104. Nancy A. McLaughlin, *The Role of Land Trusts in Biodiversity Conservation on Private Lands*, 38 IDAHO L. REV. 453, 467 (2002).

105. Stern, *supra* note 31, at 559.

106. *Id.*

107. *Id.* at 559–60.

108. *Id.* at 560.

109. JESSE DUKEMINIER ET AL., PROPERTY 813 (Wolters Kluwer L. & Bus., 8th ed. 2014).

110. *Id.*

111. *Id.*

gives the property right to whoever owns the benefited land, but it will continue to benefit the land regardless of who is the owner.¹¹²

Conservation easements are a type of conservation program that uses monetary incentives to encourage participation.¹¹³ Conservation easements are voluntary, “privately initiated land-use restrictions designed to protect and preserve private lands from development.”¹¹⁴ They are commonly used “to protect open space, preserve wildlife habitat and other sensitive ecological lands, and to prevent development of agricultural lands.”¹¹⁵ Conservation easements appear like negative appurtenant easements, where a landowner agrees not to do something on the land and the benefit stays with the land regardless of who owns the land.¹¹⁶ Unlike a normal negative easement, there is not a benefited parcel of land.¹¹⁷ Because of this important difference, in most states, conservation easements are granted by statute.¹¹⁸ In Texas, Section 183.002 creates conservation easements that are treated like regular easements and unlimited in duration unless written otherwise.¹¹⁹

To create a conservation easement, a landowner donates or sells an interest in their land to an agency or nonprofit, and the interest in the land imposes a duty on the landowner and successors.¹²⁰ The owner continues to have title of the land and can continue using the land, subject to the restrictions imposed by the easement.¹²¹ When the property is transferred by the owner, the easement typically remains with the property.¹²² Conservation easements are generally perpetual and run with the land unless stated otherwise, but there are ways of terminating the easement through common law methods such as the doctrine of changed conditions.¹²³

Conservation easement popularity has grown, but compliance with conservation easements pose a problem because the lack of easement monitoring and funds for legal enforcement.¹²⁴ Essentially, monitoring is the

112. *Id.*

113. *Id.* at 889.

114. Morrisette, *supra* note 5, at 379.

115. *Id.*

116. *Id.*

117. *Id.* at 381.

118. LAURIE A. RISTINO & JESSICA E. JAY, A CHANGING LANDSCAPE: THE CONSERVATION EASEMENT READER 5-6 (Environmental Law Institute ed., 2016).

119. Tex. Nat. Res. Code § 183.002 (1983).

120. Stern, *supra* note 31, at 554–55.

121. Morrisette, *supra* note 5, at 379.

122. *Id.*

123. *Id.* at 379, 392. (“The doctrine of changed doctrines stands for the proposition that a court may terminate a real covenant or equitable servitude if conditions have changed to the degree that the restriction no longer makes sense or it creates an undue hardship on the servient estate.”)

124. Stern, *supra* note 31, at 556–57.

key to enforcing conservation easements, but monitoring is both costly and time consuming.¹²⁵ Additionally, subsequent owners of the property may not have the same environmental concerns as the original landowner, which could cause for more compliance problems.¹²⁶ While easement monitoring may be cause for concern, legal enforcement is becoming more possible with the development of TerraFirma, a land trust insurance designed to defend conservation on lands in fee simple or with conservation easements.¹²⁷ TerraFirma is available for all land trusts who are members of the Land Trust Alliance, a trade organization for land trusts.¹²⁸

Some critics argue that in addition to enforcement challenges, conservation easements are not well suited for preserving the biological diversity in core areas.¹²⁹ “The proper level of biodiversity in core areas often can be achieved only if the landowner agrees to refrain from most or all uses of the land or to actively manage the land for biodiversity protection purposes.”¹³⁰ However, if the conservation easement is in the “buffer zone” around the core area and the landowner’s rights are compatible with the biodiversity plan, the easement could be proper.¹³¹ Critics also argue that regardless of where the easement is situated, the perpetual nature of conservation easements make them ill-suited for environmental conservation based on the ever-changing need.¹³² Proponents of conservation easements would argue that a well-written easement would be broad enough to adapt to the ecosystem’s changing needs.¹³³ Notwithstanding the perpetual environmental morphing, a never changing threat to land in Texas is development, and to protect lands from future development, conservation easements must be in perpetuity.¹³⁴

The Texas Parks and Wildlife Department has an agency-run agricultural conservation easement program, the Texas Farm and Ranch Lands

125. Julia LeMense Huff, *Protecting Ecosystems Using Conservation Tax Incentives: How Much Bang Do We Get for Our Buck*, 11 MO. ENVTL. L. & POL’Y REV. 138, 157 (2004).

126. Stern, *supra* note 31, at 571.

127. See TERRAFIRMA RISK RETENTION GROUP, <http://terrafirma.org/about> [https://perma.cc/EN7D-BAAP] (last visited Feb. 16, 2018) (stating, “[TerraFirma] is available for all Land Trust Alliance member land trusts with conservation easements or fee lands held for conservation.”)

128. *Id.*

129. McLaughlin, *supra* note 104, at 460–69.

130. *Id.* at 460.

131. *Id.* at 460–61.

132. Jessica Owley, *Changing Property in a Changing World: A Call for the End of Perpetual Conservation Easements*, 30 STAN. ENVTL. L.J. 121, 122–23 (2011).

133. Rissman, *Evaluating Conservation Effectiveness and Adaptation in Dynamic Landscapes*, 74 LAW & CONTEMP. PROBS. 145, 145–46 (2011).

134. *Protect Your Land*, TEX. LAND CONSERVANCY, <http://texaslandconservancy.org/protect-your-land/> [https://perma.cc/G5EL-82RE] (last visited Feb. 23, 2018).

Conservation Program, which aims to protect working lands from fragmentation and development.¹³⁵ The program assists donation and purchase of agriculture easements by providing grants to landowners donating easements.¹³⁶ The easements must be for conserving one or more of the following: water quality/quantity, native wildlife habitat, rare or sensitive plants, large tracts of land threatened by fragmentation or development.¹³⁷ Priority can be given to lands susceptible to fragmentation.¹³⁸ A scoring process determines who qualifies for the funding by assessing several criteria including landscape and watershed, species habitat, proximity to other protected lands, resource management plan, additional potential funding, and the term of the easement which can be perpetual or for 30 years.¹³⁹ Although this program is 11 years old, the first funding it received was in 2014 for \$2 million in which it matched and used to create \$13 million worth of conservation effort.¹⁴⁰

Conservation easements should not block future landowners from managing the land in an ecologically friendly manner simply because it was not thought of when the easement was created. The goal of the conservation easement should be to ensure that future landowners conserve the land in the most ecological and practical way possible, which may include conservation strategies that would not be possible in specific, unyielding easements. One way of ensuring the conservation easement is easier to enforce and does not become outdated compared to the need is to carefully draft the easement in a broad manner. Additionally, organizations could draft easements with language that is flexible to allow for adaptive management techniques.¹⁴¹ For example, easements could allow for ecological monitoring while easement holders could provide technical guidance.¹⁴²

1. Term Easements and Conservation Leases

Term easements and conservation leases are generally the same concept; they grant an interest in land to an agency or nonprofit for a specified time

135. Texas Farm & Ranch Lands Conservation Programs, TEXAS PARKS AND WILDLIFE, <http://tpwd.texas.gov/landwater/land/private/farm-and-ranch/> [<https://perma.cc/73A6-XYUS>] (last visited Feb. 16, 2018).

136. 2015 Tex. HB 1925, § 84.001 (2015).

137. *Id.* § 84.002(1)(A)–(D).

138. *Id.* § 84.010(1).

139. *Id.* § 84.010(2)(A)–(E).

140. TEX. A&M INST. OF RENEWABLE NAT. RES., TEXAS FARM AND RANCH LANDS CONSERVATION PROGRAM: EVALUATION REPORT 2 (Dec. 19, 2016).

141. Dianne A. Stroman & Urs P. Kreuter, *Factors Influencing Land Management Practices on Conservation Easement Protected Landscapes*, 1, 13 (2015).

142. *Id.* at 12.

period.¹⁴³ The two differ in how the landowner receives their incentive payment.¹⁴⁴ Term easements pay landowners a lump-sum directly, while conservation leases pay landowners annually.¹⁴⁵ Most term easement programs are government-sponsored and target agricultural, timber, and ranching land.¹⁴⁶

While the agriculture easement through the Texas Farm and Ranch Lands Conservation Program requires an easement to have a term of either 30 years or in perpetuity,¹⁴⁷ a general conservation easement may be for any term agreed upon by the parties.¹⁴⁸ But, if the conservation easement is terminated, the taxes saved during the time the easement was in effect must be paid back with an interest of 7% annually.¹⁴⁹

The ultimate goal of conservation is to benefit the public as a whole, instead of benefitting the taxpayer.¹⁵⁰ Thus, there may be a downside to short term easements and leases. With the uncertainty of short-term leases, other taxpayers may “subsidize the carrying costs of land under the guise of conservation” and see their investment in conservation end when the landowner sells or changes the use in the land.¹⁵¹ However, this argument fails to consider that landowners who voluntarily enter into these leases may be sincere in their effort to conserve. Additionally, it does not consider that incentives are a way to balance the cost to the landowner for this public good, not to simply pay the full sum.

Supporters argue there are many positives to abandoning the in-perpetuity conservation easement for renewable term easements.¹⁵² “Their economic, societal, and conservation value can be more readily assessed and considered when making land-use decisions.”¹⁵³ These renewable easements more closely align with adaptive management goals, and the requisite re-visitation allows for a reexamination of the conservation value of the easement.¹⁵⁴ In theory, by using short-term easements, the need of the ecosystem will continually match the use of the easement, rather than the in-perpetuity easement that is no longer optimally providing for the ecosystem. But, if a non-profit land trust devotes the time and resources to negotiating

143. Stern, *supra* note 31, at 553–54.

144. *Id.*

145. *Id.*

146. *Id.* at 553.

147. 2015 Tex. HB 1925, § 84.004(a) (2015).

148. Tex. Nat. Res. Code § 183.002(c)–(d) (1983).

149. *Id.* § 183.002(f).

150. Huff, *supra* note 125, at 153.

151. *Id.* at 154.

152. Owley, *supra* note 132, at 123.

153. *Id.*

154. *Id.*

an easement, the land trust is more likely to want a guarantee in a long-term easement rather than a short-term easement that could expire in several years and then become developed land.

B. Tax Incentives

Tax reductions provide the incentive for donating or selling a conservation easement.¹⁵⁵ Tax incentives are beneficial because there is a tax system already in place and taxing authorities can evaluate land and enforce the behavior.¹⁵⁶ Tax incentives can be offered at all levels—federal, state, and local.¹⁵⁷ Tax incentives can take the form of deductions from federal or state income taxes; credits against state or federal income tax liability; estate tax exclusion; and additional tax benefits that state and local governments give.¹⁵⁸ Based on the strict nature of tax incentives, this Article will not discuss in detail the different tax options but will give a short overview of the opportunities available for deduction.

If a landowner chooses to donate a conservation easement, the landowner may be eligible for a federal income tax reduction, if the donation is to a qualifying charitable organization.¹⁵⁹ The Internal Revenue Code (IRC) restricts deductions for contributions that are less than fee simple and not transferred by a trust.¹⁶⁰ But, the IRC has an exception if the contribution is a “qualified conservation contribution.”¹⁶¹ If a landowner sells the interest of land to a charitable organization at a discount rate less than fair market value, the land can also be eligible for the tax deduction; the landowner can claim the difference between the fair market value and the discount price as a charitable donation.¹⁶² Another incentive for landowners who wish to benefit from a conservation easement is the exclusion of up to \$500,000 from the gross estate tax for the land that has the conservation easement.¹⁶³

In addition to income tax incentives, there are many property tax incentives such as preferential assessment programs, deferred taxation programs, and restrictive agreement programs.¹⁶⁴ Preferential assessment

155. *Estate Tax Incentives for Land Conservation*, LAND TRUST ALLIANCE, <https://www.landtrustalliance.org/topics/taxes/estate-tax-incentives-land-conservation> [https://perma.cc/VGX9-CSCP] (last visited Feb. 5, 2018).

156. Huff, *supra* note 125, at 153.

157. *Id.* at 139.

158. *Id.*

159. *Id.* at 140.

160. *Id.*

161. Huff, *supra* note 125, at 140.

162. *Id.* at 141.

163. *Id.*

164. *Id.* at 142.

programs assess land based on the land's current use, if the land use is a qualifying purpose as determined by the taxing authority.¹⁶⁵ If the landowner continues to use the land for the qualifying purpose, the landowner receives a reduced property tax rate.¹⁶⁶ But, if the landowner changes the use of the land to something that is not qualified, the decreased tax rate disappears.¹⁶⁷ But note, the landowner is not penalized.¹⁶⁸ Similar to the preferential assessment program, a deferred taxation program gives a landowner a reduced property tax while the land is being used in a qualifying way.¹⁶⁹ However, unlike the preferential assessment program, when the landowner chooses to use the land for a use that is not qualified, the landowner is penalized.¹⁷⁰ The tax deduction is removed and the landowner must repay a portion of the taxes saved through the program.¹⁷¹ In a restrictive agreement program, a landowner enters into an agreement to continually use the land in a certain way for a prescribed term of years.¹⁷² The duration and terms of the agreement are known upfront, which provides stability for the taxing authority.¹⁷³

The downside of tax incentives derives from the relationship between the landowner and the conservation.¹⁷⁴ Incentives should be designed to encourage conservation behavior that will continue long after the incentive has expired. Looking at the culture around taxes and tax breaks, landowners may feel as if they are entitled to this tax deduction, not that it is justified by an action.¹⁷⁵ Additionally, tax deductions can be less personal compared to a conservation easement or cost-share project, which directly connects the landowner and the conservation action.¹⁷⁶ And finally, the landowner could become reliant on the tax incentives, which can deteriorate the reason behind the incentive—conservation.

165. *Id.*

166. *Id.*

167. Huff, *supra* note 125, at 142.

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. *Id.*

173. Huff, *supra* note 125, at 143.

174. *See id.* at 154–55 (discussing the negative implications of tax incentives as opposed to conservation easements).

175. *Id.*

176. *Id.*

C. Cost-Share Projects

Cost-share projects are a category of incentives that give landowners compensation for conservation action or inaction.¹⁷⁷ For example, an action that may receive compensation is restoring or maintaining a habitat, an inaction that may receive compensation is refraining from grazing cattle or refraining from harvesting timber.¹⁷⁸ This is a direct move by the government to tip the scales to equalize the cost to the landowner and the benefit to the public.¹⁷⁹ Cost-share projects are the obvious example of incentive programs because the relationship between the landowner, conservation, and the incentives is clear and deliberate.

Currently, there are two cost-share projects in effect through the Texas Parks and Wildlife Department (TPWD).¹⁸⁰ The Partners Watershed Funding Series has a goal to “establish, restore, and/or enhance habitat for state and federal trust fish, wildlife and plant species on privately owned lands.”¹⁸¹ Although everyone is encouraged to apply, the TPWD assesses the application using a variety of factors and a three level priority list with the ESA species and habitat carrying first priority.¹⁸² The second TPWD project is Conserving Texas Rivers Funding Series, and it has a goal to “restore riparian zones, restore aquatic habitats, improve water quality, increase water quantity, reduce erosion, and remove non-native species.”¹⁸³ This funding project is limited to three riparian zones—Llano River Watershed, Pedernales River Watershed, Blanco River Watershed—but also includes the uplands of these riparian zones.¹⁸⁴ Both TPWD projects are funded by a grant that is supported by multiple partners including the U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program and the National Fish and Wildlife Foundation.¹⁸⁵

A non-governmental cost-share project in effect is the Windbreak Planting Assistance that is offered by Texas A&M Forest Service (TFS) and West Texas Nursery (WTN) for landowners in the High Plains region who

177. Stern, *supra* note 31, at 552.

178. *Id.*

179. *Id.* at 550.

180. *Landowner Incentive Program*, TEX. PARKS & WILDLIFE, https://tpwd.texas.gov/landwater/land/private/lip/#Statewide_LIP_Funding_Series [https://perma.cc/G52Z-LLAS] (last visited Feb. 9, 2018).

181. *Id.*

182. *Id.*

183. *Id.*

184. *Id.*

185. *Id.*

operate 160 acres or more of land.¹⁸⁶ Windbreaks reduce or redirect wind, which can reduce soil erosion, protect buildings/equipment, and create habitat for wildlife.¹⁸⁷ Landowners who will comply with the TFS guidelines may receive assistance in the planting of multiple row windbreaks by using the WTN's tree planter and fabric layer.¹⁸⁸ However, landowners must purchase the seedlings.¹⁸⁹

A statutorily-created cost-share program for the Water Supply Enhancement Plan creates contracts with landowners to provide less than 70% of the cost for brush control.¹⁹⁰ By controlling the amount of brush, like mesquite and cedar trees on land, water supplies in neighboring areas are positively impacted because brush has a higher evapotranspiration rate than grasses.¹⁹¹ There are several factors considered to determine which lands qualify for the program, including location and acreage of the land, method of control, plans for revegetation, and financial ability of the landowner.¹⁹² While the cost-share does not fully fund the project, the amount given ideally provides landowners with enough money to balance the cost of the project against the benefit that is not normally felt directly by the landowner.¹⁹³ The positive effect of water enhancement is generally felt off the landowner's property, but landowners can benefit from the added grassland, while the state shoulders a lot of the financial burden.¹⁹⁴

186. *Manage Forests & Land*, TEX. A&M FOREST SERV., <http://texasforestservice.tamu.edu/windbreaks/> [https://perma.cc/P8Q6-WW2Z] (last visited Feb. 5, 2018).

187. *Id.*

188. *Id.*

189. *Id.* Type of windbreaks: *Homestead/Farmstead Windbreaks* enhance the aesthetics and increase the heating and cooling efficiency of homes

Livestock Windbreaks protect cattle in severe weather conditions by reducing the amount of energy cattle utilize to keep warm, thus increasing weight gains and decreasing the producer's feed costs

Field Windbreaks protect crops and soil from wind erosion and moisture loss

Dry Corner Windbreaks establish wildlife habitat, increase watering efficiency of adjacent center pivot irrigation systems, protect grazing livestock

Living Snow Fence Windbreaks keep snow from drifting onto farm roads and highways, protect grazing livestock and establish wildlife habitat

Wildlife Windbreaks create permanent vegetation with tree and shrub species which will provide food and cover for wildlife

190. TEX. AGRIC. CODE § 203.154(a).

191. TEX. STATE SOIL AND WATER CONSERVATION BD., WATER SUPPLY ENHANCEMENT PROGRAM: 2017 ANNUAL REPORT 1 (2017).

192. *Id.* § 203.157.

193. *See generally id.* § 203.154(a) (explaining that only 70% of the total cost is covered, leaving the remaining cost to the landowner).

194. KYLE THIGPEN ET AL., NATIVE GRASSLAND RESTORATION IN THE MIDDLE TRINITY RIVER BASIN 2 (July 2012); *see* TEX. STATE SOIL AND WATER CONSERVATION BD., WATER SUPPLY ENHANCEMENT PROGRAM: 2017 ANNUAL REPORT, *supra* note 195 at 1 (explaining that there is a budget of \$2.4 million for the 2018 fiscal year).

Cost-share projects can be a good tool for implementing a specific conservation practice in an isolated region. Cost-share projects are not financially appropriate for widespread, general conservation practices.¹⁹⁵ Because cost-share projects can subsidize a significant amount of the cost of the action, the projects must have a qualification system in place to ensure maximum return on investment.¹⁹⁶ However, this necessary set-up could deter landowners who would like to engage in a conservation project but do not meet the requirements of the program because their land is not situated in an area that would produce the most favorable results. Additionally, landowners could take advantage of the funding if the program is not designed with appropriate project completion requirements and safeguards for continued conservation.

D. Technical Guidance

Landowners have an interest in managing their property in an environmentally friendly way, but many may not know how or where to begin. This is where free technical assistance can improve a piece of the ecosystem that does not qualify for a cost-share project and may not receive any improvement otherwise.

The Texas Parks and Wildlife Department has a program dedicated to providing landowners with advice about conservation and habitat development.¹⁹⁷ The Private Lands and Habitat Program is extensive; at the landowner's request, a wildlife biologist inspects the property with the landowner and develops a management plan for the property.¹⁹⁸ The plan includes the landowner's objective, the land use history, and a description and appraisal of the habitat with specific recommendations for habitat conservation and wildlife management.¹⁹⁹ The wildlife biologist will continue to assess the progress of the land and the program, adjusting as necessary.²⁰⁰ This free service is a way for landowners to become well informed of their property; the ecosystem it belongs to; and how to manage it for the benefit of the landowner, the land itself, and the surrounding ecosystem.

195. Stern, *supra* note 31, at 579–80.

196. *Id.* at 580.

197. *Private Lands & Habitat Program*, TEXAS PARKS & WILDLIFE, <https://tpwd.texas.gov/landwater/land/private/description/> [<https://perma.cc/4PAQ-H39N>] (last visited Feb. 16, 2018).

198. *Id.*

199. *Id.*

200. *Id.*

Another example of a program using technical guidance as an incentive is the Recovery Credit System by Texas A&M's Institute of Renewable Natural Resources (RCS).²⁰¹ The RCS is a voluntary program where landowners with qualifying land receive technical guidance and assistance to support habitat for animal or plant species.²⁰² In return, the landowners receive purchasable recovery credits that can be sold to public, private, or government entities.²⁰³ This program has been used to protect the habitat of the Golden Cheeked Warblers and has resulted in eleven landowner contracts with a total of 7,158 acres protected.²⁰⁴

For technical guidance incentives to be effective, the burden is on the landowner to seek out guidance and follow the instructions.²⁰⁵ While these organizations providing the assistance also have outreach programs, the burden is still on the landowner to seek out the outreach event and contact the organization.²⁰⁶ The cost to the organization, while less than a cost-share project, can still be high because the organization has to pay for the time of qualified individuals to assess and develop unique action plans.²⁰⁷ However, because the landowner must reach out to the organization, the landowner is more likely to follow through with any technical guidance because the commitment to conservation is already present.

IV. SUGGESTIONS FOR IMPROVING CONSERVATION PROGRAMS

Because of the funding challenges discussed in Part III, there is an increasing need to become creative in conservation. Partnering with the State's landowners could be this creative solution. There are four general regulatory responses available to the government to impose conservation on private lands in Texas.²⁰⁸ First available, prescriptive regulations, which usually take the form of standards or total bans.²⁰⁹ To achieve conservation on lands not belonging to the government, the government will need to create an amicable relationship with landowners. Generally, prescriptive

201. *Recovery Credit System*, TEX. A&M INST. RENEWABLE NAT. RESOURCES, <http://rcs.tamu.edu/> [<https://perma.cc/YL55-U9WH>] (last visited Feb. 16, 2018).

202. *Id.*

203. *Id.*

204. *Id.*

205. *Id.*

206. *See generally* SHELLEY ROBERTSON, ED.D. & H. BRUCE RINKER, PH.D., THIRD PARTY EVALUATION OF THE RECOVERY CREDIT SYSTEM PROOF OF CONCEPT 44 (2010) (discussing that some participants wished to have more access to outreach days for general information concerning the program).

207. *See generally* *Recovery Credit System*, *supra* note 201.

208. LAITOS, *supra* note 9, at 33–36. *See generally* Stern, *supra* note 31, at 545 (discussing payments and subsidies).

209. LAITOS, *supra* note 9, at 33.

regulations will be viewed against landowner rights and will widen the separation between landowners and environmentally friendly actions—potentially resulting in a taking.²¹⁰ The second available regulatory response, penalties, carry an increased negative stigma.²¹¹ Penalties, such as fines and taxes, are not recommended to bring conservation to private lands for the same reason that prescriptive regulations should not be used.²¹² The third general regulatory response is already being utilized for incentivizing landowners to improve conservation on their lands.²¹³ Payments or subsidies are a positive way for the government to regulate an industry, but subsidies can create negative effects.²¹⁴ Landowners may rely on the subsidies to continue the behavior, or without proper monitoring, landowners can take advantage of the subsidies without doing the conservation practices expected.²¹⁵ The last and perhaps hardest regulatory response is persuasion through education.²¹⁶ In order to persuade landowners to voluntarily engage in conservation practices, landowners must be educated about their own land, the surrounding ecosystem that the land is a part of, the overall goal, and the benefits of conservation. This may be the most powerful tool in the government's toolbox because it is relatively inexpensive compared to subsidies, does not carry with it a negative stigma, and can have a lasting impact.²¹⁷ But this may also be the most difficult regulatory response to implement because it goes beyond simply telling a landowner what he or she should do for their land. This response requires organizations to build a relationship with landowners and teach landowners about their role in the ecosystem.

This Article investigates two regulatory responses: education and payments. Payments are needed to immediately balance the cost of conservation to the landowner against the benefit of conservation to the public. Payments may also be needed to continue to reinforce the desired conservation behavior. Education is necessary to persuade the landowner to voluntarily begin conservation measures and continue those conservation measures long after the payments have ended.

210. See generally Stern, *supra* note 31, at 545 (discussing private landowners and the impact of the Endangered Species Act to land use).

211. LAITOS, *supra* note 9, at 36.

212. See generally LAITOS, *supra* note 9, at 36 (discussing how taxes may be used to address negative externalities).

213. See generally Stern, *supra* note 31, at 545 (discussing private landowners and need for conservation).

214. See Stern, *supra* note 31, at 545 (exploring subsidies, payments, and conservation).

215. See generally LAITOS, *supra* note 9, at 30 (discussing government involvement and methods to solve negative externalities).

216. *Id.* at 34.

217. Give a man a fish and he eats for a day, teach a man to fish and eats for a lifetime.

Incentive programs should incorporate payments and education to create a longstanding, effective behavior change in private land-owning Texans. To achieve this, the programs should be designed to focus on conserving lands throughout the entire state that are ecologically profitable, while also positively affecting in some way every land that applies for conservation help. The programs should also structure the incentives to promote a continued behavior by staggering the rewards, granting the rewards on a tiered basis rather than lump sums, and by utilizing social affirmation to increase positive opinions of conservation programs in the landowner and within the community. Lastly, the programs should aim to build relationships with landowners beyond a governmental parental role and into an educational partnership.

A. Design Programs to Reach Everyone, Everywhere

First, organizations or agencies creating voluntary conservation programs should design the programs to ensure that the most ecologically important lands are conserved first. Additionally, the programs should focus on promoting biodiversity in the ecosystem, despite jurisdictional boundaries. And finally, the agencies should spread programs across the state rather than focusing on ecosystem reserves to combat the growing disconnect between society and nature.

In the planning process, agencies should continue to be selective when choosing which lands may receive assistance based on whether the land is ecologically significant and necessary to conserve.²¹⁸ By only allowing landowners who have lands where conservation would be beneficial to participate in incentive programs, the agency will save money that may be spent enforcing the conservation measures in place. Agencies could reward all conservation efforts to promote a positive attitude towards all conservation but provide more ecologically valuable lands with larger rewards. A system based on reward-size could tighten the link between the landowner, public good, and incentive.²¹⁹ While many programs already implement a selective process for funding, the process leaves some landowners without any reward if their land is less ecologically significant.²²⁰ Agencies should be aware of this potential loss in conservation practices and mitigate the rejection with a less costly reward, such as technical guidance.

218. Huff, *supra* note 125, at 158.

219. Stern, *supra* note 31, at 577.

220. *Id.*

When agencies create programs with a property-based approach, it “limits the options available to manage nature.”²²¹ Agencies could consider creating programs that focus on the natural ecosystem boundaries rather than jurisdictional boundaries.²²² To fully “capture the true environmental conditions relevant to the management and understanding of nature,” alternatives to a property-based approach may need to change towards a solution with the full ecosystem in mind.²²³ Nature does not conform to humanity’s arbitrary jurisdictions, and so agencies should develop private incentive programs focusing less on the geographical boundaries and instead provide management options “based on the characteristics that are inherent in nature.”²²⁴ When considering nature while developing the programs, agencies need to especially focus on biological diversity.²²⁵ Agencies could do this by targeting specific ecosystems that need conserving, then contacting the landowners to present a tailored incentive program specifically for that ecosystem.

Additionally, incentive programs should be spread across the entire state rather than ecosystem reserves. Critics warn against structuring conservation projects around “hot spots” or reserves, because this centered focus ignores our society’s growing disconnect from nature.²²⁶ “The more completely we isolate our daily lives from nature, the more tenuous our commitment to protecting nature is likely to become.”²²⁷ The conservation effort in Texas should take this growing disconnect into account and attempt to focus projects across the state’s vast ecosystems and abandon the isolation approach. Merging biodiversity conservation and the public may be difficult, but the State’s natural resources may benefit from a society with a connection to nature. Another way to combat this growing disconnect is to involve local schools with conservation projects. Similar to President Obama’s Every Kid in a Park,²²⁸ organizations could focus on getting schoolchildren out in nature to connect with the environment and begin conservation behavior early.

221. ENVIRONMENTAL LAW AND CONTRASTING IDEAS OF NATURE: A CONSTRUCTIVIST APPROACH 59 (Keith H. Hirokawz, ed., 2014).

222. Rosenbloom, *supra* note 25, at 62.

223. *Id.*

224. *Id.* at 57, 60.

225. McLaughlin, *supra* note 104, at 465.

226. *Id.*

227. *Id.*

228. Malvin, *supra* note 45.

B. Structure Incentives to Promote Long-Term Behavior Change

For an incentive program to succeed, the program must be designed to motivate and maintain long-term behavior.²²⁹ To accomplish this, agencies should: (1) provide incentives throughout the entire duration of the conservation program to reinforce the long-term behavior change; (2) include social rewards such as recognition programs; and (3) distribute the incentives after the landowners meet the goals.²³⁰

To maintain behavior change, agencies must give incentives throughout the entire duration of the behavior but not necessarily at regular intervals.²³¹ Intermittent reinforcements are more effective than constant reinforcement, and sporadic, unpredictable rewards can encourage a stronger behavioral response than a predictable, consistent reinforcement.²³²

Social rewards, such as certificates and awards, can also incentivize environmentally-friendly behavior.²³³ But a participant generally makes a longer-term commitment when the participant makes a visible, personal commitment like signing a pledge.²³⁴ This personal commitment could significantly help with reinforcing new landowners who have purchased a conservation easement-encumbered piece of land.²³⁵ A study on perpetual conservation easements in Texas shows that if a landowner initially grants the easement, the landowner is more satisfied with the easement than a landowner taking on an easement-encumbered piece of land.²³⁶

While continuing incentives may not be economically feasible, it will be necessary to do so if the cost of conservation is high, regardless of how environmentally-conscience the landowner is.²³⁷ Therefore, during the planning stages, agencies should be careful to continue incentives for high-cost behavior programs but can replace incentives with social rewards in low-cost behavior programs. Additionally, agencies should be cautious against offering upfront or frontloaded payments, which inadequately reinforce behavior and permit landowners to either under-perform or fail to perform.²³⁸

229. Stern, *supra* note 31, at 562.

230. *Id.* at 563.

231. *Id.* at 562.

232. *Id.*

233. *Id.* at 563.

234. *Id.*

235. Stern, *supra* note 31, at 572.

236. Dianne Stroman & Urs Kreuter, *Perpetual Conservation Easements and Landowners: Evaluating Easement Knowledge, Satisfaction and Partner Organization*, 146 J. ENVTL MGMT. 284, 289 (2014).

237. Stern, *supra* note 31, at 567.

238. *Id.* at 568–69.

To achieve the staggered method, agencies could establish a system that rewards the landowner with payment after completion of certain requirements.²³⁹ This could be especially helpful in programs that require a multi-step project such as the Water Supply Enhancement Project.²⁴⁰ If a project requires upfront costs, landowners could receive a portion of the money in advance to begin the project and receive the rest in increments based on completion.²⁴¹ The Water Supply Enhancement Plan is a 10-year contract with a landowner that includes a plan for the original brush control method, a plan for a follow-up brush control method, and a requirement that the landowner keep the brush level less than 5% throughout the 10-year period.²⁴² The statute does not set out a guideline of how and when the Plan pays the cost-share to a landowner, but it does specify that a landowner cannot acquire more funding for the follow-up brush method apart from the original cost-share contract.²⁴³ This is a perfect opportunity to draft the contract to allow a proportionate allocation of the funds to be given at the beginning of the project, during the follow-up, and periodically after the status inspections.

Along with rewards, punishments also reinforce and shape behavior.²⁴⁴ Agencies could achieve partial enforceability through denial of payment in the outcome-oriented incentive program.²⁴⁵ If a landowner does not reach the specified outcome, the landowner will not receive the payment, which can be perceived as a punishment.²⁴⁶ Agencies should carefully implement such plans so that the landowner does not begin to look at conservation or the agency in a negative way. In the Water Supply Enhancement Plan, the contract could specify that non-compliance delays payments until the landowner complies. Further, if a landowner does not follow through with the follow-up brush control method, the landowner will not receive the rest of the funds until the follow-up method is completed.²⁴⁷

C. Building Relationships with Landowners

Organizations must bridge the gap between landowner and outsider groups to truly make a lasting impact in a state with extensive private land

239. *Id.* at 570.

240. *See, e.g.*, TEX. AGRIC. CODE § 203.160(e) (stating that state money will not be used for advanced work, but rather for work that has been completed).

241. Stern, *supra* note 31, at 570.

242. TEX. AGRIC. CODE § 203.162(b).

243. *Id.* § 203.162(c).

244. Stern, *supra* note 31, at 570.

245. *Id.*

246. *Id.*

247. *See, e.g.*, TEX. AGRIC. CODE § 203.160(e) (stating the failure to complete conservation duties).

ownership and strong ownership beliefs. Offering incentives to landowners to engage in conservation is not enough. In some instances, educating landowners about their lands and conservation will also not be enough. Organizations, both governmental and private, will have to build and maintain a relationship of trust and respect with the landowner and the community. Organizations must overcome the distrust of outsiders when asking landowners to engage in costly environmental strategies. Agencies should design programs to provide frequent interaction, educational opportunities, and public acknowledgment.

1. Building & Maintaining Relationships Using Educational Opportunities

“Trust is a feeling, not a rational experience” and we begin to have trust when we realize someone is not driven by their own self-gain.²⁴⁸ Organizations developing relationships with landowners should first focus their message on why conservation is important. At its simplest form, conservation could be the reason why the organization was created. The message to landowners should start with why conservation is important. If done sincerely, this should begin to build trust because the program is not for the selfish gain of the organization, but rather for the benefit of the entire public, including the landowner.

Many organizations reach landowners through local branches. For example, the Texas State Soil and Water Conservation Board reaches landowners through the individual conservation districts that are operated by elected landowners in the district.²⁴⁹ Programs such as this are integrated effectively into the community because they are made up of community members. When landowners are intimately involved with the organizations, there is greater trust between the two. However, organizations should still stress why conservation is important in the educational workshops to inspire landowners to not only volunteer in the program, but to fully take advantage of the benefits and hopefully to continue the conservation beyond the program’s end.

In contrast, the Texas Parks and Wildlife Department (TPWD) have great opportunities for partnering with landowners, but there is no direct community involvement like in the soil and water conservation districts. Instead, each region has a director and field staff. Texas is comprised of eight

248. SIMON SINEK, *START WITH WHY: HOW GREAT LEADERS INSPIRE EVERYONE TO TAKE ACTION* 84 (2009).

249. *About the Texas State Soil and Water Conservation Board*, TEX. STATE SOIL & WATER CONSERVATION BOARD, <https://www.tssweb.texas.gov/about> [<https://perma.cc/XZ86-DNR8>] (last visited Feb. 9, 2018).

regions, which are broken into counties with their own wildlife biologist. For organizations structured like TPWD, programs will need to establish a trusting relationship first and then begin education. Currently, TPWD schedules free workshops for landowners to attend and learn more about the programs offered.²⁵⁰ However, the workshops appear to be aimed more at educating landowners about the programs available with less focus on the overall benefit of conservation.²⁵¹ While workshops are a great way to reach landowners, the workshops should aim to educate landowners first about why conservation is needed, then focus on how to implement conservation on their lands. Successful businesses who understand the importance of starting with their message (i.e. why) remain successful because people respond to inspiration.

Where economically feasible, agencies should consider creating programs that invest in education and have frequent interaction with landowners. Programs that create a close relationship with landowners create a nonmonetary reinforcement incentive and emphasize the landowner's personal commitment to conservation.²⁵² This program style "safeguard[s] against noncompliance," but is costly, so agencies should consider this in the planning process.²⁵³ Within perpetual conservation easements, authors of a study focusing on the satisfaction of easement holders suggest easement-holding organizations should focus on cultivating ongoing relationships with the landowners beyond the traditional monitor and enforcement relationship.²⁵⁴ According to their research, there is "a clear relationship between frequency of contact between landowners and easement holders and landowners' level of satisfaction with their easements."²⁵⁵ Additionally, they found that where a strong relationship exists between the two, there is an increased conservation effectiveness.²⁵⁶ However, where there is a weak relationship, there may be "a decline in the maintenance of the conservation practices."²⁵⁷

250. See *Landowner Workshops & Field Days*, TEX. PARKS & WILDLIFE, <https://tpwd.texas.gov/calendar/landowner-workshops-field-days> [<https://perma.cc/66HU-WGT3>] (last visited Feb. 7, 2018) (listing dates for workshops).

251. See generally *id.* ("This workshop will provide a general overview of the wildlife tax valuation guidelines and qualifications, wildlife management plan development, and applicable management practices.").

252. Stern, *supra* note 31, at 570–71.

253. *Id.* at 570.

254. Stroman & Kreuter, *supra* note 236, at 289.

255. *Id.* at 289.

256. *Id.*

257. *Id.*

2. Boosting Relationships with Recognition Programs

Social rewards can positively influence landowners.²⁵⁸ Organizations should try to incorporate recognition programs to boost the relationship between the organization and the landowner, which may also positively affect the relationship between the community and conservation.

The TPWD honors landowners who contribute to natural resource conservation with the Lone Star Land Steward Award.²⁵⁹ Among those who receive the Lone Star Steward Award, one will be chosen to receive the prestigious Leopold Conservation Award.²⁶⁰ The program has awarded over 200 landowners for their contributions since it was created 21 years ago.²⁶¹ Each landowner is proudly posted on the public TPWD website with a short summary of what the landowner has contributed.²⁶² Land trusts could mimic this idea by publicizing a list of landowners who have donated conservation easements to recognize the owners, reinforce the behavior, and promote a positive attitude towards conservation within the community.²⁶³ However, land trusts should be careful to receive full consent for publication as most conservation easement information and incentive programs are completely confidential, even within the trusts themselves.²⁶⁴ Recognition programs could be as simple as an announcement on a website and local board meeting, or as extravagant as awarding prizes or cash.

CONCLUSION

We all have an interest in preserving our natural resources for the future generations. We cannot rely on the government to take full ownership and

258. *Texas Landowners Earn Lone Star Land Steward Awards for Conservation Efforts*, TEX. PARKS & WILDLIFE (Apr. 20, 2016), <https://tpwd.texas.gov/newsmedia/releases/?req=20160420a> [<https://perma.cc/64TW-5X2Q>].

259. *2010 Lone Star Land Steward Awards Winners Announced.*, U. S. DEP'T OF AGRIC., NAT'L RES. CONSERVATION SERV. TEX., https://www.nrcs.usda.gov/wps/portal/nrcs/detail/tx/home/?cid=nrcs144p2_002616 [<https://perma.cc/A78K-VVCB>] (last visited Feb. 14, 2017).

260. *Lone Star Land Steward Awards Program*, TEX. PARKS & WILDLIFE (May 17, 2018), https://tpwd.texas.gov/landwater/land/private/lone_star_land_steward/ [<https://perma.cc/E883-32CW>].

261. *Texas Landowners Earn Lone Star Land Steward Awards for Conservation Efforts*, *supra* note 258.

262. *See generally Lone Star Land Steward Ecoregion Award Winners*, TEX. PARKS & WILDLIFE, https://tpwd.texas.gov/landwater/land/private/lone_star_land_steward/lslswinner/ [<https://perma.cc/K453-US8T>] (last visited Feb. 8, 2018) (listing previous Lone Star Land Steward Award Winners).

263. Stern, *supra* note 31, at 573.

264. *See, e.g.*, 1 COLO. CODE REGS. § 201-2:39-22-522 (Conservation Easement Credit) (stipulating, "[e]xcept as otherwise provided . . . every tax return and all information contained therein is confidential. § 39-21-113(17.5), provides an exception to the Department's confidentiality rule for tax information relating to conservation easement tax credits.").

responsibility of our natural resources. Landowners must take responsibility for conservation in their State. But, sometimes the cost of conservation is too high for a single landowner to shoulder when the benefits primarily focus on the community as a whole. Government agencies and non-governmental organizations must collaborate with the landowners to make an impact on natural resource conservation in Texas. Landowner incentive programs are a way to positively invoke conservation methods and should be considered over other regulatory options.

Using landowner incentive programs, agencies should build relationships with landowners and educate the landowners about the importance of their conservation. When the cost of conservation is too high, agencies should tip the scales by providing funding assistance. While funding may not always be economically feasible, education should always be included in the program design. To maintain an environmentally friendly behavior, the agency should structure the programs to provide incentives throughout the desired behavior and use social rewards in addition to incentives.

ARE EMISSIONS TRADING SCHEMES A PATHWAY TO ENHANCING TRANSPARENCY UNDER THE PARIS AGREEMENT?

*Ling Chen**

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INTRODUCTION

Article 6.2 of the Paris Agreement (PA) suggests “cooperative approaches” by which Parties could use internationally transferred mitigation outcomes (ITMOs) to achieve their nationally determined contributions (NDCs) and ensure environmental integrity and transparency.¹ The PA recognizes in various articles that the provision of

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1. Paris Agreement, art. 6.2, April 22, 2016, 80 Stat. 271, T.I.A.S. 16-1104.

information is an element of transparency. This includes articles 9, 10, and 11 dealing respectively with the financial mechanism, technology transfer, and support for capacity building.² In addition, article 13 establishes a transparency framework requiring each Party to regularly submit a national greenhouse gas (GHG) inventory, report progress in implementing and achieving its NDC, and engage in a facilitative, multilateral consideration of progress achieved. The information each Party submits shall undergo a technical expert review.³

The text of articles 9, 10, 11, and 13 sketches out only broad criteria. Parties are negotiating the guidance on cooperative approaches and the modalities, procedures, and guidelines (MPGs) for the transparency framework under the auspices of the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Ad Hoc Working Group on the Paris Agreement (APA), respectively.⁴ In November 2017, for example, the negotiations during the 47th session of SBSTA (SBSTA 47) produced the conclusions for article 6.2.⁵ The SBSTA Chair was requested to prepare an informal note that contained draft elements of the guidance on cooperative approaches to facilitate the deliberations at SBSTA 48 in 2018.⁶

Article 6.2 of the PA, in its current wording, does not restrict the type of cooperative approaches by which ITMOs could be applied toward achieving NDCs.⁷ I suggest that the cooperation may take the form of

2. *Id.* at art. 9–11.

3. *Id.* at art. 13.7, 13.11.

4. United Nations Framework Convention on Climate Change, Conference of the Parties, *Rep. of the Conference of the Parties on Its Twenty-First Session*, ¶¶ 36, 91, U.N. Doc. FCCC/CP/2015/10/Add.1 (Jan. 29, 2016) [hereinafter *Decision 1/CP.21*]. As I analyze later, however, the two negotiating tracks have reflected on many issues that are interconnected and overlapped, such as transparency, environmental integrity, and avoidance of double counting.

5. United Nations Framework Convention on Climate Change, Subsidiary Body for Sci. and Tech. Advice, *Rep. of the Subsidiary Body for Sci. and Tech. Advice on Its Forty-Seventh Session*, ¶¶ 87–92, U.N. Doc. FCCC/SBSTA/2017/7 (Jan. 31, 2018) [hereinafter SBSTA U.N. Doc. FCCC/SBSTA/2017/7].

6. *Id.* at ¶ 91; *see also* Informal Note by the Co-Chairs dated Nov. 12, 2017, Draft Elements for SBSTA Agenda Item 11(a), Guidance on Cooperative Approaches Referred to in Article 6, Paragraph 2, of the Paris Agreement, 1 (3rd iteration) (summarizing the proposed draft elements for Article 6.2 of the Paris Agreement) [hereinafter Draft Elements for SBSTA Agenda Item 11(a)].

7. Many Parties to the PA have supported a flexible application of cooperative approaches, *see, e.g.*, Canada, Submission on SBSTA Item 11(a): Article 6, Paragraph 2, ¶ 4 (Oct. 2017) [hereinafter Canada]; Republic of Korea, Submission on Art 6.2 and 6.4 of the Paris Agreement 2 (Nov. 2017); Australia, Submission on the Content of the Guidance for Article 6.2, Including the Structure and Areas, Issues and Elements to be Addressed 1 (Oct. 2017) [hereinafter Australia]. In the academic literature, *see, e.g.*, Robert N. Stavins, *Market Mechanisms in the Paris Climate Agreement: International Linkage under Article 6.2*, in *THE PARIS AGREEMENT AND BEYOND: INTERNATIONAL CLIMATE CHANGE POLICY POST-2020* 53, 54 (Robert N. Stavins & Robert C. Stowe eds., 2016)

developing and linking emissions trading schemes (ETSs) in different jurisdictions. Parties involved in ETSs could be accountable as well as making the most of carbon markets to enhance transparency.⁸ ETSs have earned increasing support from nations and regional groupings such as New Zealand, Switzerland, South Korea, China and the European Union (EU), and some jurisdictions in Japan, Canada, and the United States (U.S.).⁹ The prevalent literature indicates there are environmental, economic, political, and strategic benefits of operating carbon markets and trading emissions credits across borders.¹⁰ In addition to those benefits, some argue that this is also a good opportunity for enhanced transparency in the PA processes through reporting GHG emissions, accounting, and in sharing information about climate action.¹¹

[hereinafter Stavins]; ANDREI MARCU, ARTICLE 6 OF THE PARIS AGREEMENT: REFLECTIONS ON PARTY SUBMISSIONS BEFORE MARRAKECH 6 (2017) [hereinafter PARTY SUBMISSIONS BEFORE MARRAKECH]; ANDREW HOWARD, THE PARIS AGREEMENT ON CLIMATE CHANGE: ANALYSIS AND COMMENTARY 178, 185 (Daniel Klein et al. eds., 2017).

8. Linking ETSs has been suggested by some Parties, *see, e.g.*, New Zealand, Submission to SBSTA on Article 6.2 of the Paris Agreement, ¶ 11 (Sept. 2017); Republic of Mali on Behalf of the African Group of Negotiators, Submission on Guidance on Cooperative Approaches Referred to in Article 6, Paragraph 2, of the Paris Agreement 2 (Oct. 2017); Papua New Guinea, Submission on Article 6.2 SBSTA 47 Agenda Item 11 (a), ¶¶ 4–7 (Sept. 2017). Also, a rapidly growing body of literature has suggested that article 6.2 serve as the basis for future linkages among domestic ETSs, *see, e.g.*, Stavins, *supra* note 7, at 54; HOWARD, *supra* note 7, at 185; PARTY SUBMISSIONS BEFORE MARRAKECH, *supra* note 7, at 7; Michael Mehling & Benjamin Görlach, *Multilateral Linking of Emissions Trading Systems* 2 (MIT Ctr. for Energy and Envtl. Pol’y Res., Working Paper No. 2016-009, 2016).

9. The ETS mainly includes cap-and-trade, baseline-and-credit, and baseline-and-offset systems. According to the World Bank’s data (as of April 1, 2018), there are 24 ETS initiatives in place, consisting of 36 national jurisdictions and 25 subnational jurisdictions, and covering 5 GtCO₂e and 9.9% of global GHG emissions. The percentage of 9.9 will rise to 15.1 if China operates its national ETS. Besides the ETS, carbon tax is another major carbon pricing initiative. It has been implemented and scheduled by 24 national jurisdictions and 2 subnational jurisdictions, covering 3 GtCO₂e and 5.3% of global GHG emissions. *See Carbon Pricing Dashboard*, WORLD BANK, (last updated Apr. 1, 2018) http://carbonpricingdashboard.worldbank.org/map_data [<https://perma.cc/7DLJ-5CE8>]; *see also* WORLD BANK, ECOFYS & VIVID ECONOMICS, STATE AND TRENDS OF CARBON PRICING 2017 25 (2017) (depicting graphs that show 81 NDCs Parties submitted consider the use of carbon pricing and these NDCs cover 55% of global GHG emissions).

10. *See, e.g.*, Stavins, *supra* note 7, at 53–54 (discussing in detail the advantages and disadvantages of linking ETSs); Mehling & Görlach, *supra* note 8, at 1–2; Michael Mehling, *Linking of Emissions Trading Schemes*, in LEGAL ASPECTS OF CARBON TRADING: KYOTO, COPENHAGEN & BEYOND 108, 108–110 (David Freestone & Charlotte Streck eds., 2009); JACKSON EWING, ROADMAP TO A NORTHEAST ASIAN CARBON MARKET 29–33 (2016); Jessica F. Green, *Don’t Link Carbon Markets* (2017) 543 NATURE 484 (arguing that linking would “deliver greater complexity and fewer emissions cuts.”).

11. There is a growing body of literature turning attention to “transparency” in the ETS-related discussions. *See* Felicity Deane et al., *Principles of Transparency in Emissions Trading Schemes: The Chinese Experience*, 6 TRANSNAT’L ENVTL. L. 87, 94 (2017) (indicating that the Californian scheme increases transparency by making emissions and compliance data public); *see also* Michael Mehling & Erik Haites, *Mechanisms for Linking Emissions Trading Schemes*, 9 CLIMATE

This Article investigates how ETSs can enhance transparency in tracking GHG emissions and other climate efforts in the PA context. I will proceed with four sections as follows. The first two sections identify key issues and governance challenges for operationalizing cooperative approaches and market-related transparency provisions of the PA. It draws mainly from Parties' submissions and the discussions around these provisions. In each section, I locate and discuss the innovative aspects of the PA that could support future ETS initiatives and compare those aspects to the market mechanisms and the measurement, reporting, and verification (MRV) system in the pre-PA era. Next, I examine how developing domestic ETSs and linking them can enhance climate transparency. Section 3 considers the minimum requirements that could qualify an ETS as transparent. Taking China's evolving ETS as an example, I highlight how the process of building MRV capacities for a functional ETS enhances GHG accounting and reporting. Section 4 analyzes how linking ETSs across borders like the linkages between California, Québec, and Ontario can improve data reporting and facilitate information sharing.

I do not try to define "transparency." I examine the PA's provisions regarding market-based approaches and transparency to illustrate how they can become operational with experience and lessons from using ETSs.¹² I hope that the current literature on transparency and ETSs can engage more in analyzing their interactions, and that best practices from either domestic ETSs or bilateral and regional partnerships can inform the negotiation and resolution of the issues left on the agenda of the APA and SBSTA for completing the work program related to the implementation of the PA (PAWP).

POL'Y 169, 177, 182 (2009) (discussing the mechanisms for linking ETSs and noting the need for transparency); Mehling, *supra* note 10, at 123–25, 133; THOMAS L. BREWER & MICHAEL MEHLING, *TRANSPARENCY OF CLIMATE CHANGE POLICIES, MARKETS, AND CORPORATE PRACTICES* 180 (Oxford U Press, 2015).

12. For the definition and elements of transparency in the context of climate governance and the ETS, *see generally* Deane et al., *supra* note 11, at 89–97; Wenqin Liang, *Governing China's Domestic Carbon Market* 18–19 (Feb. 2017) (unpublished Ph.D. thesis, University of British Columbia) (on file with the University of British Columbia Library); BREWER & MEHLING, *supra* note 11, at 181.

I. MARKET-BASED APPROACHES TO CLIMATE COOPERATION

Three instruments—guidance on cooperative approaches (article 6.2); rules, modalities, and procedures for a sustainable development mechanism (article 6.4); and a work program for non-market approaches (article 6.8)—are taking forward the operation of the PA’s article 6 provisions.¹³ The analysis below is in part dedicated to cooperative approaches that may favor the establishment of carbon markets. This way, Parties can transfer mitigation outcomes to achieve GHG emissions reduction goals. Therefore, I focus on articles 6.2 and 6.3 of the PA.

The agreement provides broad outlines for what voluntary cooperation could look like even when thorny issues that could enhance their implementation remain “reasonably ambiguous.”¹⁴ Previous U.N. climate change negotiations, especially those under SBSTA, featured intense discussions on the clarification and interpretation of those issues in an attempt to complete the guidance referred to in article 6.2, that would constitute an important part of the PAWP.¹⁵ Decision 1/CP.21 requested that SBSTA should develop a guidance that the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) adopts at its first session.¹⁶ It specifically identified the need for guidance on avoiding double counting when Parties adjust their GHG emissions and removals covered by their NDCs.¹⁷ SBSTA 45 noted Parties’ efforts to discuss articles 6.2 and 6.3 and their determination to reach “a common understanding of the matters related to the guidance.”¹⁸

13. United Nations Framework Convention on Climate Change, Subsidiary Body for Sci. and Tech. Advice, *Rep. of the Subsidiary Body for Sci. and Tech. Advice on Its Forty-Sixth Session*, ¶¶ 100–26, U.N. Doc. FCCC/SBSTA/2017/4 (Jun. 30, 2017) [hereinafter SBSTA U.N. Doc. FCCC/SBSTA/2017/4]; *Decision 1/CP.21*, *supra* note 4, at ¶¶ 36–40.

14. ANDREI MARCU, GOVERNANCE OF ARTICLE 6 OF THE PARIS AGREEMENT AND LESSONS LEARNED FROM THE KYOTO PROTOCOL 1 (2017) [hereinafter GOVERNANCE OF ARTICLE 6]; Stavins, *supra* note 7, at 55.

15. See *Decision 1/CP.21*, *supra* note 4, at ¶ 36; United Nations Framework Convention on Climate Change, Subsidiary Body for Sci. and Tech. Advice, *Rep. of the Subsidiary Body for Sci. and Tech. Advice on its forty-fourth session*, ¶¶ 93–96, U.N. Doc. FCCC/SBSTA/2016/2 (Jul. 27, 2016); United Nations Framework Convention on Climate Change, Subsidiary Body for Sci. and Tech. Advice, *Rep. of the Subsidiary Body for Sci. and Tech. Advice on its forty-fifth session*, ¶¶ 81–88, U.N. Doc. FCCC/SBSTA/2016/4 (Jan. 31, 2017) [hereinafter SBSTA U.N. Doc. FCCC/SBSTA/2016/4]; SBSTA U.N. Doc. FCCC/SBSTA/2017/4, *supra* note 13, at ¶¶ 100–08; SBSTA U.N. Doc. FCCC/SBSTA/2017/7, *supra* note 5, at ¶¶ 87–92.

16. *Decision 1/CP.21*, *supra* note 4, at ¶ 36.

17. *Id.*

18. SBSTA U.N. Doc. FCCC/SBSTA/2016/4, *supra* note 15, at ¶ 84.

The informal note prepared by the co-chairs for discussing article 6.2, which recorded Parties' contributions at SBSTA 47, gives some insights to the content and tone of the guidance. With that said, the elements in this note are preliminary and "should not be considered as final or exhaustive in any way."¹⁹ In Table 1, I list the elements that are relevant to the discussion in this Article. Some of them will be discussed in greater detail below.

Table 1: Select Draft Elements of the Guidance on Cooperative Approaches²⁰

Principles	Voluntary participation; environmental integrity; sustainable development; maintaining national prerogative and bottom-up approaches; multilateral rule-based system; addressing negative social and economic impacts
Definitions	Acquiring Party; creating/issuing Party; transferring Party; using Party; cooperative approaches; corresponding adjustment; double counting (claiming, issuance, registration, use); environmental integrity; ITMOs
Governance	CMA's role; oversight arrangements: article 6.2 body (or not) or under other processes (articles 4.13, 13, 15); role of the secretariat of the U.N. Framework Convention on Climate Change (UNFCCC)
Guidance for a Party Using/Transferring in ITMOs ²¹	Participation requirements; source of ITMOs; accounting and reporting by a Party using ITMOs toward its NDC; demonstrating the role of ITMOs in achieving NDC
Infrastructure	National registry; standard reporting table; national buffer registry; national registry connected to a centrally accessible distributed ledger; blockchain ²²
Participation Requirements	Requirements for all participating Parties (e.g., status under the PA; NDC qualification; NDC communication and maintenance; NDC target type; fulfillment of transparency requirements); further requirements for a Party that creates/issues or transfers ITMOs or that uses ITMOs toward

19. Draft Elements for SBSTA Agenda Item 11(a), *supra* note 6.

20. *Id.* For a complete list of elements, potential elements, and possible further elements, see especially its parts 2, 6–14.

21. *See id.* at part 9 (also suggesting guidance for a Party that creates/issues or transfers out ITMOs).

22. *See id.* at part 10 (mentioning blockchain and distributed ledger technology in the SBSTA negotiation for the first time); *see also* Norway, Submission to SBSTA on Article 6 of the Paris Agreement 4 (Oct. 2017) (suggesting that blockchain and distributed ledger technology be considered for keeping track of ITMOs). More about blockchain, climate change, and market schemes see, e.g., TIMIEBI AGANABA-JEANTY ET AL., BLOCKCHAIN CLIMATECUP ROUND TABLE (2017); WORLD BANK GROUP, BLOCKCHAIN AND EMERGING DIGITAL TECHNOLOGIES FOR ENHANCING POST-2020 CLIMATE MARKETS (2018).

	NDC (e.g., authorization under article 6.3; recording the use or transfer of ITMOs)
Accounting	Basis for accounting; specific guidance for Parties that create/issue or transfer ITMOs or that use ITMOs toward NDCs; limits on such creation/issuance, transfer or use; timing of corresponding adjustments
Reporting	Reporting for all participating Parties (e.g., corresponding adjustment; demonstrating the environmental integrity of transferred ITMOs; evidence that ITMOs are real, permanent, additional, and verified; establishment and updates of accounting approach; information on Party of origin of ITMOs); further requirements for a Party that creates/issues or transfers ITMOs or that uses ITMOs toward NDC (e.g., authorization under article 6.3; how such creation, transfer or use fulfills the requirements of sustainable development and environmental integrity)
Review	Oversight arrangements: article 6.2 body (or not) or specific compliance procedures or under other processes (articles 4.13, 13, 15) or no review

The governance of cooperative approaches and the scope and definition of ITMOs are open questions.²³ They need further examination to see if they can be feasible means of fulfilling NDCs. The wording of articles 6.2 and 6.3 does not appear to keep the governance of cooperative approaches within the PA, in that neither article requires decisions to be made by the CMA.²⁴ Cooperation may be “bilateral, plurilateral, and possibly multilateral,” or involve the “linking of cap-and-trade systems, or other types of trading systems.”²⁵ Some Parties whose submissions favored a broad interpretation, which allows a wide spectrum of cooperation that involves ITMOs, shared this view.²⁶ Others saw the scope of article 6.2 in

23. See Draft Elements for SBSTA Agenda Item 11(a), *supra* note 6, at part 6 (g) (noting that Parties considered ITMOs may be defined by the CMA or by Parties that would implement cooperative approaches); see also Andrei Marcu, *Article 6 of the Paris Agreement: Structure, Interpretation, Possible Outcomes*, in MARKET MECHANISMS AND THE PARIS AGREEMENT 59, 62 (Robert N. Stavins & Robert C. Stowe eds., 2017) (presenting views towards the question of “whether ITMOs need to be quantified in CO₂-equivalent terms only.”).

24. GOVERNANCE OF ARTICLE 6, *supra* note 14, at 3; PARTY SUBMISSIONS BEFORE MARRAKECH, *supra* note 7, at 6; Stavins, *supra* note 7, at 54.

25. PARTY SUBMISSIONS BEFORE MARRAKECH, *supra* note 7, at 6; see also MICHAEL A. MEHLING ET AL., LINKING HETEROGENEOUS CLIMATE POLICIES (CONSISTENT WITH THE PARIS AGREEMENT) 3–5 (2017) [hereinafter MEHLING ET AL., LINKING CLIMATE POLICIES].

26. See, e.g., Canada, *supra* note 7, at ¶ 4 (believing that article 6.2 “is intended to create a flexible, evolving space that encourages the development of new and innovative bottom-up approaches and experimentation with a variety of methods.”); Republic of Korea, Submission on Art. 6

particular as similar to the trading of assigned amount units between Annex B Parties under article 17 of the Kyoto Protocol (KP).²⁷

While engaging in voluntary cooperation, Parties are still obligated to “promote sustainable development and ensure environmental integrity and transparency, including in governance” and to avoid double counting. This is obvious given the use of “shall” in article 6.2.²⁸ Submissions by some Parties suggested the governance of environmental integrity and transparency should be on a centralized basis. However, most Parties “see implementation of [such] provisions as being left to cooperating [P]arties, through transparency provisions.”²⁹ This seems to be a more useful idea because the approach being devised for article 6.2 should differ from the KP’s centralized market mechanisms. The Joint Implementation (JI) Supervisory Committee and the Clean Development Mechanism (CDM) Executive Board are governing the JI and the CDM under the authority of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).³⁰ However, the KP Parties’ experience with the CDM decreased their enthusiasm because its centralized governance led to a bureaucratic and inflexible process that failed to fully address their

of the Paris Agreement 2 (Apr. 2017) (stating that “the guidance under Art. 6.2 needs to be developed in a way that various bilateral and plurilateral approaches can be accommodated.”).

27. See, e.g., Brazil, Views on the Guidance Referred to in Article 6, Paragraph 2, of the Paris Agreement, ¶ 15 (Mar. 2017) (considering that the PA’s article 6.2 “is analogous to” the KP’s article 17), [hereinafter Brazil]. For a summary of Parties’ roundtable discussion on article 6.2 in conjunction with SBSTA 47, see Informal Document by Co-Facilitators dated Nov. 6, 2017, Round-Table Discussion Among Parties Held on 5 November 2017, SBSTA 47 Agenda Item 11(a): Guidance on Cooperative Approaches Referred to in Article 6, Paragraph 2, of the Paris Agreement [hereinafter SBSTA Roundtable Document]. For an overview of Parties’ previous submissions relating to article 6, see ANDREI MARCU, ISSUES FOR DISCUSSION TO OPERATIONALIZE ARTICLE 6 OF THE PARIS AGREEMENT (2017) [hereinafter MARCU, OPERATIONALIZE ARTICLE 6]; ANDREI MARCU, INTERNATIONAL COOPERATION UNDER ARTICLE 6 OF THE PARIS AGREEMENT: REFLECTIONS BEFORE SB 44 (2017) [hereinafter MARCU, REFLECTIONS BEFORE SB 44].

28. Paris Agreement, *supra* note 1, at art. 6.2. For more detailed discussions on environmental integrity, see Draft Elements for SBSTA Agenda Item 11(a), *supra* note 6, at part 6(f) (suggesting its possible elements: not increasing global emissions; quality of units; accounting rules); see also LAMBERT SCHNEIDER ET AL., ENVIRONMENTAL INTEGRITY UNDER ARTICLE 6 OF THE PARIS AGREEMENT 11 (2017) (defining environmental integrity as “the use of international transfers does not result in higher global GHG emissions than if the mitigation targets in NDCs had been achieved only through domestic mitigation action, without international transfers.”).

29. For detailed analyses see, e.g., GOVERNANCE OF ARTICLE 6, *supra* note 14, at 3–4, 7; SBSTA Roundtable Document, *supra* note 27, at 2; ANDREI MARCU ET AL., ISSUES AND OPTIONS: ELEMENTS FOR TEXT UNDER ARTICLE 6 7–8 (2017) (addressing some issues that are key to ensuring environmental integrity and transparency) [hereinafter MARCU ET AL., ISSUES AND OPTIONS].

30. Kyoto Protocol to the United Nations Framework Convention on Climate Change, art. 6, 12, Dec. 11, 1997, 2303 U.N.T.S. 162.

needs.³¹ That situation should be avoided through the cooperative approaches offered under the PA.

The more decentralized governance of the PA's article 6.2 may incentivize the participation of developed country Parties that have circumvented cooperation through the KP's market mechanisms. Article 6.2 may also encourage participation of non-Annex B Parties to the KP, which assume non-binding targets and cannot use the international emissions trading under the KP's article 17. For example, as neither Canada nor the U.S. is Party to the KP, the KP's market mechanisms did not apply to them. Now, they can make the most of the PA's article 6.2. Though the U.S. will in fact be withdrawing from the PA, the U.S. is still a Party until the conditions for withdrawal under article 28 are fulfilled.³² Article 6.2 is also appealing to countries like China and Korea, which are non-Annex B Parties to the KP, and are now enthusiastically using ETSs to help achieve their NDCs.³³ The bottom-up initiatives, such as linkages of ETSs among Parties or even subnational entities, are therefore promising. Though article 6.2 only mentions Parties, when read together with article 6.3, it reveals the potential participation of non-Party entities if the use of ITMOs is authorized by participating Parties.³⁴ Section 4 of this Article will provide a detailed analysis of linking subnational ETSs and its relation to the PA's articles 6.2 and 6.3.

II. MARKET-RELATED TRANSPARENCY

This section discusses the PA provisions relevant to both market-based cooperation and transparency of climate action. International rules on the MRV system have evolved over the past few years. The established MRV system, under the UNFCCC, runs "different, but seemingly parallel,

31. GOVERNANCE OF ARTICLE 6, *supra* note 14, at 2, 4; *see also* ROBERT O. KEOHANE & DAVID G. VICTOR, *THE REGIME COMPLEX FOR CLIMATE CHANGE* 19 (2011) (taking the CDM and the KP's "docking" rules as typical examples of the "counterproductive rigidities that are often built into comprehensive regimes.").

32. *See* Paris Agreement, *supra* note 1, at art. 28 (specifying the procedure for withdrawing from the PA).

33. DEP'T OF CLIMATE CHANGE, NAT'L DEV. & REFORM COMM'N OF CHINA (中国国家发展和改革委员会应对气候变化司), 强化应对气候变化行动中国国家自主贡献 [ENHANCED ACTIONS ON CLIMATE CHANGE: CHINA'S INTENDED NATIONALLY DETERMINED CONTRIBUTIONS] 3, 14 (2015).

34. Paris Agreement, *supra* note 1, at art. 6.2–6.3.

standards for developing and developed country [P]arties.”³⁵ By contrast, the PA obligates each Party to “prepare, communicate and maintain” NDCs and pursue domestic mitigation measures to fulfill their contributions.³⁶ Also, the PA has an enhanced and flexible transparency framework which “shall build upon and eventually supersede” the existing MRV system.³⁷ The PA refers to transparency throughout its text, and article 13 in particular requires Parties to regularly report on their GHG emissions, removals, implementation efforts, and to submit reports for expert and peer review.³⁸ Parties are now negotiating and developing the MPGs for this transparency framework to be included in the PAWP.³⁹

While the detailed MPGs are subject to further negotiation, a review of the instruments available from negotiations to date may illustrate the outlook for the incoming framework and inform what should be considered for realizing transparency in market-based cooperation. At an MPGs workshop before APA 1-3, experts from the Parties and regional groups discussed article 6 in the context of relevant information necessary to track progress toward implementing and achieving NDC goals.⁴⁰ Some suggested that only Parties that use article 6 report on their use of this article, and that separate guidance for tracking ITMOs be developed under SBSTA and

35. Deane et al., *supra* note 11, at 90.

36. Paris Agreement, *supra* note 1, at art. 4.2.

37. *Transparency of Support Under the Paris Agreement*, UNITED NATIONS (May 2, 2017), http://unfccc.int/cooperation_and_support/financial_mechanism/items/10121.php [<https://perma.cc/7GVG-K9D4>]. For a detailed comparison of the PA’s transparency framework and the UNFCCC’s MRV system, see YAMIDE DAGNET ET AL., MAPPING THE LINKAGES BETWEEN THE TRANSPARENCY FRAMEWORK AND OTHER PROVISIONS OF THE PARIS AGREEMENT (2017). However, it should be noted that the pursuit of a bifurcated North-South division, which had its sharpest application in the KP and should be diminishing in the post-PA era, has reemerged in the recent negotiating rounds. Some Parties to the PA suggested two-tier reporting rules for developed and developing countries. See, e.g., Informal Note by the Co-Facilitators dated Nov. 14, 2017, Draft Elements for APA Agenda Item 5, Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement [hereinafter Draft Elements for APA 1-4 Agenda Item 5].

38. Paris Agreement, *supra* note 1, at art. 9–11, 13.7, 13.11.

39. See Ad Hoc Working Grp. on the Paris Agreement, *Rep. of the Ad Hoc Working Grp. on the Paris Agreement on the Third Part of Its First Session*, ¶ 25, U.N. Doc. FCCC/APA/2017/2 (Jun 30, 2017) (inviting Parties to make submissions on agenda item 5) [hereinafter APA U.N. Doc. FCCC/APA/2017/2]; see also Provisional Informal Note by the Co-Facilitators dated May 16, 2017, APA Agenda Item 5, Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support Referred to in Article 13 of the Paris Agreement (capturing views expressed by Parties for developing MPGs).

40. Ad Hoc Working Grp. on the Paris Agreement, *Rep. on the Workshop on the Development of Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support Referred to in Article 13 of the Paris Agreement*, ¶ 42, U.N. Doc. FCCC/APA/2017/INF.2 (May 4, 2017).

linked to tracking progress in the attainment of NDCs under article 4.⁴¹ In the light of Parties' deliberations at APA 1-4, co-facilitators of the MPGs negotiations revealed how article 6 could be addressed through transparency provisions.⁴² The most relevant elements I have identified from their informal note are: national inventory report; information to track progress; technical expert review; and multilateral consideration.⁴³ Each element, as shown in Table 2, has included suggestions for the use of article 6 and cooperative approaches. When it comes to "information to track progress," the facilitators peculiarly noted "information related to article 6"—that is, (1) information concerning ITMO activities (e.g., creation, holding, transfer), cooperative approaches, and how environmental integrity is ensured; (2) institutional arrangements for operating registries, trading systems, and undertaking ITMO activities; and (3) governance and procedural arrangements that ensure double counting is avoided.⁴⁴

Table 2: Select Draft Elements of the MPGs⁴⁵

Overarching Considerations & Guiding Principles	Avoidance of double counting; promoting environmental integrity and transparency; linkage with article 6.2; building on and enhancing the transparency arrangements under the UNFCCC; flexibility to those developing countries that need it given their capacities; facilitating improved reporting and transparency over time
National Inventory Report	National circumstances and institutional arrangements; reporting guidance: methods, sectors and gases (including those covered by article 6 activities), time series, and frequency; constraints and capacity-building needs; improvement plans; submission process; reporting formats and tables (including consistency with agreed rules under article 6.2)
Information to Track Progress	Description and updates of a Party's NDC; progress in implementing its NDC (including information on the application of cooperative approaches); summary of GHG emissions and removals (and their projections); information on Parties' accounting under articles 4.13 and 4.14; information related to article 6; and capacity-building needs

41. *Id.* at ¶¶ 42 (b), (d).

42. Draft Elements for APA 1-4 Agenda Item 5, *supra* note 37.

43. *Id.* at parts B–C, G–H.

44. For a complete list see *id.* at part C.10.

45. *Id.* at parts A–C, G–H.

Technical Expert Review	Increasing transparency of information provided under article 13.7; sharing good practices and lessons learned; identifying best practice examples; assessing the consistency of information with the accounting guidance under article 6.2; information to be reviewed; format and steps (including roles of Parties and the secretariat); review team and institutional arrangements; frequency and timing (and additional requirements for Parties cooperating under article 6)
Multilateral Consideration	Sharing experiences, lessons learned, and best practices from Parties and registered observers; information to be considered (including that on participation in voluntary cooperation under article 6)

Under the SBSTA negotiating track, Parties have reflected on a range of issues concerning the contribution of reporting on article 6 activities to the assessment of efforts made toward Parties' NDCs. "Transparency" was listed as one of the elements in the informal note on article 6.2 that captured Parties' views from their pre-SBSTA 46 submissions and informal consultations during SBSTA 46.⁴⁶ The discussions at SBSTA 47 unfolded more details about transparency requirements for participating in ITMO-related activities. The resulting informal note, as Table 1 outlines, has separate draft elements captioned "accounting," "reporting," and "review," each containing specifics and options for further consideration.⁴⁷

Article 13 connects with article 6.2 such that the MPGs for the transparency framework may guide Parties to report on their practice with respect to sustainable development and environmental integrity.⁴⁸ This is because article 6.2 only explicitly mentions guidance on accounting but less clearly on either sustainable development or environmental integrity. Conversely, the development of guidance and other arrangements under article 6 may inform the reporting (e.g., content, format, and timing) under article 13. The information to track progress for achieving NDCs would necessarily include information relevant to cooperative approaches and the use of ITMOs.⁴⁹ A vivid example of this connection is when drafting

46. Informal Information Note by the Co-Facilitators dated May 17, 2017, SBSTA 46 Agenda Item 10 (a), Guidance on cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement, at part J.

47. Draft Elements for SBSTA Agenda Item 11(a), *supra* note 6, at parts 12–14.

48. See MARCU, REFLECTIONS BEFORE SB 44, *supra* note 27, at 2 (indicating that there are linkages between article 6 and article 13).

49. In Parties' submissions relating to article 6, *see e.g.*, Brazil, *supra* note 27, at ¶ 13 (stating "the 6.2 guidance would consist of an additional 'layer' for the implementation of transparency

elements for the MPGs, the facilitators had placeholders for outputs from SBSTA regarding information to track progress, article 6-related information, and information to be expert-reviewed.⁵⁰

ETSs and relevant bilateral or plurilateral partnerships indicate an encouraging scenario that should fall within the scope of cooperative approaches. ETSs are closely interrelated to transparency as they apparently influence each other. Analysts have noted the crucial role of transparency in developing and operating ETSs.⁵¹ They also recognize the necessity for a transnational transparency framework due to the greater likelihood of linking ETSs in various jurisdictions.⁵² One key indicator of whether an ETS is transparent is whether it applies uniform rules for the MRV to track compliance, coupled with enforcement measures and liability for non-compliance.⁵³ Such rules and measures support access to accurate and credible emissions data, which helps determine the emission cap for an ETS and the quantity of allowances regulated emitters have to obtain and surrender in a compliance period.⁵⁴ Those emitters are required to regularly report their emissions to competent authorities in accordance with MRV rules.⁵⁵ There are also many emitters that bear no obligation to report but still voluntarily disclose their emissions information.⁵⁶ Voluntary disclosure

commitments under Article 13 and for NDCs accounting under Article 4.13 of the Paris Agreement.”); Australia, *supra* note 7 at 2 (saying “Parties should demonstrate consistency with principles and standards of environmental integrity when they report under Article 13.7 on their use of cooperative approaches.”); *see also* PARTY SUBMISSIONS BEFORE MARRAKECH, *supra* note 7, at 9; DAGNET ET AL., *supra* note 37, at 13.

50. Draft Elements for APA 1-4 Agenda Item 5, *supra* note 37, at parts C.4, 10, G.4.14.

51. ASIAN DEV. BANK, EMISSIONS TRADING SCHEMES AND THEIR LINKING: CHALLENGES AND OPPORTUNITIES IN ASIA AND THE PACIFIC 82 (2016) [hereinafter ADB].

52. Deane et al., *supra* note 11, at 95; *see also* Joe Kruger & Christian Egenhofer, *Confidence Through Compliance in Emissions Trading Markets*, 6 SUSTAINABLE L. & POL’Y, no. 2, 2006, at 3 (indicating that market participants and the public are more likely to trust carbon markets when they are transparent); GOVERNANCE OF ARTICLE 6, *supra* note 14, at 3 (indicating that transparency is a fundamental principle for an international carbon market); BREWER & MEHLING, *supra* note 11, at 182 (indicating that international governance structures are crucial to market integrity).

53. Some jurisdictions with ETSs adopt enforcement measures for non-compliance. For example, California has regulations providing penalties for non-compliance by regulated entities, such as failing to surrender compliance instruments to fulfill their compliance obligation. *See* the text accompanying note 61. *See also* Table 4 below for China’s enforcement measures including liabilities for non-compliance. BREWER & MEHLING, *supra* note 11 at 189–90; ADB, *supra* note 51, at 85 (indicating that uniform trading infrastructure and common oversight can ensure transparency).

54. ADB, *supra* note 51, at 78.

55. *Id.* at 27.

56. Julia Rosen, *Here’s What Happens When Companies Actually Track Their CO2 Emissions*, VOX (Apr. 3, 2016, 9:10 AM), <https://www.vox.com/2016/4/3/11350404/corporate-carbon-footprint> [https://perma.cc/G3FN-LKU2].

complements mandatory reporting and encourages broader public participation.⁵⁷ Governments, companies, investors, and the public can access reliable, consistent, and comparable climate information that can generate benefits both domestically and internationally.⁵⁸

The analysis above shows that a transparent MRV of GHG emissions is essential to an operational ETS. Taking a step further, I argue that the process of building an ETS and linking ETSs in various jurisdictions can enhance transparency in relation to reporting GHG emissions, accounting, and other climate actions, including those in the PA context. Further details of how this can be achieved in practice are discussed in Sections 3 and 4 below.

III. HOW CAN ETSS ENHANCE TRANSPARENCY?

A growing body of evidence on established and emerging ETSs finds some positive contributions that ETSs have made to promoting transparency on climate action. Drawing on the practice in North America and China, this section will show that a transparent MRV is necessary for an effective ETS and developing and operating an ETS can benefit MRV.

A. Evaluating Transparency of an ETS

As discussed earlier, having uniform MRV rules in place is pivotal to ensuring the transparency of an ETS. It has also been noted that a transparent ETS should at least possess open platforms for auctioning allowances, have updated and accessible (online) public information, and apply national frameworks that are in conformity with international standards.⁵⁹ Developing these features is therefore necessary for an ETS to effectively promote transparency.

57. This Article does not engage in the discussion of voluntary disclosure. For more details see, e.g., FLORENCE DEPOERS, THOMAS JEANJEAN & TIPHAIN JÉRÔME, VOLUNTARY DISCLOSURE OF GREENHOUSE GAS EMISSIONS: CONTRASTING THE CARBON DISCLOSURE PROJECT AND CORPORATE REPORTS (2016) (discussing in detail about voluntary disclosure). See generally Gail Elizabeth Henderson, *The Materiality of Climate Change and the Role of Voluntary Disclosure*, COMP. RES. IN L. & POL. ECON., no. 47, 2009 (explaining the current disclosure requirements and how voluntary disclosure can fill the gaps).

58. See generally YAMIDE DAGNET ET AL., *supra* note 37, at 6 (discussing the benefits of transparency to various stakeholders).

59. Deane et al., *supra* note 11, at 95–96 (also considering the freedom of information legislation in addition to the three elements as mentioned); see also Liang, *supra* note 12, at 18–19;

Jurisdictions with established or comparatively mature ETSs have scaled up or designed new rules for operating those ETSs. California's cap-and-trade (C&T) program has been "praised for its highly transparent and inclusive consultation process."⁶⁰ It is equipped with a set of legislation and regulations to safeguard its operation. For instance, its rules provide detailed requirements on compliance instruments, registration, GHG allowance and allocation, compliance by covered entities, trading and banking, linkage to external ETSs, offset credits, and enforcement and penalties.⁶¹ The Air Resources Board (ARB), which governs the C&T program, held a public hearing on June 29, 2017 to consider proposed amendments to the Mandatory GHG Emissions Reporting.⁶² The ARB runs a website that announces and updates C&T-related legal instruments and system operation information.⁶³

It is worth noting that California built its C&T program in accordance with the design recommendations from the Western Climate Initiative (WCI); the WCI is a regional, market-based cooperative forum to address climate change involving some American states and Canadian provinces.⁶⁴ The WCI published instruments that took note of partner jurisdictions' consensus on policy recommendations and detailed designs for the C&T program.⁶⁵ The WCI's 2010 Design emphasizes timely access to critical

BREWER & MEHLING, *supra* note 11, at 183 (noting the noticeable progress in transparency for voluntary carbon markets).

60. Deane et al., *supra* note 11, at 93.

61. See generally CAL. CODE REGS. tit. 17, § 95801-96022 (2018) (showing California's cap-and-trade system regulations).

62. See generally CAL. AIR RES. BD., *Amendments to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions* (2017) (showing the amendments made to the regulation for the mandatory reporting of greenhouse gas emissions).

63. *Cap-and-Trade Program*, CAL. AIR RES. BD.
<https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm> [<https://perma.cc/GXZ8-P27U>] (last visited Feb. 9, 2018).

64. Presently, California and Québec are continuing to work together through the WCI to develop and harmonize their ETS policies. See WCI Inc., <https://www.wci-inc.org> [<https://perma.cc/62FB-ZT3D>] (last visited Sept. 14, 2018) (detailing the continuing work WCI does with California and Québec by providing "administrative and technical services to support the implementation of state and provincial greenhouse gas emissions trading programs."). In 2011, the WCI was incorporated to WCI, Inc., which is a non-profit corporation "providing administrative and technical services to its participants to support and facilitate the implementation of their cap-and-trade programs for reducing greenhouse gas emissions." Agreement on the Harmonization and Integration of Cap-and-Trade Programs for Reducing Greenhouse Gas Emissions, Que.-Cal.-Ont., preamble at ¶ 2, Sept. 22, 2017, Office of the Premier of Ont., <https://news.ontario.ca/opo/en/2017/09/agreement-on-the-harmonization-and-integration-of-cap-and-trade-programs-for-reducing-greenhouse-gas.html> [<https://perma.cc/E2EA-BLMP>] [hereinafter Que.-Cal.-Ont. Agreement].

65. See *Documents and Resources*, WESTERN CLIMATE INITIATIVE, <http://www.westernclimateinitiative.org/documents> [<https://perma.cc/MXW3-9RGN>] (last visited Feb.

information pertaining to program operation, and transparency for each jurisdiction's allowance budget-setting, auctioning, and emission allowance tracking.⁶⁶

Québec and Ontario have also adopted the WCI's recommendations.⁶⁷ These two Canadian provinces have developed similar environmentally rigorous C&T programs and transparency standards. Québec, for example, requires covered entities to report their GHG emissions according to the standards set in the Mandatory Reporting Regulation.⁶⁸ Québec's C&T-relevant legislation and regulations together with information and guides concerning program operation and participation are online and publicly accessible.⁶⁹ Ontario employs comparative measures to ensure the transparency and accountability of its program.⁷⁰ Its Climate Change Mitigation and Low-carbon Economy Act requires an annual status report on the province's Climate Change Action Plan.⁷¹ This report includes information on projects and priorities to be funded by C&T proceeds.⁷²

Furthermore, Québec is determined to align its C&T design and operation with the "concepts and principles" set forth in article 6.2 of the

14, 2018) (allowing access to detailed designs, such as the MRV, emissions limits, program coverage, compliance instruments, allowances distribution, offsets, and linkage).

66. WCI Inc., DESIGN FOR THE WCI REGIONAL PROGRAM 8, 18–20, 23 (2010) [hereinafter WCI DESIGN].

67. Press Release, Office of the Premier of Ont., Québec, Ontario, and California Join Forces to Fight Climate Change (Sept. 22, 2017, 10:51 AM), <https://news.ontario.ca/opo/en/2017/09/quebec-ontario-and-california-join-forces-to-fight-climate-change.html> [https://perma.cc/JZ3Z-9CTF]; Erica Morehouse, *Western Climate Initiative Expands: Ontario to Join California-Québec Carbon Market*, ENVTL. DEF. FUND BLOG (Sept. 22, 2017), <http://blogs.edf.org/climatetalks/2017/09/22/western-climate-initiative-expands-ontario-to-join-california-quebec-carbon-market/> [https://perma.cc/TVU2-XHZD].

68. GOV'T OF QUE., REGULATION RESPECTING MANDATORY REPORTING OF CERTAIN EMISSIONS OF CONTAMINANTS INTO THE ATMOSPHERE 5 (May 1, 2018).

69. See, e.g., *Québec: A Leader in the Fight Against Climate Change*, QUÉBEC, <http://www.mddelcc.gouv.qc.ca/changementsclimatiques/index-en.htm> [https://perma.cc/WFJ2-JU63] (last visited Feb. 7, 2018) (touting Québec's provincial government and their support of companies, municipalities, and private citizens in the transition to a low carbon world through implementation of measures set out in the 2013-2020 Climate Change Action Plan).

70. ENVTL. COMM'R OF ONT., FACING CLIMATE CHANGE: GREENHOUSE GAS PROGRESS REPORT 2016 77 (2016).

71. Climate Change Mitigation and Low-Carbon Economy Act, S.O. 2016, c 7, art. 8 (Can.). It should be noted that Ontario's new administration introduced the Cap-and-Trade Cancellation Act in July 2018 to repeal the Climate Change Mitigation and Low-carbon Economy Act. See *Bill 4, Cap and Trade Cancellation Act, 2018*, LEGISLATIVE ASSEMBLY OF ONTARIO (2nd Reading Sept. 13, 2018), <https://www.ola.org/en/legislative-business/bills/parliament-42/session-1/bill-4> [https://perma.cc/T66S-5T67].

72. *Cap and Trade in Ontario*, ONTARIO, <https://www.ontario.ca/page/cap-and-trade-ontario> [https://perma.cc/FRU5-KJCQ] (last updated Jul. 25, 2018).

PA.⁷³ In fact, Québec submitted comments on guidance regarding article 6.2 to the SBSTA.⁷⁴ Its submission addressed the transparency of the province's C&T program and the main program features aimed at achieving environmental integrity.⁷⁵ Québec also reported that it had developed its program in conformity with “the environmental integrity standards set out in decision 2/CP.17, paragraph 79 and 1/CP.18, paragraph 42 in the sense that it must deliver GHG emission reductions that are real, verifiable, permanent and additional, while avoiding double counting.”⁷⁶

B. Building MRV Capacity to Enhance Transparency

Developing and operating ETSs builds MRV capacity, especially in emerging markets. Effective ETSs rely on accurate and updated data to help set the overall emissions limit and the allowance allocation plan. ETSs incentivize the establishment of MRV rules, which ensures transparency. Also, emission data gathered through new MRV regulatory systems could be valuable to existing initiatives. For example, integrating such MRV data with national GHG inventories for energy auditing and reporting can improve both GHG emissions and energy data collection.⁷⁷

China's evolving ETS is one of the emerging and inspiring stories. Between 2013 and 2014, the world's biggest GHG emitter launched pilot ETSs in Beijing, Tianjin, Shanghai, Guangdong, Shenzhen, Hubei, and Chongqing. As of September 2016, they involved some 3000 key enterprises in over 20 industries.⁷⁸ In December 2016, Fujian also started its ETS with a focus on carbon sinks.⁷⁹ Concurrently, a national ETS (NETS)

73. Compare Que., Can. to the United Nations Framework Convention on Climate Change Subsidiary Body for Sci. and Tech. Advice 3 (Oct. 2016), [hereinafter Oct. 2016 Submission by Que., Can.] (describing how Québec's C&T system is designed to prevent double counting) with Paris Agreement, *supra* note 1, art. 6.2 (requiring Parties to avoid double counting).

74. Oct. 2016 Submission by Que., Can., *supra* note 73; Que., Can. to the United Nations Framework Convention on Climate Change Subsidiary Body for Sci. and Tech. Advice (Mar. 2017) [hereinafter Mar. 2017 Submission by Que., Can.].

75. Mar. 2017 Submission by Que., Can., *supra* note 74, at 2–4; Oct. 2016 Submission by Que., Can., *supra* note 73, at 3–5.

76. Oct. 2016 Submission by Que., Can., *supra* note 73, at 3.

77. ADB, *supra* note 51, at 64.

78. See NAT'L DEV. AND REFORM COMM'N, CHINA'S POLICIES AND ACTIONS FOR ADDRESSING CLIMATE CHANGE 48 (2017) [CHINA CLIMATE CHANGE 2017].

79. *Id.*; INTERIM MEASURES FOR THE ADMINISTRATION OF CARBON EMISSIONS TRADING IN FUJIAN PROVINCE, art. 6, 30 (Sept. 30, 2016), http://www.fujian.gov.cn/zc/zfxgkl/gkml/jgzz/fgfz/201610/t20161002_1135886.htm [https://perma.cc/5W6X-BV57] (in Chinese).

has been under development since 2014.⁸⁰ The National Development and Reform Commission (NDRC) is the department within the State Council responsible for developing and managing the ETS nationwide.⁸¹ On December 18, 2017, the NDRC announced a detailed plan for building the NETS that marked its official launch.⁸² It is intended to start with the electricity generation industry, and gradually include more industries and tradable products.⁸³ The following figure presents a draft timeline the NDRC plans to roll out the NETS.⁸⁴

80. See NAT'L DEV. AND REFORM COMM'N, CHINA'S POLICIES AND ACTIONS FOR ADDRESSING CLIMATE CHANGE 40–41 (2016) [CHINA CLIMATE CHANGE 2016].

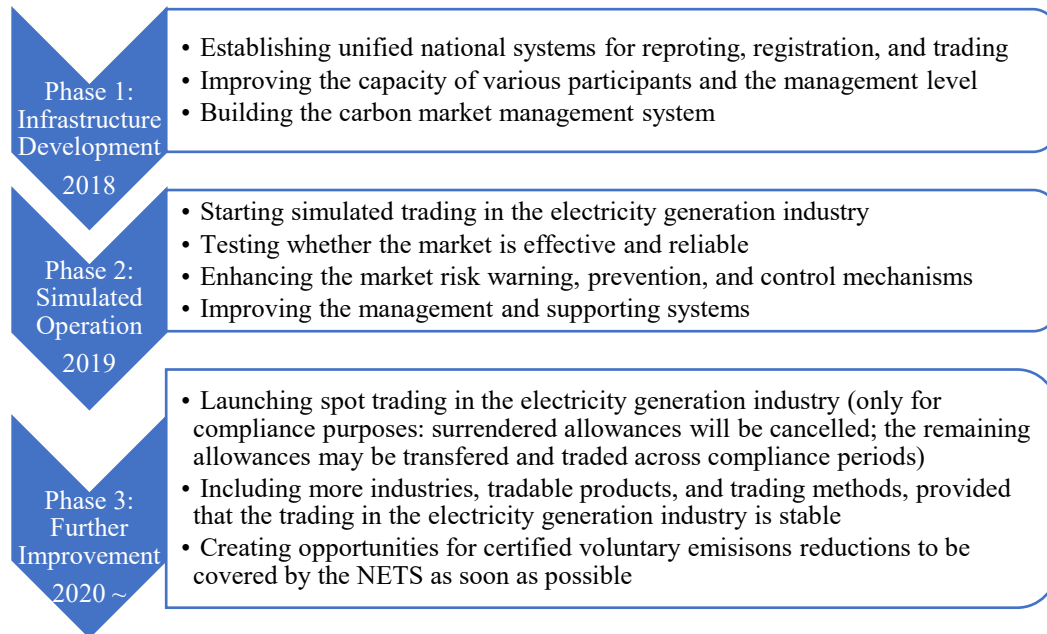
81. But with the ongoing institutional reform within the State Council, the responsibility in relation to climate change and emission reduction is shifting to the newly formed Ministry of Ecology and Environment. See STATE COUNCIL, NOTICE ON INSTITUTIONAL SETTINGS (Mar. 24, 2018), http://www.gov.cn/zhengce/content/2018-03/24/content_5277121.htm [<https://perma.cc/VRG8-4XYL>] (in Chinese); *The State Council Institutional Reform Plan*, XINHUA (Mar. 17, 2018), http://www.xinhuanet.com/politics/2018lh/2018-03/17/c_1122552185.htm [<https://perma.cc/5ZYC-5RKV>] (in Chinese); see also Jackson Ewing, *Tough Tasks for China's New Environment Ministry*, THE DIPLOMAT (Mar. 17, 2018), <https://thediplomat.com/2018/03/tough-tasks-for-chinas-new-environment-ministry/> [<https://perma.cc/UG9U-PZRL>].

82. NAT'L DEV. AND REFORM COMM'N, NOTICE ON ISSUING THE PLAN FOR BUILDING THE NATIONAL CARBON EMISSIONS TRADING MARKET (ELECTRICITY GENERATION INDUSTRY) (Dec. 18, 2017), http://qhs.ndrc.gov.cn/zcfg/201712/t20171220_871133.html [<https://perma.cc/TS2Q-9Y8H>] (in Chinese), with the attachment PLAN FOR BUILDING THE NATIONAL CARBON EMISSIONS TRADING MARKET (ELECTRICITY GENERATION INDUSTRY), <http://qhs.ndrc.gov.cn/zcfg/201712/W020171220577324953088.pdf> [<https://perma.cc/FZ2Q-SRE6>] (in Chinese) [hereinafter NETS PLAN]; see also *National Carbon Emissions Trading Scheme Launched*, NAT'L DEV. AND REFORM COMM'N (Dec. 20, 2017), http://qhs.ndrc.gov.cn/gzdt/201712/t20171220_871173.html [<https://perma.cc/AS98-JYVE>] (in Chinese). For assessments of the NETS, see, e.g., Jocelyn Timperley, *Q&A: How Will China's New Carbon Trading Scheme Work?* CARBON BRIEF (Jan. 29, 2018, 3:46 PM), <https://www.carbonbrief.org/qa-how-will-chinas-new-carbon-trading-scheme-work> [<https://perma.cc/QNK6-WTAR>].

83. NETS PLAN, *supra* note 82, at 2. This plan consists of eight parts: (1) general requirements: guidelines, principles, objectives; (2) market elements: trading participants, tradable products, platforms; (3) participants: key emitters; regulatory authorities; verification bodies; (4) institutional development: MRV system, allowance management, trading rules; (5) allowance management in the electricity generation industry: allowance allocation and surrender; (6) supporting systems: reporting, registration, trading, transaction settlement; (7) pilot ETSs in transition; (8) safeguard measures: organization and leadership, fulfillment of responsibilities, capacity building, and guidance and knowledge sharing.

84. *Id.* at 3. Notably, this plan would be a living instrument because the development and reform departments under the State Council, in conjunction with other relevant departments, may adjust and improve the plan as required on a timely basis. See *id.* at 6–7.

Figure 1: Roadmap for the NETS



Operating pilot ETSs have facilitated GHG emission reporting in China. Prior to launching those pilots, China did not have a national or regional GHG accounting and reporting system.⁸⁵ So far, all the jurisdictions with pilot ETSs have adopted local rules on GHG emissions. These jurisdictions have formulated methods and guidelines for counting emissions from key enterprises. They have also established reporting platforms.⁸⁶ Nationally, China's commitment to GHG emissions profile disclosure was written into the State Council's GHG Control Plan for the 13th Five-Year Plan (2016–2020).⁸⁷ The NDRC has circulated

85. See CHINA CLIMATE CHANGE 2016, *supra* note 80, at 44–47; Angel Hsu, Chendan Yan & Yaping Cheng, *Addressing Gaps in China's Environmental Data: The Existing Landscape* 24 (Yale Data Driven, Working Paper, Jan. 2017) (emphasizing a lack of a standardized MRV system).

86. Ling Chen, *China and Asia-Pacific Carbon Markets*, THE DIPLOMAT (Jun. 2, 2017), <https://thediplomat.com/2017/06/china-and-asia-pacific-carbon-markets/> [<https://perma.cc/7UPZ-3SKU>]; see also CHINA CLIMATE CHANGE 2016, *supra* note 80, at 46–47.

87. STATE COUNCIL, WORK PLAN FOR CONTROLLING GREENHOUSE GAS EMISSIONS DURING THE 13TH FIVE-YEAR PLAN, part 8 (3) (Nov. 4, 2016), http://www.gov.cn/zhengce/content/2016-11/04/content_5128619.htm [<https://perma.cc/YDH6-Z5DJ>] (in Chinese).

departmental rules and policy prescriptions.⁸⁸ The NDRC also submitted the Draft NETS Regulations to the State Council for review and discussion.⁸⁹

Table 3 is a summary of the legislation and applicable policies. These instruments stipulate reporting requirements, including general GHG reporting rules and the reporting-related provisions designed for the ETS. Table 4 further illustrates who must report, what to report, and how to report. This table also contains information on verification of reporting and enforcement measures.⁹⁰

88. All the instruments are available at <http://qhs.ndrc.gov.cn/zcfg/> [<https://perma.cc/GCY9-VNZY>] (in Chinese) (last visited Mar. 20, 2018).

89. See GENERAL OFFICE OF THE STATE COUNCIL, NOTICE ON ISSUING THE STATE COUNCIL'S 2016 LEGISLATIVE WORK PLAN, part 3(4) (Apr. 13, 2016), http://www.gov.cn/zhengce/content/2016-04/13/content_5063670.htm [<https://perma.cc/E7LD-3PYA>] (in Chinese); CHINA CLIMATE CHANGE 2017, *supra* note 78, at 45, 47.

90. In China's legislative system, the National People's Congress (NPC) and its Standing Committee enact and amend laws. The State Council formulates administrative regulations. The ministries and competent authorities of the (vice) ministerial level under the State Council issue departmental rules and measures. Laws prevail over administrative regulations, followed by departmental rules and measures. For detailed analyses of their formulation, hierarchy, and resolution of conflicts, see *China's Legislative System*, THE NATIONAL PEOPLE'S CONGRESS OF THE PEOPLE'S REPUBLIC OF CHINA, http://www.npc.gov.cn/englishnpc/about/2007-11/20/content_1373257.htm [<https://perma.cc/MZ57-J8ZU>] (last visited Feb. 5, 2018) (describing China's legal and legislative system); *Meetings of the Standing Committee and Their Procedures*, THE NATIONAL PEOPLE'S CONGRESS OF THE PEOPLE'S REPUBLIC OF CHINA, http://www.npc.gov.cn/englishnpc/Organization/2007-11/15/content_1373019.htm [<https://perma.cc/H5H5-BXJF>] (last visited Feb. 9, 2018) (describing how bills are deliberated). See also LEGISLATION LAW OF THE PEOPLE'S REPUBLIC OF CHINA (amended Mar. 15, 2015), http://www.npc.gov.cn/npc/dbdhhy/12_3/2015-03/18/content_1930713.htm [<https://perma.cc/GBR6-G87C>] (in Chinese).

Table 3: Key Policies and Legislation concerning Reporting GHG Emissions in China

Authority	Instrument	Year
The State Council submitting to the National People's Congress for approval	12th Five-Year Plan for Economic and Social Development (FYP) [国民经济和社会发展第十二个五年规划纲要] ⁹¹	2011
	13th FYP [国民经济和社会发展第十三个五年规划纲要] ⁹²	2016
The State Council	Work Plan for Controlling Greenhouse Gas Emissions (GHG Control Plan) during the 12th FYP [“十二五”控制温室气体排放工作方案] ⁹³	2011
	Integrated Reform Plan for the Ecological Civilization System [生态文明体制改革总体方案] ⁹⁴	2015
	GHG Control Plan during the 13th FYP [“十三五”控制温室气体排放工作方案]	2016
NDRC	Notice on Reporting Greenhouse Gas Emissions of Key Enterprises and Public Institutions (GHG Reporting Notice) [组织开展重点企业（事）单位温室气体排放报告工作的通知]	2014
	Interim Measures for the Administration of Carbon Emissions Trading (Interim ETS Measures) [碳排放权交易管理暂行条例] ⁹⁵	
	Accounting Methodologies and Reporting Guidelines for Greenhouse	2013–2015

91. THE 12TH FIVE-YEAR PLAN FOR ECONOMIC AND SOCIAL DEVELOPMENT OF CHINA 2011–2015, ch. 21, § 1 (trans., British Chamber of Commerce) (2011) (determining to build an effective GHG accounting system and gradually develop an ETS). The FYP is to set forth China's strategic intentions in a five-year circle. It defines major objectives, initiatives and measures for economic and social development. It also serves as a guide for market participants and an important basis for government to perform its duties.

92. THE 13TH FIVE-YEAR PLAN FOR ECONOMIC AND SOCIAL DEVELOPMENT OF THE PEOPLE'S REPUBLIC OF CHINA 2016–2020 ch. 46, § 1 (trans., Compilation and Translation Bureau, Central Committee of the Communist Party of China) (2016) (determining to develop a national ETS and implement MRV and allowance management in key enterprises).

93. The GHG Control Plan is to achieve the FYP's goals with respect to GHG emission control and low-carbon development. Both the plans during the 12th and 13th FYPs have specific parts dedicated to the development and operation of the ETS.

94. See especially its part 8(42) (having similar provisions as the 12th and 13th FYPs on the ETS). More about this plan see *Full Text: Integrated Reform Plan for Promoting Ecological Progress*, XINHUA (Sept. 21, 2015), http://www.xinhuanet.com/english/china/2015-09/21/c_134646023.htm [https://perma.cc/9GGX-NRRW].

95. NAT'L DEV. AND REFORM COMM'N, INTERIM MEASURES FOR THE ADMINISTRATION OF CARBON EMISSIONS TRADING (Jan. 10, 2015), http://qhs.ndrc.gov.cn/zcfg/201412/t20141212_652007.html [https://perma.cc/RU6U-TEEP] (in Chinese) [hereinafter Interim ETS Measures]. These measures were formulated to implement the 12th FYP and relevant GHG Control Plan. They provide general requirements for allowance management, emissions trading, verification and allowance surrender, supervision and governance, and liabilities. In particular, the departments responsible for the ETS are required to announce in due course the scope of industries, types of GHGs, and standards for determining key emitters (art. 6). As shown in Tables 3 and 4, the NDRC has specified some of the issues in a series of notices/orders, such as the GHG Reporting Notice and the NETS Plan. Its General Office issued the Reporting Guidelines, the NETS Launching Notice, and the 2016–2017 MRV Notice.

	Gas Emissions of Enterprises in 24 Industries (Trial) (Reporting Guidelines) [24 个行业企业温室气体排放核算方法与报告指南（试行）]	
	Notice on Earnestly Completing the Key Work for Launching the National Carbon Emissions Trading Market (NETS Launching Notice) [关于切实做好全国碳排放权交易市场启动重点工作的通知]	2016
	Notice on Completing the Work on Carbon Emissions Reporting and Verification and the Plan for Emissions Monitoring in 2016 and 2017 (2016-2017 MRV Notice) [关于做好 2016、2017 年度碳排放报告与核查及排放监测计划制定工作的通知]	2017
	Plan for Building the National Carbon Emissions Trading Market (Electricity Generation Industry) (NETS Plan) [全国碳排放权交易市场建设方案（发电行业）] ⁹⁶	
NDRC submitting to the State Council for review and discussion	Draft Regulations on the Administration of National Carbon Emissions Trading (Draft NETS Regulations) [碳排放权交易管理条例]	2015–present

Table 4: Details for the Reporting Framework⁹⁷

Who must report	GHG Reporting Notice: (1) enterprises or public institutions that have legal personality or entities that use independent accounting and are considered as legal persons; (2) GHG emissions in 2010 $\geq$ 13000 tons of CO ₂ e or comprehensive energy use $\geq$ 5000 tons of standard coal equivalent (TCE)
	NETS Launching Notice: (1) enterprises that have legal personality or use independent accounting in eight industries: petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper, electricity, and aviation; (2) comprehensive energy use in either 2013, 2014, or 2015 $\geq$ 10000 TCE
	2016-2017 MRV Notice: (1) enterprises or other economic entities in eight industries: petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper, electricity, ⁹⁸ and aviation; (2) GHG emissions in any year from 2013 to 2017 $\geq$ 26000 tons of CO ₂ e or comprehensive energy use $\geq$ 10000 TCE
What to report	GHG Reporting Notice: (1) the emissions of, if any, CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆ ; ⁹⁹ (2) the information of reporting

96. Although the title specifies that it is for the electricity generation industry, many provisions of this plan (see note 83) are general requirements and could implicate other industries.

97. The information in Table 4 was selected and summarized from the instruments in Table 3.

98. The NDRC considers captive power plants in any industry that meet the condition of GHG emissions in (2) as the enterprises in the electricity industry.

99. In addition to the six GHGs, the Interim ETS Measures added NF₃, see art. 47 (defining GHGs as “natural and man-made gaseous components that absorb and reemit infrared radiation in the atmosphere, including CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and NF₃”).

	entities; (3) annual total emissions and emissions by source (from fossil fuel combustion, industrial production, or attributable to the consumption of purchased electricity and heat); (4) if any, emissions outside the place where an entity is registered
	NETS Launching Notice: (1) annual GHG emissions in 2013, 2014 and 2015; (2) other relevant basic data
	2016-2017 MRV Notice: (1) annual GHG emissions in 2016 and 2017; (2) other relevant basic data; (3) emissions monitoring plan
How to report	GHG Reporting Notice: (1) reporting entities measuring and reporting to provincial climate change authorities (by March 30 of each year); (2) provincial authorities assessing and verifying; (3) consolidation report submitted to NDRC (by June 30 of each year)
	NETS Launching Notice: (1) local authorities (assisted by industry associations and state-owned enterprise groups) making draft lists of emitters to be included in the NETS; NDRC cross-checking the lists; (2) emitters on the lists following the Reporting Guidelines to measure and report; (3) third-party verifying; local authorities assessing and verifying; individual emitter reports and consolidated data submitted to NDRC
	2016-2017 MRV Notice (similar to the NETS Launching Notice but with two additions): (1) enterprises in the aviation industry copying their reports to the Civil Aviation Administration of China; (2) spot check, expert review, and other methods used for report assessment and verification
Verification	Reference Qualification on Third-Party Verification Bodies and Verifiers; Reference Guidance on Third-Party Verification ¹⁰⁰
Enforcement measures	Credit management system; blacklist for non-compliance exposure ¹⁰¹
	Administrative penalties, liability for damages and/or criminal liability for key emitters, verification bodies, trading agencies, and other participants ¹⁰²

100. These two references were attached to the NETS Launching Notice. They provide basic requirements for third-party verification bodies and verifiers, as well as verification procedures, reports and formats. The Interim ETS Measures also contain some general requirements for verification, especially in its chapter 4. The NDRC is presently researching the development of administrative measures for third-party verification bodies. *See* NDRC GENERAL OFFICE, NOTICE ON EARNESTLY COMPLETING THE KEY WORK FOR LAUNCHING THE NATIONAL CARBON EMISSIONS TRADING MARKET, part 2(3) (Jan. 11, 2016), http://www.ndrc.gov.cn/gzdt/201601/t20160122_772150.html [<https://perma.cc/SN79-ZM49>] (in Chinese).

101. *See* Interim ETS Measures, *supra* note 95, at art. 38–39 (requiring the establishment of a credit management system that could review and maintain the credit records of key emitters, verification bodies, trading agencies, and other practitioners, as well as a blacklist that could expose those severely violating law and being dishonest).

102. *See id.*, ch. 6. This entire chapter is dedicated to “Liability.” For example, key emitters who refuse to fulfill reporting obligations or to submit verification reports will be ordered by provincial ETS authorities to make corrections within a time limit. Those failing to do so will be given administrative penalties pursuant to law (art. 40.1). For verification bodies, when issuing false reports, making major errors, using or publicizing trade secrets of entities being verified without consent, or

China's transition to the NETS is pushing progress in the MRV system. China does so by broadening the coverage of GHGs and emitters, solidifying the ETS legislation from departmental rules into administrative regulations, unifying the rules, and creating greater potential for linking with other carbon markets. In addition to the progress made in law and policy, China is presently exploring new technologies like blockchain applicable to managing carbon assets that can nurture transparency and trust.¹⁰³ This effort is in concert with the UNFCCC-facilitated initiative on blockchain and distributed ledger technology in support of climate action.¹⁰⁴ China's experience with developing the ETS and MRV may encourage other countries without mature MRV systems to use market-based approaches to realize their emission reduction targets and operate more transparent schemes.¹⁰⁵

IV. LINKING ETSS ENHANCES TRANSPARENCY

The national, subnational, and regional ETSS operating in some Parties to the PA have either already been linked or will likely be linked in future.

conducting other illegal activities, they will be given administrative penalties by provincial ETS authorities pursuant to law and reported to the national ETS authority. They will be suspended should the violation be severe. Pursuant to law, they will bear liability for payment of an award of damages for causing financial loss to key emitters or even criminal liability for committing crimes (art. 42).

103. IBM, *Energy-Blockchain Labs and IBM Create Carbon Credit Management Platform Using Hyperledger Fabric on the IBM Cloud*, PR NEWswire (Mar. 20, 2017), <http://www.prnewswire.com/news-releases/energy-blockchain-labs-and-ibm-create-carbon-credit-management-platform-using-hyperledger-fabric-on-the-ibm-cloud-300425910.html> [<https://perma.cc/WB5L-ZTT4>].

104. *Blockchain Technology Can Boost Climate Action: UNFCCC Recognizes Potential*, UNITED NATIONS (Jun. 1, 2017), <https://unfccc.int/news/how-blockchain-technology-could-boost-climate-action> [<https://perma.cc/N9DJ-BCKA>]; *UN Supports Blockchain Technology for Climate Action*, UNFCCC (Jan. 22, 2018), <https://cop23.unfccc.int/news/un-supports-blockchain-technology-for-climate-action> [<https://perma.cc/UNX9-P993>] (introducing the Climate Chain Coalition and its shared principles and values).

105. *But see* JEFF SWARTZ, CHINA'S NATIONAL EMISSIONS TRADING SYSTEM: IMPLICATIONS FOR CARBON MARKETS AND TRADE 15 (2016) (discussing criticism of China for being too protective of its emissions data and not fully reporting emissions); ALEX LO, CARBON TRADING IN CHINA: ENVIRONMENTAL DISCOURSE AND POLITICS 139–40 (2016) (cautioning that the efforts China has made in preparing the NETS may be compromised by the lack of “a proper design and effective regulation”); Emil Dimantchev, *Calling China's Carbon Markets 'Ambitious' Shows How Low the Bar Has Fallen*, CLIMATE HOME NEWS (Jun. 27, 2017, 5:27 PM), <http://www.climatechangenews.com/2017/06/27/calling-chinas-carbon-market-ambitious-shows-low-bar-fallen/> [<https://perma.cc/L96B-DBXX>] (criticizing the limited information shared by China on its market's key design features such as emissions cap, allowance allocation, and reserve methods, as well as questioning its ambition and effectiveness). Indeed, as shown in Tables 3 and 4, China has made many efforts and progress in addressing those concerns. *See also* Deane et al., *supra* note 11, at 105–06 (observing China's growing attention to the transparency of its pilot ETSS, and that some shortcomings would not necessarily jeopardize the building of a transparent NETS).

Those already linked have mutually accepted each other's compliance instruments to help them achieve GHG reduction targets.¹⁰⁶ This section will discuss established and ongoing ETS linkages and examine the transparency benefits and risks.¹⁰⁷

A. Established and Ongoing Linkages

As early as 2008, Norway linked its ETS with the EU's. Norway incorporated the EU ETS Directive into the European Economic Area Agreement by which they are both bound.¹⁰⁸ This linkage was successful and facilitated by at least two factors: "early consideration for linking to help align system design and a strong political will supported by close trading relations between regions to be linked."¹⁰⁹ By contrast, the negotiations between the EU and Switzerland to link their ETSs started in 2011, and concluded technical negotiations in 2016. However, a linkage agreement is unlikely to enter into force before 2019.¹¹⁰ Arguably, the lack of early consideration of harmonizing key design features slowed down the linking process.¹¹¹ As a result, they had to invest much more time in ensuring compatibility of their systems in terms of: their MRV capacities, the stringency of domestic emissions cap and ambitions, offsets, price control, enforcement measures, and domestic legal issues.¹¹²

106. See generally Que.-Cal.-Ont. Agreement, *supra* note 64, at art. 2 (defining "compliance instruments" as "an instrument, issued by one of the Parties, that can be used by a covered entity or a voluntary participant to fulfill a compliance obligation and having a value corresponding to the emission of one metric ton of CO₂ equivalent greenhouse gas"). For the discussions on the definition and types of linkages see, e.g., Mehling, *supra* note 10, at 112–14; Mehling & Görlach, *supra* note 8, at 3 (discussing the types of multilateral linkages); DANIEL M. BODANSKY ET AL., HARVARD KENNEDY SCHOOL, PROJECT ON CLIMATE AGREEMENTS, FACILITATING LINKAGE OF HETEROGENEOUS REGIONAL, NATIONAL, AND SUB-NATIONAL CLIMATE POLICIES THROUGH A FUTURE INTERNATIONAL AGREEMENT 3–5 (2014).

107. This section pays particular attention to the influence of the U.S. announced withdrawal on the linkages of ETSs.

108. ADB, *supra* note 51, at 70; *Emissions Trading: Commission Announces Linkage EU ETS with Norway, Iceland and Liechtenstein*, EUROPEAN COMMISSION (Oct. 26, 2007), http://europa.eu/rapid/press-release_IP-07-1617_en.htm [<https://perma.cc/Y46T-5XS9>]; INT'L EMISSIONS TRADING ASS'N ET AL., NORWAY: AN EMISSIONS TRADING CASE STUDY 2 (May 2015).

109. ADB, *supra* note 51, at 70.

110. See *Linking the Swiss and EU Emissions Trading Schemes*, SWISS FED. OFFICE FOR THE ENV'T (Jan. 25, 2016), <https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/climate-policy/emissions-trading/linking-the-swiss-and-eu-emissions-trading-schemes.html> [<https://perma.cc/LV49-FSW5>] (showing the slow timeline); *EU and Switzerland Join Forces on Emissions Trading*, EUROPEAN COMMISSION (Aug. 16, 2017), https://ec.europa.eu/clima/news/eu-and-switzerland-join-forces-emissions-trading_en [<https://perma.cc/Z9WX-8FKP>].

111. ADB, *supra* note 51, at 70.

112. *Id.* at 73–79.

Another ETS linkage happened in North America in 2013 when California and Québec reached an agreement to harmonize and integrate their C&T programs.¹¹³ The two programs became fully linked in 2014 and now use a common electronic registry and auction platform.¹¹⁴ The tracking system—Compliance Instrument Tracking System Service (CITSS)—supports participating entity registration, ownership tracking, compliance instrument transfer, emissions compliance, and market oversight.¹¹⁵ The CITSS is expected to “ensure rigorous accounting, avoid double counting and prevent market manipulation and fraud.”¹¹⁶ California and Québec also hold regular joint auctions of GHG allowances.¹¹⁷ This is done in a manner that increases market transparency and price discovery. For example, auction information—including clearing price and purchased allowances—is publicly available after the auction.¹¹⁸ The California-Québec market, also known as the WCI regional market, expanded when Ontario formally joined it on January 1, 2018.¹¹⁹

B. Transparency Benefits

Linking ETSs can operate as a peer-review mechanism for the cooperating jurisdictions in terms of their GHG profiles, climate action, and

113. Agreement between the California Air Resources Board and the *Gouvernement Du Québec* concerning the Harmonization and Integration of Cap-and-Trade Programs for Reducing Greenhouse Gas Emissions, Sept. 27, 2013, Cal. Air Res. Bd., https://www.arb.ca.gov/cc/capandtrade/linkage/ca_quebec_linking_agreement_english.pdf [<https://perma.cc/N54Z-BL8Q>].

114. Que.-Cal.-Ont. Agreement, *supra* note 64, at art. 10 (requiring the Parties to develop and use a common electronic registry and auction platform); Oct. 2016 Submission by Que., Can., *supra* note 73, at 2–3; Mar. 2017 Submission by Que., Can., *supra* note 74, at 3.

115. *Compliance Instrument Tracking System Service*, CAL. AIR RES. BOARD, <https://www.arb.ca.gov/cc/capandtrade/markettrackingsystem/markettrackingsystem.htm> [<https://perma.cc/UF4N-GVH2>] (last updated Sept. 24, 2018).

116. Mar. 2017 Submission by Que., Can., *supra* note 74, at 3.

117. *See Archived Auction Information and Results*, CAL. AIR RES. BOARD, https://www.arb.ca.gov/cc/capandtrade/auction/auction_archive.htm [<https://perma.cc/T78S-M9WC>] (last updated Nov. 21, 2018) (archiving the past auction information and results).

118. *GHG Allowance Auction & Reserve Sale Platform*, WCI, INC. (last visited Sept. 17, 2018), <https://www.wci-auction.org/> [<https://perma.cc/R8E9-FCQS>].

119. *Québec, Ontario and California Join Forces to Fight Climate Change*, QUÉBEC PREMIER (Sept. 22, 2017), <http://www.premier-ministre.gouv.qc.ca/actualites/communiqués/details-en.asp?idCommunique=3272> [<https://perma.cc/YY34-JXFU>] (in French). However, Ontario has recently decided to leave the WCI. *See* Office of the Premier, *Premier Doug Ford Announces the End of the Cap-and-Trade Carbon Tax Era in Ontario* (July 3, 2018, 10:37 AM), <https://news.ontario.ca/opo/en/2018/7/premier-doug-ford-announces-the-end-of-the-cap-and-trade-carbon-tax-era-in-ontario.html> [<https://perma.cc/W5S2-FJVQ>]; *Linkage*, CAL. AIR RES. BOARD, <https://www.arb.ca.gov/cc/capandtrade/linkage/linkage.htm> [<https://perma.cc/7DTV-RRNX>] (last updated Sept. 7, 2018).

associated policy and legislative support. When preparing to link Québec's C&T program with California's or to let Ontario join the WCI regional market, the staff from each system "conducted line-by-line comparisons of the respective program regulations to harmonize them in every respect."¹²⁰ This series of review went well given that all the ETs were built with the WCI recommendations.¹²¹ The 2010 Design shows whether and how to link individual programs.¹²² "This common framework and rules assure that all linkage candidates have a program of equivalent stringency, to ensure the environmental integrity of the carbon market."¹²³

It is essential to implement the review mechanism by more formal institutional arrangements. California, for example, has incorporated the requirements for review into its legislation. Section 12894(f) of California Government Code stipulates that the Governor of California shall make four findings supporting the linkage request from the ARB before the linkage can take place.¹²⁴ These conditions include: (1) stringency of program requirements for GHG reductions (e.g., emission reduction goals, program and MRV requirements, offsets); (2) enforceability of statutory and regulatory requirements of California; (3) enforceability of requirements from the proposed linking jurisdictions; and (4) liability for failure arising from the linkage.¹²⁵ Based on the review of ARB materials and the consultation with the Attorney General of California, on March 16, 2017, the Governor of California (Edmund G. Brown Jr.) found California's and Ontario's C&T programs met the four requirements for linking.¹²⁶

Québec, California, and Ontario concluded a linkage agreement on September 22, 2017.¹²⁷ It provides a transparent and predictable framework for deeper cooperation. The way Québec, California, and Ontario maintain and advance the review of each program can be a model for future initiatives that seek to ensure transparency. Article 1.2(g) of the agreement

120. DISCUSSION OF FINDINGS REQUIRED BY GOVERNMENT CODE SECTION 12894, CAL. AIR RES. BD. 6 (2017) [hereinafter DISCUSSION OF FINDINGS].

121. See CAL. DEP'T OF JUSTICE, ATTORNEY GENERAL ADVICE TO THE GOVERNOR CONCERNING LINKAGE OF CALIFORNIA AND ONTARIO CAP-AND-TRADE PROGRAM (2017) (discussing some of the regulatory history and consensus between jurisdictions) [hereinafter CA ATTORNEY ADVICE]; *Program Design*, WCI INC., <http://www.wci-inc.org/program-design.php> [<https://perma.cc/4G9Y-BGLQ>] (last visited Feb. 7, 2018).

122. See WCI DESIGN, *supra* note 66, at DD-44–46.

123. Mar. 2017 Submission by Que., Can., *supra* note 74, at 2.

124. CAL. GOV'T CODE § 12894(f) (2012).

125. CA ATTORNEY ADVICE, *supra* note 121.

126. See Letter from Governor Edmund G. Brown Jr. to Mary D. Nichols, Chair, Cal. Air Res. Bd. (Mar. 16, 2017); CA ATTORNEY ADVICE, *supra* note 121; Letter from Mary D. Nichols, Chair, Cal. Air Res. Bd., to Edmund G. Brown Jr., Governor of Cal. (Jan. 30, 2017); DISCUSSION OF FINDINGS, *supra* note 120.

127. See Que.-Cal.-Ont. Agreement, *supra* note 64.

provides that, “The intended outcome of the harmonization and integration is to enable each Party under its own statutory and regulatory authority to...enable the sharing of information to support effective administration and enforcement of each party’s statutes and regulations.”¹²⁸ In the harmonization and integration process, article 3.2 prescribes that all Parties shall respect the procedural requirements of each Party, “including appropriate and effective openness and transparency of each Party’s public consultations.”¹²⁹ The Parties shall discuss and/or consult with each other before any changes or additions are made to their programs. A sufficient period of time shall be given for public review and comment prior to the adoption of those changes or additions.¹³⁰ During the supervision and enforcement of this agreement, “The Parties shall work cooperatively to maintain market integrity, including preventing fraud, abuse and market manipulation and to ensure the reliability of the joint auction and their respective programs.”¹³¹

Peer review improves data reporting and information sharing between partners; it also incentivizes them to improve their own MRV standards to be equally effective and able to link their ETSs. This addresses the concern that design features in a less stringent ETS can extend to all other linked schemes and compromise the environmental rigor of a market.¹³² Indeed, some authors indicate that trading allowances is more likely to proceed when programs share equivalent MRV and enforcement measures.¹³³ This was the case for Québec when it amended the Mandatory Reporting Regulation. In one instance, Québec added rules to improve the methods for assessing missing data and ensure the accuracy of measured data before linking with California.¹³⁴ Likewise, Ontario amended relevant regulations for implementing and operating a linked C&T program.¹³⁵ Comparing and

128. *Id.* at art. 1.2(g).

129. *Id.* at art. 3.2.

130. *Id.* at art. 4.3.

131. *Id.* at art. 11.1.

132. *See, e.g.,* Mehling, *supra* note 10, at 110 (noting the necessity for harmonization because design features and differences in each scheme may affect the integrity of the overall market).

133. *See, e.g.,* Liang, *supra* note 12, at 118–119.

134. *Id.* at 118.

135. *Regulation Decision Notice: Amendments to the Cap and Trade Program and Reporting Regulations & Service Regulation & Administrative Penalties Regulation*, ENVIRONMENTAL REGISTRY OF ONTARIO (updated Dec. 28, 2017), <http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTMzNTQx&statusId=MjAzODc3> [<https://perma.cc/5BGS-CVA8>].

harmonizing the proposed linked programs—including MRV regulations—enables equivalent market rules, environmental integrity, and compliance requirements among those jurisdictions.¹³⁶

Internationally, Québec brought the linkage issue discussed above to the negotiation of the PAWP development. In its submission to the SBSTA, Québec considered environmental integrity as “a pre-condition for full linking.”¹³⁷ A thorough review of each jurisdiction’s environmental integrity parameters and associated regulations can ensure that “regulatory language variations did not give way to differences of implementation between partner jurisdictions that could jeopardize the implementation, and alter the environmental integrity, of the common market.”¹³⁸ Québec believed that jurisdictions that transfer allowances internationally should demonstrate that environmental integrity is a paramount concern in the design and operation of their programs.¹³⁹ Québec and Ontario also informed the Canadian federal government of their intention to collaborate with California and to establish an accounting mechanism for the flow of GHG emissions allowance within the WCI regional market.¹⁴⁰ As they suggested, this mechanism could inform the interpretation and implementation of the PA’s article 6.2.¹⁴¹ They further stressed that it should ensure “a transparent and data-driven calculation that attributes to each Party its portion of the total [GHG emissions reductions] achieved jointly by the Parties.”¹⁴² They attached great importance to the mechanism’s consistency with relevant national and international principles and criteria concerning environmental integrity and robust accounting.¹⁴³

C. Risks

The practice discussed above reveals how linking ETSs can promote MRV requirements and transparency. Benefits generated from bilateral or regional partnerships could be useful in implementing multilateral agreements such as the PA. The WCI regional partnership is arguably the

136. DISCUSSION OF FINDINGS, *supra* note 120, at 10.
137. Mar. 2017 Submission by Que., Can., *supra* note 74, at 3.
138. *Id.*
139. *Id.* at 2.
140. *Id.* at 4.
141. *Id.*
142. Que.-Cal.-Ont. Agreement, *supra* note 64, at art. 8.1.
143. *Id.* at art. 8.2, 8.4.

best practice for cooperative approaches that involve the adjustment of compliance instruments to realize GHG emissions reduction objectives. However, according to the PA's article 6.3, non-Party cooperation for the achievement of NDCs only counts when participating Parties give authorization.¹⁴⁴ Compliance instruments traded between California, Québec, and Ontario, as this Article suggests, are ITMOs. The U.S. and Canada could authorize—if those subnational entities intend—their efforts to be calculated toward achieving the NDCs of the U.S. and/or Canada.¹⁴⁵

The controversial retreat of the current U.S. federal government from the PA climate regime highlights the question of how mitigation outcomes transferred between non-Party entities can count toward achieving country Parties' NDCs.¹⁴⁶ It is easier to answer when the political environment favors climate action. Currently, Canada has struck a more positive note at the federal level. Pricing carbon pollution constitutes a core element of the Pan-Canadian Framework on Clean Growth and Climate Change announced on December 9, 2016.¹⁴⁷ This plan requires all Canadian jurisdictions to have carbon pricing in place by 2018. In this case, counting mitigation efforts from Ontario's and Québec's C&T programs toward achieving Canada's NDC should not be overly difficult.¹⁴⁸ The question

144. Paris Agreement, *supra* note 1, at art. 6.3.

145. Notably, some Parties did not consider ITMOs as including allowances from C&T programs. See SBSTA Roundtable Document, *supra* note 27, at 2. See also Brazil, *supra* note 27, at ¶ 20 (saying that article 6.2 does not accommodate linkages between domestic, subnational or regional ETSSs, given the concerns about the transparency and comparability of mitigation outcomes). As this Article discusses, however, such concerns can be addressed by an ETS that has transparent features as well as a linkage that prioritizes rigorous environmental integrity and transparency.

146. Chen, *supra* note 86.

147. PAN-CAN. FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE (2016). For the status of its implementation, see PAN-CAN. FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE, FIRST ANNUAL SYNTHESIS REPORT ON THE STATUS OF IMPLEMENTATION (2017).

148. See TECHNICAL PAPER ON THE FEDERAL CARBON PRICING BACKSTOP (2017) (seeking to inform and obtain feedback from Canadians and stakeholders about the federal carbon pricing backstop system that would apply in any jurisdiction that has not employed carbon pricing by 2018). This federal plan, however, has come with resistance from provincial governments. See, e.g., Kelly Cryderman & Shawn McCarthy, *Saskatchewan's Scott Moe Seeks Court Opinion on Whether Carbon Tax Is Constitutional*, GLOBAL AND MAIL (Apr. 25, 2018), <https://www.theglobeandmail.com/canada/article-saskatchewan-seeks-court-of-appeal-ruling-on-federal-carbon-tax/> [<https://perma.cc/8TYC-M749>]; Fatima Syed & Steph Wechsler, *Ontario Government Launches Constitutional Court Challenge Against Federal 'Carbon Tax'*, CANADA'S NATIONAL OBSERVER (Sept. 14, 2018), <https://www.nationalobserver.com/2018/09/14/news/ontario-government-launches-constitutional-court-challenge-against-federal-carbon> [<https://perma.cc/S3RU-WUKV>]. Similar legal issues may arise in other countries when their national and subnational governments have divergent opinions with respect to linking ETSSs, signing international treaties, and the like. These risks are likely to affect an ETS, including its role in achieving transparency, and need to be carefully addressed in future research.

becomes far more complicated when political support for climate action is absent or faltering. Despite aspiring subnational determination and other efforts to keep the U.S. alive to its PA commitments, its federal notification to the U.N. regarding its intention to withdraw provides an example of the challenges that may arise.¹⁴⁹

Under article 6.3, when a jurisdiction does not obtain approval or is part of a country that is not a Party to the PA, the recognition of ITMOs from the jurisdiction as such remains uncertain. It is a practically important question. The SBSTA should consider providing better guidance on interpreting this provision in relation to participation, eligibility, and requirements. With that said, progress to date has been sporadic. At best, the SBSTA co-chairs mentioned “guidance for participation of other actors” in passing in their most recent informal note.¹⁵⁰ In Parties’ submissions, there were calls for promoting the involvement of non-Party actors like private sectors and subnational governments in the cooperative approaches.¹⁵¹ What is disappointing is that they were merely reiterating the text of article 6.3 (as indicated in Table 1), but without further elaboration on whether and how an ITMO from a non-Party, and short of authorization, could be used toward a Party’s NDC.¹⁵²

CONCLUSION

Developing and linking ETSs is a feasible pathway to enhancing transparency under the PA. Such initiatives contribute to increased transparency through GHG emissions tracking. Other contributions include building stronger MRV capacities and improving access to information regarding the ETS and other climate actions. The established markets have strengthened the MRV for an operational ETS. In emerging markets,

149. Office of the Spokesperson, *Communication Regarding Intent to Withdraw from Paris Agreement*, U.S. DEP’T. OF STATE (Aug. 4, 2017), <https://www.state.gov/t/pa/prs/ps/2017/08/273050.htm> [<https://perma.cc/AL4P-LF87>]. For the U.S. subnational efforts see We Are Still in, *An Open Letter to the International Community and Parties to the Paris Agreement from U.S. State, Local, and Business Leaders* (last visited Sept. 17, 2018), <http://wearestillin.com/> [<https://perma.cc/DP3E-USY3>].

150. Draft Elements for SBSTA Agenda Item 11(a), *supra* note 6, at part 25.

151. See, e.g., Canada, *supra* note 7, at ¶ 4; Australia, *supra* note 7, at 3.

152. It is nonetheless useful to look at efforts beyond international negotiations. See, e.g., MEHLING ET AL., *LINKING CLIMATE POLICIES*, *supra* note 25, at 16–18 (2017) (discussing possible interpretations of article 6.3 with supporting arguments); MARCU ET AL., *ISSUES AND OPTIONS*, *supra* note 29, at 11 (addressing issues concerning authorization).

China's pilot ETSs offer an encouraging story. Its ETSs have facilitated the development of robust accounting and GHG emissions reporting. Through its transition to the NETS, the system is pushing for further advancements in the MRV system. Linkages between cross-border ETSs such as the WCI regional market serve as an avenue for peer-reviewing collaborating partners' climate profiles, their efforts and regulatory support. This improves data reporting and information sharing among the partners, and levels up MRV standards.

This Article suggests that trading emission allowances in linked ETSs falls within the PA's cooperative approaches, given its essential role in promoting transparency, among other benefits. Articles 6.2 and 6.3 of the PA do not seem to restrict their governance within the CMA, and reading them together reveals the possibility for non-Party participation where Parties authorize the use of ITMOs. Decentralized governance is likely to incentivize broader participation as the current global trend indicates that more ETSs and partnerships are likely to emerge. Notably, when an ETS fails the approval requirement or belongs to a non-Party country, whether to recognize its transferred allowances as ITMOs remains uncertain under article 6.3. The SBSTA needs to address this issue when developing the guidance for cooperative approaches.

I hope that further discussions can focus on the relationship between ETSs and climate transparency. The PA's article 6.2 can inform its article 13. The development of guidance on cooperative approaches can inform Parties' regular report of their GHG emissions, removal, and other implementation efforts. If cooperative approaches and ITMOs are used, the information relevant to them should be used to track progress. Conversely, the MPGs designed by the APA may guide Parties to report on the implementation of their obligations as to environmental integrity and sustainable development, which currently lack specific SBSTA work programs to make them become functional. Best practices from bilateral or regional ETS partnerships (e.g., peer review of climate standards and actions) are useful in multilateral contexts to inspire or complement the technical expert review and multilateral consideration of progress. They can also inform policymakers and legislators in emerging markets, and negotiators for developing the PAWP.

CALLING FOR CLARITY: REVISITING THE WILDERNESS ACT IN LIGHT OF EMERGING TECHNOLOGY

*Katelin Shugart-Schmidt**

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INTRODUCTION

“[T]here is in our planning a need also to secure the preservation of some areas that are so managed as to be left unmanaged—areas that are undeveloped by man’s mechanical tools and in every way unmodified by his civilization.”¹

Of the many types of natural areas set aside in the United States, those areas designated as *wilderness* receive the greatest protection from human

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1. Howard Zahniser, *The Need for Wilderness Areas*, LIVING WILDERNESS, Winter–Spring 1956, at 37, 37.

impact.² While national parks are deliberately filled with roads and lodges for easy recreational access, and trails for off-road vehicles are built to cross rangelands,³ wilderness areas are unique places where adventurers and wanderers, outdoorsmen and explorers can seek solitude and separation from modern life. Unlike all other managed natural lands, the Wilderness Act⁴ ensures that wilderness areas are kept completely free of cars, bicycles, rest stops, hotels, and restaurants.⁵ They are meant “to establish a human-to-nature connection with the landscape” and to permit a visitor to “fully and deeply experience the natural world.”⁶

Today, when it is increasingly difficult to find spaces not filled with the sounds and distractions that technology brings, exposure to the outdoors may make people more empathetic, kind, and creative, and less anxious and stressed.⁷ Though many individuals have the self-restraint to disengage by leaving electronics at home, areas without any access to the internet or phone signal provide a unique opportunity for *forced* disconnection. Children are particularly susceptible to technology’s allure, and non-networked wilderness areas allow complete escape from the otherwise pervasive modern “technococoon.”⁸

2. TOM CARLSON ET AL., SOC’Y FOR WILDERNESS STEWARDSHIP, WHITE PAPER ON STEWARDSHIP ISSUES: THE USE OF NEW TECHNOLOGY IN WILDERNESS: EMERGING ISSUES AND NEED FOR POLICY AND MANAGEMENT 12 (2016), <http://wildernessstewardship.org/sites/default/files/custom/Technology%20White%20Paper%20Final.compressed.pdf>.

3. Scott Johnson, *National Park Roads: A Legacy in the American Landscape*, NAT’L PARKS TRAVELER (Mar. 28, 2017), <https://www.nationalparkstraveler.org/review/2017/03%E2%80%8B/national-park-roads-legacy-american-landscape> [https://perma.cc/SD4G-PL9R].

4. Wilderness Act of 1964, Pub. L. No. 88-577, 78 Stat. 890 (codified as amended at 16 U.S.C. §§ 1131–1136 (2018)).

5. See, e.g., Peter A. Appel, *Wilderness and the Courts*, 29 STAN. ENVTL. L.J. 62, 78 (2010) (outlining prohibited commercial enterprises within wilderness areas).

6. NAT’L PARK SERV., KEEPING IT WILD IN THE NATIONAL PARK SERVICE: A USER GUIDE TO INTEGRATING WILDERNESS CHARACTER INTO PARK PLANNING, MANAGEMENT, AND MONITORING 192 (2014).

7. See Florence Williams, *This Is Your Brain on Nature*, NAT’L GEOGRAPHIC, <http://www.nationalgeographic.com/magazine/2016/01/call-to-wild/> [https://perma.cc/62ZR-HJKF] (last visited Apr. 18, 2018) (discussing a study that showed volunteers’ calming physiological responses to images of nature versus the negative and stressful physiological reactions when the subjects viewed images of “urban scenes”).

8. L.D. Rosen et al., *Media and Technology Use Predicts Ill-Being Among Children, Preteens and Teenagers Independent of the Negative Health Impacts of Exercise and Eating Habits*, 35 COMPUTERS HUMAN BEHAV. 364, 372 (2014) (quoting MICHELLE M. WEIL & LARRY D. ROSEN, TECHNOSTRESS: COPING WITH TECHNOLOGY @WORK @HOME @PLAY 364 (1998)). See generally Michael Mutz & Johannes Müller, *Mental Health Benefits of Outdoor Adventures: Results from Two Pilot Studies*, 49 J. ADOLESCENCE 105, 110–11 (2016) (discussing how complete disconnection from technology while in natural areas increased the “life satisfaction, happiness, mindfulness, and self-efficacy” of teenagers and young adults).

Recently, wilderness managers have noted that “[t]here are a number of things on the horizon that could degrade opportunities for solitude or primitive and unconfined recreation. . . . [I]ncreased availability and use of technology—from satellite phones to web cams to personal tracking devices—diminish solitude.”⁹ Yet none of the federal agencies responsible today for managing wilderness areas have developed explicit policies for decision-making on cellular and wireless internet service issues.¹⁰ Wilderness areas established within national parks are particularly hard-hit by the unregulated spread of cellular signals, and conflicts arising out of the Theodore Roosevelt and Mount Rainier wildernesses provide clear case studies of how pressing this issue has become.¹¹

Located in North Dakota, the Theodore Roosevelt Wilderness makes up 29,920 acres of the Theodore Roosevelt National Park (TRNP).¹² In late 2014, TRNP notified the public that it was considering replacing an existing (and functional) radio tower in the park with one constructed and managed by Verizon.¹³ The proposed tower was considerably larger and more complex than the prior structure, and though it was proposed to be physically placed just outside of the wilderness border, the enhanced signal would have

9. NAT’L PARK SERV., *supra* note 6, at 166.

10. *Frequently Asked Questions*, NAT’L PARK SERV.: WILDERNESS, <https://wilderness.nps.gov/faqnew.cfm> [<https://perma.cc/S2R2-BAZG>] (last visited Apr. 18, 2018).

11. Compare Laura Zuckerman, *America’s National Parks Weigh Solitude Against Cellular Access*, REUTERS (Jan. 19, 2013, 8:00 AM), <http://www.reuters.com/article/usa-parks-cellphones-idUSL2N0AK10V20130119> [<https://perma.cc/YMB7-GTMN>] (reviewing public displeasure with cellular access in national parks), with Celina Kareiva & Peter Kareiva, *Op-Ed: We Need to Expand Cell Coverage in National Parks*, OUTSIDE (Oct. 10, 2016), <https://www.outsideonline.com/2100816/op-ed-we-need-to-expand-cell-coverage-national-parks> [<https://perma.cc/45VH-B2WG>] (arguing for expansion of cell phone coverage in national parks). Additionally, although Yellowstone National Park does not have any congressionally designated wilderness areas, ninety percent of the park has been recommended for designation and thus should be managed to the same standards as designated wilderness as a Wilderness Study Area. See generally NAT’L PARK SERV., WILDERNESS RECOMMENDATION: YELLOWSTONE (1972) (describing the reasons that Congress should designate Yellowstone as a wilderness area); Krista Langlois, *Yellowstone Tower Reignites Debate over Cell Phones in the Backcountry*, HIGH COUNTRY NEWS (Aug. 5, 2013), <http://www.hcn.org/blogs/goat/towers-in-yellowstone-deaths-in-the-wave-prompt-more-musings-on-cell-phones-in-the-backcountry/> [<https://perma.cc/8SZU-Z6RA>] (discussing how the spread of cellular coverage within Yellowstone has sparked considerable debate). As an additional example, Big Bend National Park is planning to erect two cellular towers in the Study Butte/Terlingua area of the park. See *Proposed Terlingua Cell Towers to be 200 Feet Tall Down From Original 270 Feet*, BIG BEND GAZETTE (Aug. 29, 2018), <https://bigbendgazette.com/2018/08/29/proposed-terlingua-cell-towers-200-feet-tall-original-270-feet/>. There are additional concerns that lights placed on top of the towers will negatively impact the park’s night sky viewing conditions. *Id.*

12. NAT’L PARK SERV., FOUNDATION DOCUMENT: THEODORE ROOSEVELT NATIONAL PARK: NORTH DAKOTA 13 (2014).

13. *Replace North Unit Radio Tower*, NAT’L PARK SERV., <https://parkplanning.nps.gov/projectHome.cfm?projectID=55468> [<https://perma.cc/3ZJ2-UX52>] (last visited Apr. 18, 2018).

blanketed the interior wilderness.¹⁴ After substantial public pressure, TRNP considered options for directional signal placement in an attempt to keep the wilderness network-free, and the finalized tower plan ultimately “only target[ed] the [nearby] US Highway 85 corridor and will not provide additional cell service in designated wilderness areas.”¹⁵ However, park managers had little regulatory guidance on how technology trade-offs should be evaluated throughout the permitting process.¹⁶

Similarly, 97% of Mount Rainier National Park (MRNP) is composed of congressionally designated wilderness areas, covering more than 200,000 acres.¹⁷ In late 2016, the National Park Service (NPS) received proposals from both Verizon and T-Mobile to install additional communications infrastructure on an existing tower located within MRNP’s tiny slice of non-wilderness land.¹⁸ Coverage maps provided through the public-notice process indicate that the construction will cause spillover of cellular service into the surrounding wilderness.¹⁹ The proposal sparked significant debate in the surrounding community, and more than 480 people responded to the NPS’s request for public comment, almost evenly divided between those for and against.²⁰

14. *Environmental Assessment: Communication Tower Replacement and Co-Location in Theodore Roosevelt National Park*, NAT’L PARK SERV., <https://parkplanning.nps.gov/document.cfm?parkID=167&projectID=55468&documentID=70215> [<https://perma.cc/M6FT-UGX6>] (last visited Apr. 18, 2018).

15. NPT Staff, *Theodore Roosevelt National Park Moving Ahead with North Unit Communication Tower*, NAT’L PARKS TRAVELER (May 4, 2017), <https://www.nationalparkstraveler.org/2017/05/theodore-roosevelt-national-park-moving-ahead-north-unit-communication-tower> [<https://perma.cc/8P2U-2URK>]; see also *Theodore Roosevelt National Park Releases Final Environmental Assessment and Finding of No Significant Impact for the Proposed North Unit Communication Tower Replacement*, NAT’L PARK SERV. (Apr. 26, 2017), <https://www.nps.gov/thro/learn/news/nu-tower-replacement.htm> [<https://perma.cc/CM79-PNYC>].

16. Kurt Repanshek, *Cell Phone Tower Issue at Theodore Roosevelt National Park Raises Questions of Connectivity in National Parks*, NAT’L PARKS TRAVELER (Nov. 20, 2016), <https://www.nationalparkstraveler.org/2016/11/cell-phone-tower-issue-theodore-roosevelt-national-park-raises-questions-connectivity> [<https://perma.cc/L5RX-EDAM>].

17. Washington Park Wilderness Act of 1988, Pub. L. No. 100-668, 102 Stat. 3961 (codified as amended in scattered sections of 16 U.S.C.).

18. See Phuong Le, *Cellphone Service at Mount Rainier: Safety Improvement or Obnoxious Intrusion?*, SEATTLE TIMES (Dec. 27, 2016, 1:13 PM) <http://www.seattletimes.com/seattle-news/cell-service-at-mount-rainier-safety-improvement-or-obnoxious-intrusion/> [<https://perma.cc/Q25N-GLZD>].

19. See *Paradise Cellular Predicted Coverage Maps*, NAT’L PARK SERV., <https://parkplanning.nps.gov/document.cfm?parkID=323&projectID=56639&documentID=76417> [<https://perma.cc/4NJD-YGHX>] (last visited Feb. 6, 2018) (providing maps to compare existing service coverage with the Verizon and T-Mobile expansion maps to see wilderness area spillovers).

20. Stuart Leavenworth, *Wire the Wilderness? As Cell Service Expands, National Parks Become the Latest Digital Battlegrounds*, MCCLATCHY: DC BUREAU (Dec. 27, 2017, 12:26 PM), <http://www.mcclatchydc.com/news/nation-world/national/article191682394.html> [<https://perma.cc/ZG2P-TDL7>]; see also Craig Hill, *Mount Rainier Cell Coverage: Should Concerns for Serenity Trump Public Safety? Speak up*, OLYMPIAN (June 8, 2017, 8:04 AM), <http://www.theolympian.com/outdoors/article154444269.html> [<https://perma.cc/7EB2-YZ6K>]; Le, *supra*

The questions emerging from just these two wilderness areas demonstrate the pressing nature of the technology conundrum. Wilderness areas constitute a unique natural resource. Without guidance, wilderness managers have been left to try to balance the underlying goals of the Wilderness Act against commercial pressure to expand cellular coverage on a discrete, area-by-area basis. Managers lose out on the benefits of lessons learned through administrative review and public comment, and advance planning occurs only on an ad hoc basis.

Until Congress develops a comprehensive standard to address the existence of advanced modern technology within wildernesses, decisions about what is permissible will fall to the courts and to the managing agencies.²¹ First, courts should adapt their existing frameworks for evaluating whether a particular form of wilderness conduct is acceptable to assess the unique problem posed by advanced technology.²² Second, each regulating agency should use administrative rulemaking to promulgate a binding policy that articulates standards for assessing the appropriateness of technological expansion.²³ The policies should place a significant burden on commercial operators and wilderness managers to articulate why expansion is both necessary and consistent with the preservation of an area's wilderness character.²⁴

Part I details the rationale for the creation of the Wilderness Act itself, alongside the current management regime of wilderness areas. It then explores the types of technology historically permitted in wilderness areas and how modern technology does not fit neatly into the conduct imagined at the time of the Act's passage. Next, Part II explores the standards courts have developed to judge what conduct is consistent with the Wilderness Act's aims and proposes a modified guideline to aid judicial inquiry into these issues. Finally, Part III suggests that, in the absence of executive or congressional action, managing agencies should take the initiative to craft regulatory

note 18 ("Some say cell service would improve safety and provide a convenience for visitors. Others don't want it, saying the proliferation of phones would distract from the natural beauty of the surroundings."); Mitch Pittman, *Mount Rainier National Park Considers Installing Cell Towers in Paradise Visitors Center*, KOMONEWS.COM (Dec. 15, 2016, 1:13 PM), <http://komonews.com/news/local/mount-rainier-national-park-considers-installing-cell-towers-in-paradise-visitors-center> [https://perma.cc/B9HZ-DXVP] ("The park said opinions were impassioned and mixed.").

21. See generally Appel, *supra* note 5, at 66 (discussing the judicial process and how permissibility challenges fall on the court system).

22. See *infra* Part II.

23. MAEVE P. CAREY, CONG. RESEARCH SERV., RL32240, THE FEDERAL RULEMAKING PROCESS: AN OVERVIEW 2 (2013) (noting that agencies have the authority to use the administrative rulemaking process).

24. See *infra* Part III.

criteria to guide decisionmaking with regard to emerging technology and wilderness lands.

I. THE WILDERNESS ACT & TECHNOLOGICAL DEVELOPMENT

Wilderness areas are designated by Congress pursuant to the 1964 Wilderness Act,²⁵ and a federal public lands agency manages each area.²⁶ As the Act's prohibitions on development are not self-modernizing, determining how, and to what extent, technological expansion infringes upon the underlying goals of wilderness preservation is a difficult problem. Evaluating the goals behind the establishment of wilderness lands, the history of the Wilderness Act's creation, and the recent changes in available technology demonstrates how changing technology poses problems for wilderness unanticipated by the original legislation.

A. The Creation of Wilderness Areas

National interest in preserving untouched natural areas began at the turn of the twentieth century, when agency scientists in the U.S. Forest Service began to publicly criticize the unmanaged expansion of road systems within national forests.²⁷ In 1924, in response to advocacy efforts by two agency employees, the Forest Service established the Gila Primitive Area and followed it with five additional small but similarly protected areas.²⁸ For the first time in American history, federal land was set aside purely to preserve its undisturbed natural character.²⁹ Five years later, Congress temporarily placed more than fourteen million acres of national forest under a "primitive" designation that aimed to protect its natural, pre-industrial state, although it permitted logging to continue.³⁰ After another decade, in 1939, Congress reclassified each of the primitive areas as "wild," "wilderness," or "recreation" lands.³¹ Within both the "wild" and "wilderness" lands, Congress also banned all road construction, logging, motorized transportation, and other commercial activities.³²

25. 16 U.S.C. §§ 1131–1136 (2012).

26. *Frequently Asked Questions*, *supra* note 10.

27. Robert L. Glicksman, *Wilderness Management by the Multiple Use Agencies: What Makes the Forest Service and the Bureau of Land Management Different?*, 44 ENVTL. L., 447, 461 (2014).

28. *Id.* The two employees, Arthur Carhart and Aldo Leopold, were prominent figures in the broader conservation movement. *Id.*

29. *History of the Gila Wilderness*, U.S. DEP'T OF AGRIC.: FOREST SERV., <https://www.fs.usda.gov/detail/gila/learning/history-culture/?cid=stelprdb5038907> [<https://perma.cc/M87X-JPKU>] (last visited Apr. 25, 2018).

30. Glicksman, *supra* note 27, at 461.

31. *Id.*

32. Appel, *supra* note 5, at 73.

However, attempts to preserve undisturbed land remained rare until two decades later when a movement began to stop construction of the Echo Park Dam within the Dinosaur National Monument.³³ The dam's construction caused concern over the far-reaching degradation of wilderness lands to reach a wider audience. Howard Zahniser, a leader of the movement and the executive secretary of the Wilderness Society,³⁴ drafted the first Wilderness Bill in 1955 for Congress's consideration.³⁵ After its introduction a year later, the bill survived "66 rewrites and 6000 pages of testimony" before passing both legislative bodies in 1964.³⁶ Although compromises and significant changes were struck along the way, including alterations to the federal body that made wilderness recommendations and changes to how areas were implemented,³⁷ much of Zahniser's original language persisted in the final iteration of the Act.³⁸ This language articulates the Act's focus and still drives designation decisions today.

The most poetic and well-known language from the Wilderness Act comes from its definition of wilderness, which says, "in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."³⁹ Scholars have further articulated the definition of wilderness by dividing it

33. Interview by Ken Verdoia with David Brower, Exec. Dir., Sierra Club, in Salt Lake City, Utah (Oct. 1999).

34. Kevin Proescholdt, *Untrammeled Wilderness*, MINN. HIST., Fall 2008, at 114, 115.

35. NAT'L PARK SERV., THE WILDERNESS ACT AND SUBSEQUENT LEGISLATION - AN OVERVIEW at II.D1 (2004), <http://www.peopleforwesternheritage.com/WildernessActSum.pdf>.

36. *Id.*

37. Compare S. 1123, 86th Cong. § 2(f) (1959) ("Any proposed [change to the] Wilderness System, shall be made only after not less than ninety days' public notice and the holding of a public hearing, if there is a demand for such a hearing, and shall be reported with map and description to Congress by the Secretary of Agriculture, the Secretary of the Interior, or other official or officials having jurisdiction over the lands involved and shall take effect upon the expiration of the first period of one hundred and twenty calendar days, of continuous session of Congress, following the date on which the report is received by Congress; but only if during this period there has not been passed by Congress a concurrent resolution opposing such proposed addition, modification, or elimination."), with H.R. 9070, 88th Cong. § 3(b) (1964) ("The President shall advise the United States Senate and House of Representatives of his recommendations with respect to the designation as 'wilderness' or other reclassification of each area on which review has been completed, together with maps and a definition of boundaries. . . . Each recommendation of the President for designation as 'wilderness' shall become effective only if so provided by an Act of Congress.").

38. As an example of Zahniser's enduring prose, compare S. 1176, 85th Cong. § 1(c) (1957) ("A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a member of the natural community who visits but does not remain and whose travels leave only trails."), with H.R. 9070, 88th Cong. § 2(c) (1964) ("A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.").

39. 16 U.S.C. § 1131(c) (2012).

into a set of objective and subjective characteristics.⁴⁰ This deconstructive analysis is necessary because, while wilderness is hard to describe, “[l]aws must articulate a clear legal standard that . . . agencies can implement.”⁴¹

The objective requirement of the Act is generally straightforward, requiring only that each area have “at least five thousand acres of land or [be] of sufficient size as to make practicable its preservation and use in an unimpaired condition.”⁴² In contrast, the subjective aspects of wilderness are more difficult to quantify.⁴³ For example, the definition of wilderness states that the land chosen must “generally appear[] to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable.”⁴⁴ The NPS has focused on Congress’s decision to avoid the words “untouched” or “pristine” within the definition as an indicator that Congress did not intend wilderness areas to be “completely free from all human impacts,” but rather substantially unaffected by them.⁴⁵ In contrast, some scholars have noted that the public commonly thinks of the wilderness as “a primordial, relatively untouched natural area where natural forces dominate, and human presence is limited to visitation by outdoor recreations and the limited infrastructure . . . they require.”⁴⁶ Taken as a whole, the intent of wilderness designation is to ensure the continued existence of this type of experience to anyone who wished to seek it.

Further, wilderness areas are meant to provide “outstanding opportunities for solitude or a primitive and unconfined type of recreation.”⁴⁷ The emphasis on primitive, non-mechanized forms of recreation lies in sharp contrast to modern mechanized recreation that the Act explicitly prohibits:⁴⁸

Except as specifically provided for in this chapter, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this

40. Glicksman, *supra* note 27, at 453–54.

41. Mark Fincher, *Humans Apart from Nature? Wilderness Experience and the Wilderness Act*, USDA FOREST SERV. PROC., RMRS-P-66, 2012, at 152, 153.

42. 16 U.S.C. § 1131(c) (2012); *cf. Pelican Island Wilderness*, WILDERNESS CONNECT, <http://www.wilderness.net/NWPS/wildView?WID=448> [<https://perma.cc/H7NF-TJE5>] (last visited Feb. 9, 2018) (noting that although many wilderness areas are larger than 5,000 acres, the smallest wilderness area, Pelican Island Wilderness, covers only five and a half acres, so the sufficiency of an area of land to be “practicable [for] preservation and use in an unimpaired condition” clearly can occur with parcels much smaller than 5,000 acres).

43. See Glicksman, *supra* note 27, at 455–60.

44. § 1131(c).

45. NAT’L PARK SERV., *supra* note 35, at II.D4.

46. John Shultis, *The Impact of Technology on the Wilderness Experience: A Review of Common Themes and Approaches in Three Bodies of Literature*, USDA FOREST SERV. PROC., RMRS-P-66, 2012, at 110, 110.

47. § 1131(c).

48. Fincher, *supra* note 41, at 156.

chapter and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this chapter (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.⁴⁹

At the time of the Wilderness Act's passage, Congress sought to exclude nearly every type of activity that would leave a long-lasting, physical impact or otherwise reduce the capacity for primitive recreational uses.⁵⁰ Permissible activities within wilderness areas generally included non-permanent uses such as camping, hiking, rafting, horseback riding, hunting, and fishing.⁵¹ In the intervening years, however, new technology has changed both the kinds of outdoor recreation and the tools visitors have at their disposal, which has made fulfillment of the Wilderness Act's mandate a more complex and challenging goal.

B. Modern Wilderness Management

In the more than 50 years since its passage, the Wilderness Act itself has been left virtually unchanged.⁵² Still today, Congress may designate lands as wilderness under the Act, and thereby protect them against modern development.⁵³ New wildernesses have been added to the National Wilderness Preservation System by virtually every Congress since 1964.⁵⁴

49. § 1133(c).

50. *Id.* (“[T]here shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.”).

51. *Wilderness Act*, WILDERNESS SOC’Y, <https://wilderness.org/article/wilderness-act> [https://perma.cc/8KKQ-82U9] (last visited Apr. 25, 2018).

52. Appel, *supra* note 5, at 67, n.15 (noting the single alteration to the original statute made changes that are applicable only to the Boundary Waters Wilderness Area, one of the few wilderness areas created through the original Act, but did not result in any alterations to the overall management regime established for wilderness areas as a whole).

53. §§ 1131–1136.

54. See KATIE HOOVER & SANDRA L. JOHNSON, CONG. RESEARCH SERV., R41610, WILDERNESS: LEGISLATION AND ISSUES IN THE 114TH CONGRESS, summary (May 5, 2016) (noting that “[n]umerous wilderness bills were introduced in the 112th Congress, but it was the first Congress since 1966 that did not add to the wilderness system”). Further, bills have already been introduced in the 115th Congress to expand and create wilderness areas. See, e.g., Wild Olympics Wilderness and Wild and Scenic Rivers Act of 2017, H.R. 1285, 115th Cong. (2017); Blackfoot Clearwater Stewardship Act of 2017, S. 507, 115th Cong. (2017) (“A bill to sustain economic development and recreational use of National Forest System land in the State of Montana, to add certain land to the National Wilderness Preservation System, to designate new areas for recreation, and for other purposes.”).

Today, there are 765 wilderness areas across the country, covering more than one hundred million acres and spanning forty-four states.⁵⁵

However, many of the more recent legislative acts establishing wilderness areas mandate weaker protection for newly designated areas than exist within the management regime of the original statute.⁵⁶ The Alaska National Interest Lands Conservation Act (ANILCA) is a key example of the imposition of such constraints.⁵⁷ Through ANILCA, Congress added more than fifty-six million acres to the National Wilderness Preservation System, but also altered the historic management regime as applied to the new Alaskan wildernesses.⁵⁸ Unlike earlier established wilderness areas, those designated through ANILCA permit motorized access for traditional uses, as well as the construction of permanent cabins or temporary facilities that enhance the collection of fish and wildlife.⁵⁹

Other additions to the National Wilderness Preservation System modify the specific management regulations for a wilderness area.⁶⁰ This includes permitting existing infrastructure to remain within the newly designated area or by allowing specific new infrastructure developments.⁶¹ While these changes have altered the management regime for specific wilderness areas, they have not retroactively impacted previously designated wilderness areas or altered the language of the Wilderness Act. Managers of those areas must uphold the original statutory mandate of near-total land protection.⁶²

55. *The Beginnings of the National Wilderness Preservation System*, WILDERNESS CONNECT, <http://www.wilderness.net/NWPS/fastfacts> [<https://perma.cc/JL7Z-PEDF>] (last visited Apr. 25, 2018) (noting that Connecticut, Delaware, Iowa, Kansas, Maryland, and Rhode Island do not have wilderness areas, along with the District of Columbia); *Common Misconceptions About Wilderness*, WILDERNESS CONNECT, <http://www.wilderness.net/NWPS/misconceptions> [<https://perma.cc/S3RH-NRAB>] (last visited Apr. 25, 2018).

56. HOOVER ET AL., *supra* note 54, at summary (“Wilderness bills often contain additional provisions, such as providing special access for particular purposes, for example, border security.”).

57. *See generally* 16 U.S.C. § 3170 (2012) (referencing the ability of wilderness recreationists to use snow machines and motorized boats, which is not allowed under the Wilderness Act); Alaska Native Claims Settlement Act, 43 U.S.C. §§ 1601–1642 (2012); Trans-Alaska Pipeline Authorization Act, 43 U.S.C. §§ 1651–1656 (2012); Federal Land and Policy Management Act, 43 U.S.C. §§ 1701–1787 (2012).

58. Michael J. Tranel, *Wilderness Management Planning in an Alaskan National Park: Last Chance to Do It Right?*, USDA FOREST SERV. PROC., RMRS-P-15, 2000, at 369, 371.

59. NAT’L PARK SERV., *supra* note 35, at IL.D7.

60. *Id.* at IL.D2.

61. KATIE HOOVER ET AL., CONG. RESEARCH SERV., R41610, WILDERNESS: LEGISLATION AND ISSUES IN THE 113TH CONGRESS 8 (2014). For example, the California Desert Protection Act of 1994, Pub. L. No. 103-433, § 102(1), 108 stat. 4471, 4472, “authorizes a right-of-way and road construction solely for installation of a space energy laser facility, if requested by the Secretary of the Navy within 15 years of enactment.” KRISTINA ALEXANDER & KATIE HOOVER, CONG. RESEARCH SERV., R41649, WILDERNESS LAWS: STATUTORY PROVISIONS AND PROHIBITED AND PERMITTED USES 59 (2013).

62. ALEXANDER & HOOVER, *supra* note 61, at 2.

Under the modern regime, no single federal agency is tasked with managing this complex system.⁶³ Instead, wilderness areas are created within federal lands already managed by the Forest Service, Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), or NPS.⁶⁴ Each agency is solely responsible for managing its wildernesses.⁶⁵ The Forest Service manages over half of the wilderness units, while the BLM is responsible for approximately another quarter, and the NPS and FWS manage the rest.⁶⁶ However, in terms of raw acreage, the NPS is responsible for almost forty percent of the nation's wilderness, while the BLM is responsible for just eight percent.⁶⁷ The Wilderness Act further requires agencies to act in guardianship of areas that are not currently designated wilderness, but that meet the statutory conditions, and are under consideration for such a future declaration (often termed "wilderness study areas").⁶⁸ If ultimately protected under the same management conditions as congressionally designated wilderness areas, these lands will vastly increase the functional size of the wilderness area system.⁶⁹

The lack of centralized management, or statutorily mandated management standards, inherently creates inconsistencies in wilderness management between agencies. In practice, the attitude toward wilderness preservation within agencies varies considerably,⁷⁰ although all four agencies jointly operate a training center for agency employees tasked with wilderness

63. *National Wilderness Preservation System*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_1/Arctic/PDF/ccp/ccpnwps.pdf [<https://perma.cc/3P5J-8Q8S>] (last visited Apr. 25, 2018).

64. *Id.*

65. *Id.*

66. *Wilderness Statistics Reports: Number of Wilderness Units by Agency*, WILDERNESS CONNECT, <http://www.wilderness.net/NWPS/chartResults?chartType=UnitsByAgency>, [<https://perma.cc/YC2M-N39C>]. The Forest Service oversees 445 units, the BLM oversees 224, and the FWS and NPS oversee 71 and 61, respectively. *Id.*

67. *Wilderness Statistics Reports: Wilderness Acreage by Agency*, WILDERNESS CONNECT, <http://www.wilderness.net/NWPS/chartResults?chartType=acreagebyagency>, [<https://perma.cc/9E77-D8AZ>]. The NPS manages 43,932,002, the Forest Service manages 36,574,689 acres, the FWS manages 19,862,488, and the BLM manages 8,760,478 acres. *Id.*

68. See HOOVER & JOHNSON, *supra* note 54, at 12 (discussing areas with wilderness characteristics designated as Wilderness Study Areas); see also *DOI Memo Clarifies Continuing Responsibilities for "Wild Lands,"* ENEWSUSA (June 2, 2011, 3:02 PM), <http://enewsusa.blogspot.com/2011/06/doi-memo-clarifies-continuing.html> [<https://perma.cc/RNV4-YFFS>] (providing an overview of the political controversy surrounding Wilderness Study Areas in recent years). For the Bureau of Land Management, this requirement is found within 43 U.S.C. § 1782(c) (2012).

69. See BUREAU OF LAND MGMT., U.S. DEP'T OF THE INTERIOR, WILDERNESS STUDY AREAS: BLM'S NATIONAL CONSERVATION LANDS 1 (2014) (showing that the BLM alone manages more than 12.7 million acres of land in about 530 Wilderness Study Areas).

70. Glicksman, *supra* note 27, at 462; see Sandra B. Zellmer, *Wilderness Management in National Parks and Wildlife Refuges*, 44 ENVTL. L. 497, 500 (2014) (discussing the perceived hostility of two agencies toward wilderness within their systems).

management.⁷¹ Not only must each agency design its own management plans, but it must balance the goals of wilderness preservation with its own congressionally derived agency agenda.⁷² Both the BLM and the Forest Service are tasked with “multiple use, sustained yield mandates under their organic statutes,” while the NPS and the FWS operate under more conservation-oriented regulatory structures.⁷³

Some differences in management may also stem from the creation date of the various agencies and the times at which they were tasked with wilderness management. When the Wilderness Act was passed in 1964, all national forest lands that had previously been designated as either “wilderness” or “wild” were automatically given wilderness status by Congress under the new regime.⁷⁴ In contrast, other public lands were not even considered for inclusion as wilderness areas until the passage of the Federal Land Policy and Management Act (FLPMA) in 1976.⁷⁵ FLPMA required the BLM to evaluate its land holdings for possible designation as wilderness areas for the first time.⁷⁶ In practice, the management choices made by different agencies contribute to disparity in their rules and approaches.⁷⁷ For example, the BLM is thought by some commenters to have a “consistent antiwilderness bias,”⁷⁸ while the Forest Service has been called a “more faithful steward” of wilderness lands.⁷⁹

The Act provides that areas are to be managed by each agency so they are left “unimpaired for future use and enjoyment as wilderness” and with an emphasis on “the preservation of their wilderness character.”⁸⁰ In the face of evolving technology, the meaning of the terms “unimpaired” and “untrammeled” has become opaque and presented a new challenge to managing agencies and the courts.⁸¹

71. See generally *History*, ARTHUR CARHART NAT’L WILDERNESS TRAINING CTR., <http://carhart.wilderness.net/index.cfm?fuse=history> [https://perma.cc/9LEY-LPLH] (last visited Apr. 25, 2018) (discussing a history of preservation of wilderness through agency employee and public training and education).

72. See generally CARLSON ET AL., *supra* note 2, at 21–24 (showing agencies’ policies of technology in wilderness from their own internal rules).

73. Glicksman, *supra* note 27, at 449. See generally Zellmer, *supra* note 70, at 500 (noting that both the NPS and the FWS operate “under a similar conservation oriented mandate”).

74. Glicksman, *supra* note 27, at 461–62.

75. Federal Land and Policy Management Act (FLPMA), 43 U.S.C. §§ 1701–1787 (2012).

76. *Id.* § 1782(a).

77. Glicksman, *supra* note 27, at 465.

78. George Cameron Coggins & Doris K. Nagel, “*Nothing Beside Remains*”: *The Legal Legacy of James G. Watt’s Tenure as Secretary of the Interior on Federal Land and Law Policy*, 17 B.C. ENVTL. AFF. L. REV. 473, 512 (1990).

79. Glicksman, *supra* note 27, at 451.

80. 16 U.S.C. § 1131(a) (2018).

81. *Id.* § 1131(c).

C. How Technology Changes the Wilderness Experience

The impact of technology on wilderness areas has been a concern since before the passage of the Wilderness Act. Conservation voices in the mid-twentieth century emphasized the potential damage of vehicles on outdoor areas.⁸² President Johnson, who signed the Wilderness Act, later said: “If future generations are to remember us more with gratitude than with sorrow, we must achieve more than just the miracles of technology. We must also leave them a glimpse of the world as God really made it, not just as it looked when we got through with it.”⁸³

Technology has been both an “enabler and destroyer” of the wilderness experience, and today it is a source of both trepidation and opportunity in wilderness management.⁸⁴ Empirical studies on the use of technology within wilderness areas are unfortunately rare, leaving much of the scholarship on technology as a collection of anecdotal, emotional responses to the issue.⁸⁵ Unsurprising, what generalized research is available indicates that views of wilderness and technology are polarized.

Since the original concerns over road creation and automobile encroachment into wild lands, technology has enabled people to reduce risk and increase ease and comfort during their wilderness expeditions. There is no doubt that “[b]ridges, toilets, and technology reduce opportunities for self-reliance and personal challenge.”⁸⁶ Examples include the development of high-tech fabrics, which enable outdoor activities in a greater span of weather conditions at immensely increased comfort to the adventurer, and the increased use of fuel based stoves, which eliminate the need for personal knowledge on how to build and maintain a campfire.⁸⁷ These “improvements” have served a valuable purpose in enabling more individuals to experience outdoor activities, such as in national parks, without extensive training or guidance. Beyond enabling exploration to go further, technology also has the impact of removing any remaining “blank space on the map.”⁸⁸

82. Shultis, *supra* note 46, at 112.

83. President Lyndon B. Johnson, Remarks at the Signing of a Bill Establishing the Assateague Island Seashore National Park (Sept. 21, 1965), <http://www.presidency.ucsb.edu/ws/?pid=27265> [https://perma.cc/SK4B-8MZK].

84. Shultis, *supra* note 46, at 112.

85. CARLSON ET AL., *supra* note 2, at 4.

86. NAT’L PARK SERV., *supra* note 6, at 174.

87. William T. Borrie, *Impacts of Technology on the Meaning of Wilderness*, USDA. FOREST SERV. PROC., RMRS-P-14, 2000, at 87.

88. *Id.*

In large part, it is this “increase in the knowability of wilderness” that concerns both scholars and wilderness recreationists.⁸⁹ Information on hiking trails and camping locations is now available to a range of people, as well as to a degree of detail, that is unique in the human experience.⁹⁰ Historically, information about a wilderness area was shared through physical maps, with details filled in by word of mouth or personal surveying.⁹¹ Today, information is shared through instantly accessible websites and details are filled by GPS coordinates, satellite imagery, and digital photos.⁹²

Agency managers of outdoor areas, however, have often been reluctant to prohibit the use of technological aids, possibly due to “increasing social concern over liability and safety issues in the wilderness.”⁹³ Current Forest Service regulations generally prohibit motorized equipment “activated by a nonliving power source,” but they explicitly permit “small battery-powered, hand-carried devices such as flashlights, shavers, and Geiger counters.”⁹⁴

The flip side of this concern is that the advent of easily accessible information on social media and other online platforms may encourage new outdoor visitors to have an incorrect perception of the risks involved in wilderness exploration.⁹⁵ Proponents of cellular service expansion often extol the virtue of increased rescue operation accessibility.⁹⁶ However, this “perception that risk is decreased because emergency rescue can be more easily summoned”⁹⁷ often manifests as a false sense of security for novice explorers and can lead to deadly consequences.⁹⁸ Even more limited devices,

89. *Id.*; see Langlois, *supra* note 11 (indicating concern over a new cell tower which would increase the cellular accessibility of Yellowstone National Park).

90. See CARLSON ET AL., *supra* note 2, at 7 (explaining the extremely detailed digital information that is now available to the public).

91. *Id.* at 3.

92. *Id.* at 7.

93. Shultis, *supra* note 46, at 111.

94. 36 C.F.R. § 293.6(b) (2017).

95. See CARLSON ET AL., *supra* note 2, at 3; see Jessica L. Blackwell, Influences of Hand-Held Information and Communication Technology on Risk Behavior and the Experience of Wilderness Visitors (May 2015) (unpublished M.S. thesis, Humboldt State University) (on file with the *Vermont Journal of Environmental Law*) (providing an empirical evaluation of changes in risk perception alongside the increasing use of advanced technology outdoors).

96. See Zuckerman, *supra* note 11 (“Cellular providers say new wireless infrastructure will boost public safety by improving communications among park rangers and emergency responders.”).

97. CARLSON ET AL., *supra* note 2, at 3.

98. For examples of this overreliance, including many tales of hikers or backpackers depending on cell phones as the sole backup plan in case of injuries or other emergencies, see J.R. Sullivan, *Our Reliance on Technology Makes the Backcountry More Dangerous*, OUTSIDE (Mar. 16, 2016), <https://www.outsideonline.com/2060641/our-reliance-technology-makes-backcountry-more-dangerous> [https://perma.cc/W5C8-CKTJ]. A related emerging safety issue for both humans and wildlife that has been the increased prevalence of visitors taking “selfies” close to wildlife. For examples, see Christopher Mele, *When Humans, Fueled by the Selfie Culture, Imperil Wildlife*, N.Y. TIMES (May 19, 2016), <http://www.nytimes.com/2016/05/20/us/when-humans-fueled-by-the-selfie-culture-imperil-wildlife.html> [https://perma.cc/K957-65MG]. The Forest Service preparation manual for the Boundary

such as Personal Locator Beacons, may enable wilderness visitors to call for help in situations that do not warrant a response or recovery by emergency personnel.⁹⁹ Such “false alarms” may reduce the availability of services for true emergencies, endanger the lives of search and rescue personnel, or increase administrative costs to manage wild areas.¹⁰⁰

Ultimately, there is no doubt that cell coverage will continue to expand across the world and that internet-capable phones have become as ubiquitous for many outdoor travelers as the family car or synthetic jackets. However, it appears an open question as to whether wilderness areas will continue to provide an outdoor experience filled with “solitude” and “a primitive and unconfined type of recreation” for some wild enthusiasts.¹⁰¹ The courts, Congress, or agencies must take action to manage the potential influx of technology rather than permitting it to spread unchecked.

II. DEFINING UNTRAMMELED NATURE: JUDICIAL FRAMEWORKS FOR ASSESSING WILDERNESS VIOLATIONS

Courts have never addressed a possibility that a technological expansion could violate the prohibitions of the Wilderness Act; the question of whether cellular coverage changes the essential, natural characteristics of a wilderness area is entirely novel in the judicial context. Expansion of cellular service networks into wilderness areas could constitute a violation of the Act by creating novel and unprecedented noise impacts or by impermissibly expanding commercial services within the wilderness.¹⁰² The Act’s limited

Waters Canoe Area Wilderness (BWCAW) also explicitly states to visitors: “Having a cell phone cannot substitute for knowing how to handle an emergency in wilderness.” Findings of Fact, Conclusions of Law, and Order ¶ 67, *State v. AT&T Mobility, LLC*, No. 27-CV-10-15150 (Minn. Dist. Ct. Aug. 3, 2011), 2011 WL 3360003.

99. See Kristen Pope & Steven R. Martin, *Visitor Perceptions of Technology, Risk, and Rescue in Wilderness*, 17 INT’L J. WILDERNESS 19, 19 (2011) (discussing the disparate usage and reliance on technology by expert and novice outdoorsmen). While more experienced users may also benefit from increased access to certain technologies during true emergencies, these users are more likely to know when a situation presents a real risk, and thus less likely to pose the same false alarm dangers as inexperienced users.

100. CARLSON ET AL., *supra* note 2, at 6 (“The feeling from managers is that users probably would have dealt with many of these problems on their own in the past rather than creating the need for an agency response. It is difficult to evaluate the seriousness of an alarm from a [Personal Locator Beacon], so a response is generally dispatched. Frequently this involves helicopter use which presents both a safety risk for responders and a disturbance to wilderness.”); Pope & Martin, *supra* note 100, at 20–21 (“When rescuers asked the men what they would have done had they not possessed the device, they said: ‘We would have never attempted this hike.’ . . . This increasing reliance on others also includes reliance on the financial resources of others (particularly public agencies) in order to fund search and rescue missions.”).

101. 16 U.S.C. § 1131(c) (2012).

102. § 1133(c) (referring to a prohibition on commercial activity); see also 16 U.S.C. § 1133(d)(5) (referring to the exceptions for when the Wilderness Act allows commercial activity).

exceptions to these general prohibitions do not create a loophole through which expansion is automatically permissible.¹⁰³ A new judicial framework that focuses on evaluating the degree of degradation on a wilderness area *relative* to system-wide decline in pristine lands would help courts determine whether a new technology is permissible under the Act or if it exceeds the bounds of permissible conduct.¹⁰⁴

A. Evaluating the Impact of Sound on Wilderness Areas

Judicial challenges to actions within wilderness areas have primarily focused on major disruptions, such as activities that create loud, continuous sounds or the sanctioned presence of mechanical transport (such as helicopters).¹⁰⁵ While courts have never evaluated the permissibility of cellular networks on wilderness lands, these other types of challenges have resulted in the creation of a few potential frameworks for determining whether an action violates the terms of the Wilderness Act. Generally, the “spatial and temporal effect” of an activity on a wilderness area must be considered.¹⁰⁶

In *Izaak Walton League of America, Inc. v. Kimbell*, a group of advocacy organizations challenged the construction of a snowmobile trail along the edge of the Boundary Waters Canoe Area Wilderness (BWCAW).¹⁰⁷ During the permitting process, the Forest Service indicated that the construction of the route would lead to increased use by recreational snowmobile riders, but failed to conduct any testing to determine how much noise would spill over into the BWCAW.¹⁰⁸ Due to this failure, the plaintiffs argued that construction of the trail violated “the plain language of the Wilderness Act.”¹⁰⁹

While the court rejected a per se ban on any activity that could potentially impact a wilderness area, it did assess “whether that action degrades the

103. See § 1133(d)(2) (maintaining, for example, commercial mineral rights existing at the time of a wilderness area’s designation even though such operations would otherwise degrade wilderness character); see also § 1133(c) (permitting agency activities needed to “meet minimum requirements for the administration of the area” even if such actions would otherwise violate the Act).

104. See *infra* Part II.C.

105. See generally *Izaak Walton League of Am., Inc. v. Kimbell*, 516 F. Supp. 2d 982 (D. Minn. 2007) (explaining that agency activity producing louder sounds than presently exist is likely to degrade the wilderness).

106. *Greater Yellowstone Coalition v. Timchak*, No. CV-06-04-E-BLW, 2006 WL 3386731, at *2 (D. Idaho Nov. 21, 2006) (the court in *Greater Yellowstone* was interpreting the Wyoming Wilderness Act, which requires the same standard of maintaining “outstanding opportunities for solitude or a primitive and unconfined type of recreation” as noted in the original Wilderness Act).

107. *Kimbell*, 516 F. Supp. 2d at 982.

108. *Id.* at 985.

109. *Id.* at 987.

wilderness character of a designated wilderness area.”¹¹⁰ The court’s test was an evaluation of “the nature of the agency activity, the existing character of the wilderness area, and the extent to which the essential, natural characteristics of the wilderness area are changed by the agency activity in question.”¹¹¹ If the activity under consideration produced significant auditory impacts, the sound generated by the activity should be compared to the “volume, duration, frequency, and quality” of the existing wilderness soundscape.¹¹²

After an injunction requiring the Forest Service to conduct a more thorough evaluation of the potential sound impacts on the wilderness area, the court held that the impacts were insufficiently detrimental to prohibit the construction of the trail.¹¹³ In this case, the court determined that dispersed use of snowmobiles outside of the wilderness area was consistent with the managing statutes and that the use did not create a new form of sound pollution within the wilderness. Further, the resulting sound did not substantially change the existing sound profile (in terms of volume or duration) of the area.¹¹⁴

However, the court also noted that “[t]he final and most dispositive factor is the extent to which the essential, natural characteristics of the wilderness area are changed by the agency activity.”¹¹⁵ The court implied that, to not detrimentally impact the wilderness character of an area, the sound produced by an activity should be quieter than “traffic, alarm clocks, [and] power tools,” perhaps even “quieter than normal conversation,” and should “only occur in a small portion of the affected wilderness.”¹¹⁶

In *Vermonters for a Clean Environment, Inc. v. Madrid*,¹¹⁷ the construction of a wind farm on Forest Service land near the border of a wilderness area was challenged on the grounds of excessive noise creation.¹¹⁸ During the permitting process, the Forest Service undertook monitoring efforts to determine how much noise would be created and compared it with noise already experienced within the wilderness area.¹¹⁹ Ultimately, the agency prevailed in issuing the permit because the court believed that a transition zone must exist between wilderness and civilization and because

110. *Id.* at 989.

111. *Id.*

112. *Id.* at 990.

113. *Izaak Walton League of Am., Inc. v. Tidwell*, No. 06-3357, 2015 WL 632140, at *1 (D. Minn. Feb. 13, 2015).

114. *Id.* at *10–15.

115. *Id.* at *11.

116. *Id.* at *12, 15.

117. 73 F. Supp. 3d 417 (D. Vt. 2014).

118. *Id.* at 434.

119. *Id.* at 432–33.

the wilderness area was “subject to traffic noise when the area was designated a wilderness in 1984.”¹²⁰ The court used the framework established by *Izaak Walton League of America* to determine that while there was additional noise creation that entered the boundaries of the wilderness, it was insufficient to degrade the area’s wilderness characteristics.¹²¹

If a legal challenge was brought against the permitting of a cellular tower that produced significant wilderness spillover, a court would consider whether the volume, duration, frequency, and quality of the resulting sounds impermissibly impacted the character of the wilderness area. While visitors to wilderness areas must make an affirmative choice to use electronic devices, the type of noise produced by cell phones certainly differs in “volume, duration, frequency, and quality” from any other noises found in wilderness.¹²² If cellular service coverage blankets the interior of a wilderness area, there is nothing that prohibits an individual from downloading and watching the latest Netflix show at full volume in an area previously completely devoid of similar sounds. Crucially, this permits a visitor to significantly impact the wilderness experience of other visitors in a particular area, even if that other visitor has deliberately moved as far away from external sound sources as possible.

B. The Act’s Prohibitions on Commercial Activity

In addition to the activities it specifically prohibits, the Act also contains two references to limitations on the permissibility of commercial activity.¹²³ Cellular service expansion within wilderness areas is primarily driven by commercial operators, such as Verizon or T-Mobile, seeking to expand their own coverage networks.¹²⁴

The Act’s first prohibition is strongly worded: “Except as specifically provided for in this chapter, and subject to existing private rights, there *shall be no commercial enterprise* and no permanent road within any wilderness area designated by this chapter”¹²⁵ Second, the Act states that “[c]ommercial services may be performed within the wilderness areas

120. *Id.* at 434.

121. *Id.*

122. *See Izaak Walton League of Am., Inc., v. Kimbell*, 516 F. Supp. 2d 982, 989–90 (D. Minn. 2007) (explaining that sounds that “degrade the wilderness character of an area” are those that “increase or exacerbate the existing sound impact on the wilderness area”).

123. *See* 16 U.S.C. § 1133(c) (2012) (referring to a prohibition on commercial activity); *see also* § 1133(d)(5) (referring to the exceptions for when the Wilderness Act allows commercial activity).

124. *See, e.g., supra* notes 12–20 and accompanying text (discussing the numerous cell towers to be built by Verizon & T-Mobile).

125. § 1133(c) (emphasis added).

designated by this chapter *to the extent necessary* for activities which are proper for realizing the *recreational or other wilderness purposes* of the areas.”¹²⁶ The prohibition on commercial activity is strongly articulated, with only limited exceptions specifically articulated within the Act (such as preexisting mining and grazing rights).¹²⁷ However, the Act does not define the terms “commercial enterprise” or “commercial services,” and there have only been a few attempts to define or apply the phrases by courts and managing agencies.¹²⁸

The NPS has internally defined a “commercial service” as:

[O]ne that relates to or is connected with commerce wherein work is performed for another person or entity, when the primary purpose is the experience of wilderness through support provided for a fee or charge and when the primary effect is that the wilderness experience is guided and shaped through the use of support services provided for a fee or charge.¹²⁹

Permissible commercial services generally entail the “provision of outfitter and guide services to recreational users.”¹³⁰

The Ninth Circuit, whose jurisdiction covers approximately 80% of the country’s wilderness areas, defined the phrase “commercial enterprise” simply as “a project or undertaking of or relating to commerce.”¹³¹ The Court has also noted that “[t]here is no exception given for commercial enterprise in wilderness when it has benign purpose and minimally intrusive impact.”¹³² This ruling has been interpreted as indicating that there is an “automatic presumption” that a commercial enterprise should be disallowed in the absence of an affirmative exception permitting its conduct.¹³³ Furthermore,

126. § 1133(d)(5) (emphasis added).

127. See § 1133(c).

128. See, e.g., *Wilderness Soc’y v. U.S. Fish & Wildlife Serv.*, 353 F.3d 1051, 1061-62 (9th Cir. 2003) (en banc) (defining “commercial enterprise” as “a project or undertaking of or relating to commerce”), *amended on reh’g en banc* by 360 F.3d 1374 (9th Cir. 2004); *High Sierra Hikers Ass’n. v. U.S. Forest Serv.*, 436 F. Supp. 2d 1117, 1146 (E.D. Cal. 2006) (evaluating whether an agency receives deference in its interpretation of “commercial enterprise”).

129. NAT’L PARK SERV., WILDERNESS STEWARDSHIP REFERENCE MANUAL app. A, at 1 (2013).

130. Craig W. Allin, *Understanding the Wilderness Act of 1964*, in WILDERNESS WARS 12 (2002).

131. *Wilderness Soc’y*, 353 F.3d at 1061; see NAT’L PARK SERV., COMMERCIAL SERVICES IN WILDERNESS: GUIDANCE FOR DETERMINATION OF EXTENT NECESSARY 1, 5 n.3.

132. *Wilderness Soc’y*, 353 F.3d at 1062.

133. Katherine Daniels Ryan, *Preservation Prevails over Commercial Interests in the Wilderness Act: Wilderness Society v. United States Fish & Wildlife Service*, 32 ECOLOGY L.Q. 539, 562 (2005).

courts have considered the limitations on commercial enterprise to be “one of the strictest prohibitions of the Act.”¹³⁴

Before permitting commercial activities to take place within a wilderness area, the relevant management agency must make a specialized “finding of necessity.”¹³⁵ The ultimate activity permitted may not extend beyond that necessary to “achieve the goals of the Act.”¹³⁶ However, at least one court has also recognized that any determination on commercial service requires balancing the desire to leave land untouched with an understanding that wilderness areas do not exist in a complete vacuum.¹³⁷

Construction of a commercial cell phone tower outside the bounds of a wilderness, alongside the resulting spread of cellular coverage into that wilderness, is clearly “a project or undertaking of or relating to commerce.”¹³⁸ For-profit providers of coverage would have no interest in constructing and maintaining a tower on federal lands if they did not seek to use the expanded network to provide additional service to paying customers. Since there is a presumption against such activity, managers should be required by courts to go beyond simply saying that technological expansion should be permitted unless there is some countervailing interest. Instead, managers should be required to make specific findings on why an expansion is necessary to uphold the intentions of the Wilderness Act before permitting the activity.

There is an additional factor that complicates a court’s consideration of cellular service within wilderness areas. Many of the more recently designated wilderness areas are subject to a “no-buffer zone” clause, which directs managing agencies to ignore the potential impacts on a wilderness area of an activity just outside the boundaries of that area.¹³⁹ For those wilderness areas not subject to no-buffer zone clauses, such as the Theodore Roosevelt Wilderness,¹⁴⁰ there is nothing that prohibits the managing agency from considering the impacts of actions taken outside the boundaries of the

134. *Californians for Alts. to Toxics v. U.S. Fish & Wildlife Serv.*, 814 F. Supp. 2d 992, 1016 (E.D. Cal. 2011); *see also Wilderness Watch, Inc., v. U.S. Fish & Wildlife Serv.*, 629 F.3d 1024, 1040 (9th Cir. 2010) (“The prohibition on the creation of permanent structures within a wilderness area is one of the strictest prohibitions . . .”).

135. *High Sierra Hikers Ass’n v. Blackwell*, 390 F.3d 630, 647 (9th Cir. 2004).

136. *Id.* at 647.

137. *High Sierra Hikers Ass’n v. U.S. Dep’t of the Interior*, 848 F. Supp. 2d 1036, 1046 (N.D. Cal. 2012).

138. *See Wilderness Soc’y v. U.S. Fish & Wildlife Serv.*, 353 F.3d 1051, 1061 (9th Cir. 2003) (en banc) (defining commercial enterprise as “a project or undertaking of or relating to commerce”), *amended on reh’g en banc* by 360 F.3d 1374 (9th Cir. 2004) (defining commercial enterprise as “a project or undertaking of or relating to commerce”).

139. ROSS W. GORTE, CONG. RESEARCH SERV., R41649, WILDERNESS LAWS: STATUTORY PROVISIONS AND PROHIBITED AND PERMITTED USES 2 (2011) (noting that the first no-buffer zone clauses were included in wilderness laws in the 1980s).

140. 16 U.S.C. §§ 241–247 (2012).

wilderness on the wilderness itself.¹⁴¹ Particularly, as an “agency’s duty to preserve [a] wilderness area is wholly independent of the source or location of that activity,” the fact that a cell tower is constructed or improved just outside the boundaries of a wilderness area is not a dispositive factor in determining its impact.¹⁴²

For those wildernesses with statutory no-buffer zone clauses, the decision is more complicated.¹⁴³ There is some degree of permanent physical intrusion of the radio signal into the wilderness that could be analogized to sound, which can be a permissible action.¹⁴⁴ However, once a user connects to a network with a cell phone, that activity clearly takes place entirely within the boundaries of the wilderness area. Collectively, neither the frameworks created to aid judicial evaluation of noise intrusions nor the commercial-services doctrine provides clear guidance to courts in determining how modern technology should be judged.

C. A New Judicial Framework

The frameworks currently available to judges are not well-suited to the unique challenges posed in evaluating the impact of evolving technologies on wilderness areas.¹⁴⁵ Instead, courts should base their consideration on whether the impacted wilderness resource is replaceable or whether it is a “limited and finite resource.”¹⁴⁶ Courts should balance this evaluation against the availability of a “feasible and prudent alternative” if, and *only* if, the activity in question is “required for promotion of the public health, safety, and welfare.”¹⁴⁷

Without this framework in place, wilderness areas will suffer long-term, irreversible degradation through repeated slight cuts in quality. For example, a Minnesota appellate court recently reversed a trial court’s determination that the construction of a large cell phone tower impermissibly impacted the scenic viewscape within the BWCAW because “evidence of human existence (including a water tower, cabins, and existing communication

141. GORTE, *supra* note 140, at 2.

142. Izaak Walton League of Am., Inc., v. Kimbell, 516 F. Supp. 2d 982, 988–89 (D. Minn. 2007).

143. GORTE, *supra* note 140, at 2.

144. See, e.g., Vermonters for a Clean Env’t, Inc. v. Madrid, 73 F. Supp. 3d 417, 434 (D. Vt. 2014) (finding that additional, novel noise could be introduced without impermissibly degrading an area’s “wilderness character”).

145. See *supra* Sections II.A–B.

146. See Findings of Fact, Conclusions of Law, and Order ¶179, State v. AT&T Mobility, LLC, No. 27-CV-10-15150 (Minn. Dist. Ct. Aug. 3, 2011), 2011 WL 3360003.

147. State ex rel. Friends of the Boundary Waters v. AT&T Mobility, LLC, No. A11-1725, 2012 WL 2202984, at *2 (Minn. Ct. App. June 18, 2012).

towers) [was] already visible from one of the lakes.”¹⁴⁸ As a result, the next attempt to build a structure, mechanize trail use, or increase noise or light pollution within those areas would be viewed as a less “severe” downgrade in each’s wilderness quality. The goals underlying the Wilderness Act will be best served if courts consider the impact of a desired action on a wilderness area, not only in light of the current quality or historic degradation of that particular area, but against the nationwide availability of pristine wilderness lands.

Ultimately, the challenges of a judicial solution are not unique to wilderness. There are no cases currently positioned for review by the Supreme Court, and without such a judgment, any individual decision would only have an impact on the courts within that jurisdiction. The best hope for uniformity would come through a Ninth Circuit decision, as any ruling by that court would control management decisions in approximately 80% of wilderness areas.¹⁴⁹ In the absence of such a decision, federal agencies continue to be the sole determiners of technological permissibility.

III. REGULATORY SOLUTIONS: AGENCIES’ RULES AND WILDERNESS OBJECTIVES

If Congress does not take steps to clarify the bounds of permissible wilderness intrusion by modern technology,¹⁵⁰ it will be left to either the courts or the Executive to act. As current judicial frameworks may not be particularly well suited to evaluate the potential impact of an activity on the wilderness environment, internal regulatory action by each of the four managing agencies is the best way to ensure the Wilderness Act goals are realized.¹⁵¹ It is unlikely that there is any one-size-fits-all solution for the puzzle of permitted technology in wilderness areas. The creation of a new

148. *Id.* at *6; see U.S. FOREST SERV., LAND RESOURCE AND MANAGEMENT PLAN: SUPERIOR NATIONAL FOREST 3-43 (2004) (categorizing areas within the BWCAW as “pristine,” “primitive,” or “semi-primitive”).

149. See *Wilderness & Wild and Scenic Rivers & Wilderness Study Areas*, U.S. DEP’T AGRIC.: FOREST SERV., https://data.fs.usda.gov/geodata/other_fs/wilderness/index.php [<https://perma.cc/4ZDK-YV9Q>] (last visited Apr. 25, 2018) (showing that most Wilderness areas are located in ninth circuit states: Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington).

150. The current Congress may even choose to permit additional modern activities in existing wilderness areas. See H.R. 1349, 115th Cong. (2017) (amending “the Wilderness Act to ensure that the use of bicycles, wheelchairs, strollers, and game carts is not prohibited in Wilderness Areas, and for other purposes”); see also Abe Streep, *Three Million Acres of Public Lands Are off the Market—For Now*, OUTSIDE (Feb. 2, 2017), <https://www.outsideonline.com/2154196/public-lands-safe-for-now> [<https://perma.cc/VET3-D6GX>] (noting that a bill was introduced two weeks into the 115th Congress “to sell off 3.3 million acres of land in ten states” and that general anti-public land sentiment in Congress appears to be on the rise).

151. See *supra* Section II.C.

management agency to comprehensively address wilderness management appears improbable, especially in light of the Trump Administration's views on the size and scope of federal agencies.¹⁵²

Using internal rulemaking procedures, each of the four agencies should pass regulations requiring managers of any area containing wilderness to deliberately consider whether expansion of cellular signal is consistent with the statute's mandates. In contrast with case-by-case decision making at the individual area manager level, "[a]dministrative rulemaking also offers relatively permanent protections for wild lands."¹⁵³ Under *Motor Vehicle Manufacturers Association v. State Farm Mutual Automobile Insurance Co.*,¹⁵⁴ an agency must articulate specific new evidence demonstrating a reason for a shift in policy direction before altering an existing rule.¹⁵⁵

Rulemaking would permit the agencies to establish a uniform policy under which it would be difficult for one agency to go rogue. Articulating a reason for a policy shift would be more difficult when three other agencies have failed to find convincing reasons to do so and all agencies are operating under the same general mandate.¹⁵⁶ Initially, it may appear more plausible for those agencies focused on non-extractive uses (the NPS and the FWS) to move forward with the creation of standards. For example, the FWS has explicitly stated that "wilderness character" includes not only the physical characteristics of the land, but embodies the loftier goals of opportunity for human self-limitation, humility, and restraint.¹⁵⁷

However, the objectives underlying the Wilderness Act come directly into conflict with the guiding management principles of these agencies when

152. Robert L. Glicksman & George Cameron Coggins, *Wilderness in Context*, 76 DENV. U.L. REV. 383, 394 (1999) (proposing the creation of a combined "National Park and Wildlife Service" to manage public lands for non-extractive purposes). See generally Exec. Order No. 13,771, 82 Fed. Reg. 9339 (Feb. 3, 2017) (requiring that for every new proposed regulation, an agency must also identify two regulations to be repealed); Damian Paletta, *Trump Budget Expected to Seek Historic Contraction of Federal Workforce*, WASH. POST (Mar. 12, 2017), https://www.washingtonpost.com/business/economy/through-his-budget-a-bottom-line-look-at-trumps-new-washington/2017/03/12/29739206-05be-11e7-b9fa-ed727b644a0b_story.html [<https://perma.cc/M7FA-VQXR>] ("Trump's chief strategist, Stephen K. Bannon, has said Trump will lead a 'deconstruction of the administrative state.' On Friday, White House press secretary Sean Spicer said Obama loyalists had 'burrowed into government.' Last month, Trump said the government would have to 'do more with less.'").

153. Michael C. Blumm & Andrew B. Erickson, *Federal Wild Lands Policy in the Twenty-First Century: What a Long, Strange Trip It's Been*, 25 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 1, 59 (2014).

154. 463 U.S. 29 (1983).

155. *Id.* at 43.

156. See generally Administrative Procedure Act, Pub. L. No. 79-404, 60 Stat. 237 (1946) (codified as amended in scattered statutes of 5 U.S.C. (2018)) (describing the arbitrary and capricious standard of review in § 706).

157. General Overview of Wilderness Stewardship Policy, U.S. FISH & WILDLIFE SERV. (Nov. 7, 2008), <https://www.fws.gov/policy/610fw1.html> [<https://perma.cc/PPJ9-CGCU>].

it comes to ease of visitor recreation or instructive opportunities.¹⁵⁸ The NPS's mission is specifically aimed at increasing visitor "enjoyment" and "education," goals which can directly conflict with wilderness aims.¹⁵⁹ The Forest Service, in contrast, may have fewer interest groups that would oppose restrictions on cellular coverage in managed lands, and thus may be a better agency to spearhead this type of regulatory action.¹⁶⁰

Fundamentally, these regulations should set baseline standards that disapprove the expansions of coverage unless there is an extremely compelling reason or an alternative mandate weighs significantly in their favor. The framework could evaluate whether such expansion would be necessary to the administration of an area or whether there would be other, less invasive, means available. For example, there are some instances in which the placement of cellular towers on public lands, such as within a national park, may be the most cost- and service-effective means of providing signal access to a surrounding community.¹⁶¹ This consideration might weigh particularly heavy in favor of permitting service in a low-income community lacking any feasible alternative way of achieving access, especially if such coverage was critical for ensuring access to essential or emergency services.

In addition to the community argument, proponents of cellular expansion may also point to a provision within the Wilderness Act that does create an exception to some otherwise prohibited activities:

[T]here shall be no commercial enterprise and no permanent road . . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this chapter (including measures required in emergencies involving the health and safety of persons within the area)¹⁶²

158. See generally 16 U.S.C. § 1131(a) (2012) (describing the reason Congress established the Wilderness Act).

159. *About Us*, NAT'L PARK SERV., <https://www.nps.gov/aboutus/index.htm> [<https://perma.cc/SBQ8-45PZ>] (last visited Apr. 25, 2018), ("The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.").

160. See generally *National Park or National Forest?*, NAT'L PARK SERV., <https://www.nps.gov/grsm/planyourvisit/np-versus-nf.htm> [<https://perma.cc/XBA8-ERZ8>] (last updated Aug. 6, 2015) (explaining the differences between the two mission statements of the NPS and the Forest Service, which may explain differences in the number of interest groups).

161. Findings of Fact, Conclusions of Law, and Order ¶¶182–183, *State v. AT&T Mobility, LLC*, No. 27-CV-10-15150 (Minn. Dist. Ct. Aug. 3, 2011), 2011 WL 3360003 (weighing the "wireless coverage needs" of the community surrounding a wilderness against impacts on the wilderness); *id.* at ¶ 199 (the district court ultimately held that "[w]hile extending cell-phone service into a Wilderness area may have some benefit, this Court could find no case law, congressional finding or FCC findings that there is a national need for extending cell-phone service into Wilderness areas for 911 purposes.").

162. § 1133(c).

Proponents of cellular expansion argue that, unlike when the Wilderness Act was passed in 1964, a modern management structure needs cellular coverage to “meet minimum requirements for the administration of the area.”¹⁶³

Yet, “administration” is not aimed at visitor comfort, manager ease, or even visitor safety—“[t]o constitute ‘administration of the area,’ the activity *must further the wilderness character* of the area.”¹⁶⁴ Other currently available options, such as the use of basic radio transmitters or satellite phones, could continue to fulfill the administrative needs of managers while leaving wilderness areas otherwise unmodified.¹⁶⁵ As a court recently noted, “[g]iven the stringent, preservation-oriented purposes of the Wilderness Act, this Court has found the prohibitions in § 1133(c) to be categorical and *subject to only very limited, narrow exceptions*.”¹⁶⁶

To the degree possible, the four agencies should collectively and collaboratively articulate this policy so that it is consistent across the National Wilderness Preservation System. The creation of standards would not be unduly costly to agencies and may ultimately be more cost-effective than the current ad hoc, repetitive decision-making process. In the absence of such rules, the decision about what to permit will continue on an ad hoc basis without purposeful and principled decision-making guiding the agencies’ hands in furtherance of the Wilderness Act’s underlying mandate.¹⁶⁷

CONCLUSION

Unless Congress modernizes the language of the Wilderness Act to clarify how new developments should be addressed, technological expansion will present a continuing conundrum for the managers of wild areas. Spaces free of cell phones are diminishing at an increasingly rapid rate. The decision to add wilderness areas to those connected zones should be one made deliberately, rather than allowing it to occur in a haphazard and uncontrolled manner.

Courts should be critical of proposed changes to permissible wilderness activities, and regulatory agencies should create internal rules prohibiting technological expansion without clearly articulated and compelling reasons. As the letter used to introduce the Wilderness Act more than fifty years ago

163. *Id.*

164. *Wolf Recovery Found. v. U.S. Forest Serv.*, 692 F. Supp. 2d 1264, 1268 (D. Idaho 2010) (emphasis added) (quoting § 1133(c) of the Wilderness Act).

165. See Gordon H. Worley, *Wilderness Communications*, 22 WILDERNESS & ENVTL. MED. 262, 263–65 (2011) (discussing basic radio and satellite communication technologies that already satisfy the communicative needs of those exploring wilderness areas).

166. *High Point, LLLP, v. Nat’l Park Serv.*, 850 F.3d 1185, 1197 (11th Cir. 2017) (emphasis added).

167. CARLSON ET AL., *supra* note 2, at 12.

stated: “Without any remaining wilderness we are committed wholly, without chance for even momentary reflection and rest, to a headlong drive into our technological termite-life, the Brave New World of a completely man-controlled environment.”¹⁶⁸ Whether wilderness becomes as networked as the country’s urban centers should be a decision made deliberately, and with caution.

168. Letter from Wallace Stegner to David E. Pesonen, Member, Outdoor Recreation Res. Review Comm’n (Dec. 3, 1960) (on file with The Wilderness Society), <https://wilderness.org/bios/former-council-members/wallace-stegner>.