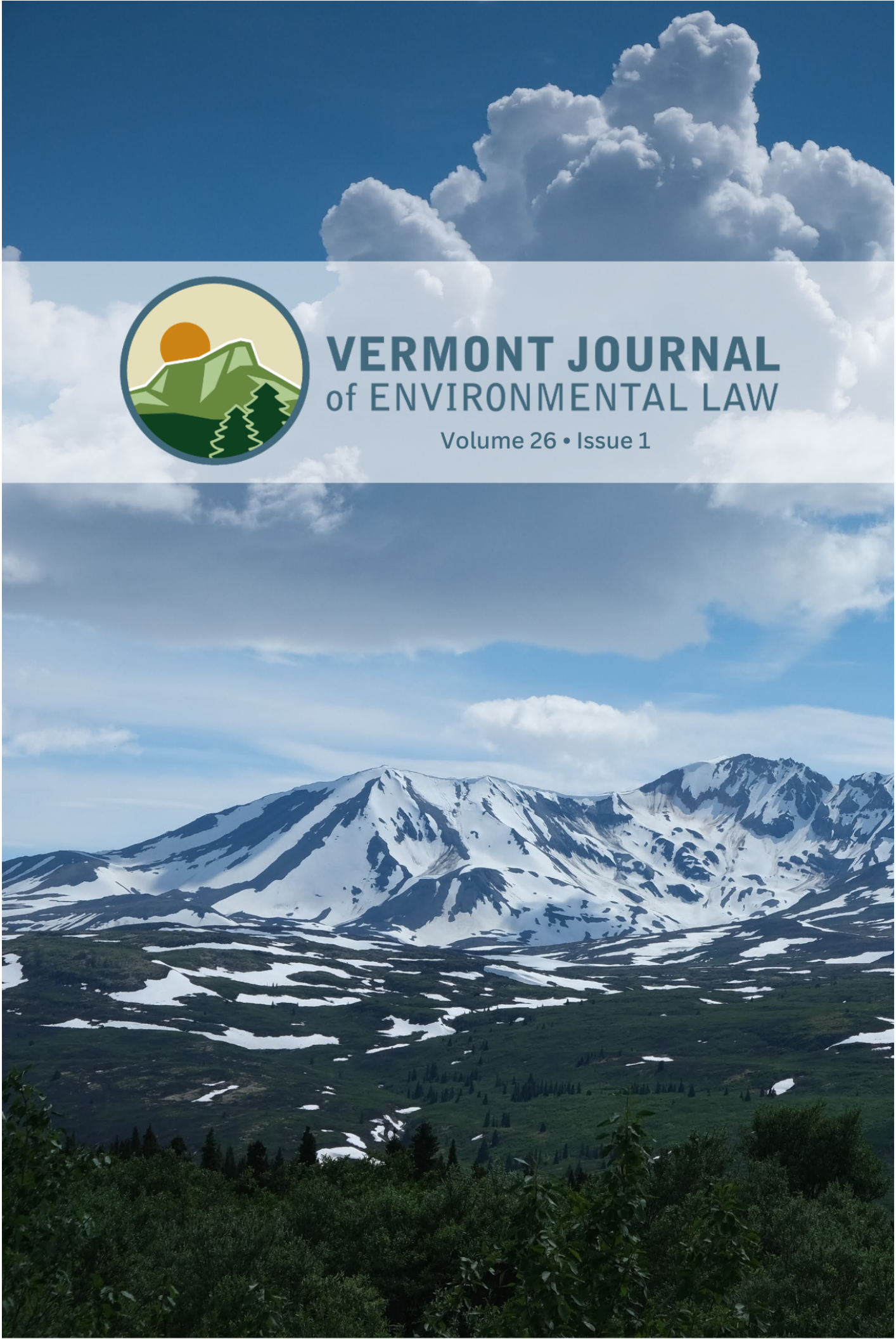

VERMONT JOURNAL of ENVIRONMENTAL LAW

Volume 26 • Issue 1

VERMONT JOURNAL OF ENVIRONMENTAL LAW
VERMONT LAW AND GRADUATE SCHOOL

Volume 26, Issue 1 Fall 2024

The *Vermont Journal of Environmental Law* is excited to announce the publication of Volume 26, Issue 1. Unlike previous Books, for this Volume's inaugural issue we decided to publish four student notes. Our goal is to highlight students' academic contributions as the emerging voices of the environmental movement. This Book reflects our journal's commitment to supporting these voices, and to the exciting and diverse topics concerning them.

STUDENT NOTES

VERMONT JOURNAL OF ENVIRONMENTAL LAW
Vermont Law & Graduate School
164 Chelsea Street
P.O. Box 96
South Royalton, VT 05068
(802) 831-1024

vjel.vermontlaw.edu

Cite to this *Journal* as: 26 VT. J. ENV'T L. _____ (2024).

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Cover Image: "Dalton Peak, near the Alaska/Yukon border, June 2024" by Travis Hein

This Journal is available exclusively in electronic format.

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Volume 26, Issue 1 Fall 2024

THOSE WE FORGET: NEPA DOES NOT PROTECT REMOTE ALASKA NATIVE COMMUNITIES FROM EXPLOITATION BY RESOURCE EXTRACTION COMPANIES

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PRECIS

The tiny Native village of Nuiqsut is on the North Slope of Alaska, well above the Arctic Circle. From the village, the horizon reveals almost nothing but tundra as far as the eye can see. But several ConocoPhillips oil drilling compounds break the view of the wild landscape.[1] The Willow Project is a new oil drilling project by ConocoPhillips that, when operational, will extract up to 180,000 barrels of oil per day from the land around Nuiqsut.[2] Residents of Nuiqsut are vocal about their opposition to the project and concerns about damage to the environment and their living conditions.[3] Reports produced by the Bureau of Land Management (BLM) show significant effects to human health and wildlife habitats.[4] Resource extraction projects are known to cause damage to the climate,[5] subsistence lifestyles,[6] and overall health of the local population.[7] Additionally, recent studies show that resource extraction worker camps in proximity to Indigenous communities substantially increases violence and sexual crimes against Indigenous women.[8] Yet there is no data about past or potential harm of this kind in the Environmental Impact Statement (EIS) released by the BLM for the Willow Project.[9]

The lack of independent and accurate data collection surrounding Indigenous populations and extraction projects creates the perfect storm of confusion, violence, and disenfranchisement of Alaska Native people. Current National Environmental Policy Act (NEPA)[10] regulations allow ConocoPhillips and government agencies to conduct harmful projects near

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1. *If Willow is Approved, Nuiqsut Community Will Be Completely Engulfed by Oil and Gas Development*, STOP WILLOW (Nov. 1, 2022), https://stopwillow.org/resources/if-approved-nuiqsut-community-will-be-completely-engulfed-by-oil-and-gas-development/ [hereinafter STOP WILLOW].

2. *ConocoPhillips Welcomes Record of Decision on the Willow Project*, CONOCOPHILLIPS (Mar. 13, 2023), https://www.conocophillips.com/news-media/story/conocophillips-welcomes-record-of-decision-on-the-willow-project/.

3. U.S. DEP'T OF THE INTERIOR BUREAU OF LAND MGMT., WILLOW MASTER DEVELOPMENT PLAN SCOPING MEETING, NUIQSUT, ALASKA 36 (2018) [hereinafter *Scoping Meeting*].

4. U.S. DEP'T OF THE INTERIOR BUREAU OF LAND MGMT., WILLOW MASTER DEVELOPMENT PLAN SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT DOI-BLM-AK-0000-2018-0004-EIS 354 (2023) [hereinafter *Final EIS*].

5. *Global Outlook Highlights Resource Extraction as Main Cause of Climate Change, Biodiversity Loss*, INT'L INST. FOR SUSTAINABLE DEV. (Mar. 20, 2019), https://sdg.iisd.org/news/global-outlook-highlights-resource-extraction-as-main-cause-of-climate-change-biodiversity-loss/.

6. *Food Security and Climate Change in Alaska*, CLIMATE HUBS U.S. DEP'T OF AGRIC., https://www.climatehubs.usda.gov/hubs/northwest/topic/food-security-and-climate-change-alaska (last visited Mar. 7, 2024).

7. *Final EIS*, *supra* note 4.

8. *See* Lily Cohen, *The Role of Environmental Law in Addressing the Violent Effects of Resource Extraction on Native Women*, 47 HARV. ENV'T L. REV. 275, 277 (2023) (arguing that the National Environmental Policy Act creates a legal obligation for federal agencies to take the effects on Native women into account when evaluating resource extraction project impacts).

9. *Final EIS*, *supra* note 4, at 361.

10. 42 U.S.C. § 4332.

Native communities by controlling the flow of data that informs project approval. For projects like Willow, requisites for accurate data collection under NEPA are vague and do not require independent, corroborative research for the data produced by and for extraction companies.[11] Despite urging by affected communities, lawsuits alleging poor data collection methods, and clear conflicts of interest, the law requires very little independent data collection before oil drilling projects like Willow begin.

The increased danger to Native women and the ability to ignore public input calling for independent research are both exacerbated by the unique legal positions of Alaska Native tribes and the extreme remoteness of the location. The future of small, remote, Alaska Native communities depends on a reliable subsistence lifestyle. Extractive projects, like Willow, further disrupt the ability of these communities to adapt subsistence strategies to a rapidly changing landscape.

This Note argues that EISs are inadequate to protect Alaskan environments and Alaska Native communities directly affected by resource extraction projects. Part I outlines Nuiqsut and the Willow Project within the context of North Slope oil extraction and the United States's colonization of Alaska Natives. It also provides a brief overview of the unique legal position of Alaska Natives compared with other Indigenous American groups, and the relevant NEPA regulations.[12] Part II demonstrates how NEPA regulations provide inadequate protections for the land and the people living near extraction projects, and how certain Alaska-specific factors affecting Alaska Native populations compound those issues. Part III of the Note explores solutions to the problem and various facets of it. This Note concludes that a combination of approaches to this multi-faceted issue is necessary to protect communities like Nuiqsut, and one of those approaches must be to support the independent tribal sovereignty of Indigenous people.

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11. *See* 40 C.F.R. § 1506.5(b) (2023) (listing the requirements for the formation of an EIS).

12. KAREN JARRAT-SNIDER, TWO CASES OF NAVIGATING LEGAL COMPLEXITY: ENVIRONMENTAL JUSTICE IN BARROW AND TAR CREEK 123 (Karen Jarrat-Snider & Marianne O. Nielsen eds., 2020) [hereinafter Snider].

I. BACKGROUND

A. Extraction Projects are Especially Dangerous to Indigenous Communities

The United States has a long history of violence, disenfranchisement, and erasure when it comes to its Indigenous[13] populations.[14] Although the United States government[15] began the colonization and genocide of Indigenous peoples many years ago, Indigenous communities experience ongoing colonization of their lands and bodies. This is visible in the crisis of Missing and Murdered Indigenous Women (MMIW) from reservations and communities around the country, including Alaska.[16] Indigenous women are especially vulnerable to violence and sexual crimes.[17] The Bureau of Indian Affairs' website states that "violence against Native Americans and Alaska Natives far exceed national averages."[18] But statistics only show part of the story. Inconsistencies in how data is collected and recorded results in a skewed average that obscures the extent of the problem in areas considered tribal land.[19] Even with holes in the data, researchers estimate that "rates of violence on reservation[s] can be up to ten times higher than national averages."[20] Though Alaska does not have reservations, Alaska Native women have the highest victimization rate for sexual offenses of any racial or gender group in the state. Areas of the state where the population is almost entirely Alaska Native have a rate of felony-level sexual offenses that was 106% higher than the statewide rate in 2017.[21]

Indigenous communities are particularly susceptible to sexual violence and crime when resource extraction projects encroach on residential areas.[22]

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13. Throughout this Note, the term "Indigenous" is used to refer to Indigenous Americans in general, and the term "Native" or "Alaska Native" is used to refer to Indigenous Alaskans specifically, with the exception of quoted materials. The term "Indian" is only used in reference to statutory language.

14. Summer Blaze Aubrey, *Violence Against the Earth Begets Violence Against Women: An Analysis of the Correlation Between Large Extraction Projects and Missing and Murdered Indigenous Women, and the Laws that Permit the Phenomenon Through an International Human Rights Lens*, 10 ARIZ. J. ENV'T L. & POL'Y 34, 37 (2019).

15. *Id.*

16. Aubrey, *supra* note 14, at 37; *see also*, *Gender Justice & Healing* NATIVE MOVEMENT, https://www.nativemovement.org/gender-justice (last visited Mar. 7, 2024) (affirming that Alaska, like many other states, struggles with high numbers of missing or murdered Indigenous women and girls).

17. Laura Cahier, *Environmental Justice in the United Nations Human Rights System: Challenges and Opportunities for the Protection of Indigenous Women's Rights Against Environmental Violence*, 13 GEO. WASH. J. ENERGY & ENV'T L. 37, 38 (2022).

18. *Missing and Murdered Indigenous People Crisis*, DEP'T OF THE INTERIOR BUREAU OF INDIAN AFF., https://www.bia.gov/service/mmu/missing-and-murdered-indigenous-people-crisis (last visited Feb. 20, 2024).

19. *Id.*

20. *Id.*

21. CHRISTEN L. SPEARS, DIV. OF STATEWIDE SERVS. CRIM. RECS. & IDENTIFICATION BUREAU, FELONY LEVEL SEX OFFENSES: 2017 CRIME IN ALASKA SUPPLEMENTAL REPORT 4 (Aug. 2018).

22. Cohen, *supra* note 8, at 283.

Documented increases in crime related to sex trafficking and violence follow resource extraction projects near Indigenous communities.[23] Tribal victim services workers in North Dakota observed this phenomenon connected to the "influx of transient oil field workers" for an oil extraction project nearby.[24] An extraction company will often place temporary housing for its transient workers near the worksite, allowing for an easy commute but few entertainment options in a rural or remote area.[25] These workers are usually men, away from their families from weeks to months at a time, and with access to substantial paychecks from the project.[26] The workers are also more likely than the average person to have a history of sexual violence, because the high demand for workers results in lower standards of employee screening.[27] Under-resourced tribal law enforcement and jurisdictional complexities can give extraction workers a sense of freedom from accountability when it comes to Indigenous communities.[28]

The Native village of Nuiqsut is the closest civilization to the proposed site of the Willow Project. The location of Nuiqsut was originally only a place for the Native Iñupiat people to gather seasonally for trading, hunting, and fishing.[29] The seasonal camp became an incorporated village in 1975 after the Arctic Slope Regional Corporation agreed to fund the village's construction.[30] The Willow Project and the village of Nuiqsut are located in a region called the National Petroleum Reserve-Alaska (NPR-A). Nuiqsut is the northernmost town in Alaska with road access, which connects it to the rest of the state for only four months out of the year.[31] The next closest civilization is Prudhoe Bay, a community that sprung up around a long-time oil drilling site, about 60 miles west.[32] Nuiqsut has a year-round population between 400 and 500 residents and relies on Kuukpik Native Corporation (Corporation) for most of its public services.[33] Over 90% of Nuiqsut residents are Iñupiat Alaska Native,[34] part of the Indigenous Inuit culture of

23. Cohen, *supra* note 8, at 277.
24. *Id.* at 276.
25. Aubrey, *supra* note 14, at 44.
26. *Id.*
27. Cohen, *supra* note 8, at 280.
28. Aubrey, *supra* note 14, at 45.
29. *Nuiqsut*, N. SLOPE BOROUGH, https://www.north-slope.org/our-communities/nuiqsut/ (last visited Jan. 17, 2024) [hereinafter *North Slope Borough*].
30. *Id.*
31. *Id.*
32. *Gates of the Arctic Research Portal: Nuiqsut*, UNIV. OF ALASKA FAIRBANKS, https://jukebox.uaf.edu/gatesportal7/community/nuiqsut (last visited Mar. 8, 2024).
33. *Nuiqsut*, KUUKPIK, https://www.kuukpik.com/history/nuiqsut/ (last visited Oct. 26, 2024) [hereinafter Kuukpik].
34. *Id.*

people that spans the northern coasts of Alaska, Canada, and Greenland.[35] The residents of Nuiqsut rely heavily on subsistence hunting, fishing, and gathering for food.[36] This enables Nuiqsut residents to offset the high prices of imported food to the remote area, and to maintain connections to traditional ways of life.

Current and future extraction projects in Alaska risk the viability of this lifestyle and jeopardize the long-term resilience of remote communities like Nuiqsut. The federal government designated this area for oil and gas production one year after the Arctic Slope Regional Corporation incorporated Nuiqsut as a permanent residential village.[37] In 1998, ConocoPhillips began developing an oil drilling site at the Alpine oil field, very near the village of Nuiqsut.[38] Because the Corporation owns portions of the surface rights to that land, ConocoPhillips pays it a royalty whenever oil production is underway.[39]

B. Unique Legal Positions of Alaska

Laws governing Alaska Native people differ in several ways from those defining Indigenous rights in the contiguous United States. These differences are due in part to confusing and contradictory statements in Russia's cession of Alaska to the United States, and a series of similarly confusing congressional enactments and court decisions since then.[40] Article III of the 1867 Treaty of Cession from Russia placed Alaska Natives in roughly the same legal position as other Indigenous Americans. This position, however, was largely ignored by governments and remained in flux until 1999.[41] The federal Organic Act of 1884 provided that "Indians . . . shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them . . . ."[42] In 1959, the federal government changed Alaska's status from a federal military district to full statehood.[43] The Statehood Act required that the state government cede control of Alaska lands held by any

35. *The Inupiat People*, KIKIKTAGRUK INUPIAT CORP., https://kikiktagruk.com/shareholders/inupiat-people/ (last visited Mar. 13, 2024).

36. *Final EIS*, *supra* note 4, at 363.

37. Timothy Puko, *What is Willow? How an Alaska oil project could affect the environment*, THE WASH. POST, https://www.washingtonpost.com/climate-environment/2023/03/17/willow-project-alaska-oil-drilling-explained/ (last updated Apr. 22, 2023, 5:35 PM); *North Slope Borough*, *supra* note 29.

38. STOP WILLOW, *supra* note 1.

39. *Nuiqsut*, KUUKPIK, https://www.kuukpik.com/corporation/about-us/ (last visited Oct. 26, 20024).

40. DAVID S. CASE & DAVID A. VOLUCK, ALASKA NATIVES AND AMERICAN LAWS 165–67 (University of Alaska Press eds., 3rd ed. 2012) [hereinafter Case].

41. Treaty of Cession, Russ.-U.S., art. III, Mar. 30, 1867, 15 Stat. 539; Case, *supra* note 40, at 165.

42. Organic Act of May 17, 1884, ch. 53, § 8, 23 Stat. 24, 26; Case, *supra* note 40, at 166.

43. Case, *supra* note 40, at 166.

Native groups to the federal government.[44] Subsequently, Native groups brought several cases asserting various land rights, further complicating the law.[45] A mire of legal ambiguities set the stage for the federal government to claim expansive rights to Alaskan land.

The federal government views Alaska almost exclusively as a source of natural resources.[46] Shortly after Alaska became a state, prospectors discovered oil.[47] Before this, the federal government had not fully defined Alaska Native rights under American law.[48] To gain access to the oil, the government enacted legislation that dramatically altered Native land rights in Alaska. The Alaska Native Claims Settlement Act (ANCSA) of 1971[49] terminated all Native reservations in Alaska except one, and transferred title for 44 million acres to 12 Alaska Native regional corporations and over 200 smaller village corporations.[50] ANCSA dispensed $963 million to Alaska Natives through those regional corporations as compensation for the state and the federal government to have "collaborative use" of the land.[51] Each Alaska Native person received 100 shares in stock in the corporation representing their tribal group, and Native children born after ANCSA could inherit that stock.[52]

The critical effect of ANCSA is that it unilaterally extinguished Native claims to inherent land rights in Alaska.[53] Through ANCSA, Alaska Natives may not claim any land as protected for their exclusive use, outside the boundaries of specific villages.[54] Originally, ANCSA contained language ensuring that the new corporations use part of the settlement to provide public services and safeguard subsistence lifestyles, but the final version did not.[55] The original language alluded to a deal that would pay Native people for conservation easements to preserve the land for subsistence.[56] Instead, the federal government insisted on fee simple title transfer of Native lands,

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44. Case, *supra* note 40, at 166.

45. *See generally* Tlingit & Haida Indians v. United States, 177 F. Supp. 452 (Ct. Cl. 1959); Metlakatla Indian Cmty. v. Egan, 369 U.S. 45 (1962); Alaska v. Udall, 420 F.2d 938 (9th Cir. 1969) (illustrating the confusion of the law, and the struggle for Native groups to have their rights clearly defined).

46. Snider, *supra* note 12, at 123–24.

47. *Id.*

48. *Id.*

49. Alaska Native Claims Settlement Act, 43 U.S.C. §§ 1601–1629h.

50. Kuukpik, *supra* note 33.

51. *Id.*

52. Snider, *supra* note 12, at 124; *see also* Case, *supra* note 40, at 35 (confirming the distribution of Corporation shares in the wake of ANCSA).

53. Alaska Native Claims Settlement Act, 43 U.S.C. § 1603(a)–(c).

54. *Id.* §§ 1603, 1611, 1613.

55. Case, *supra* note 40, at 35.

56. *Id.*

conveying it entirely away from the tribes.[57] In short, the effect of ANCSA is that Alaska Natives cannot exercise full sovereignty over any part of Alaska's lands or waters.[58] This presents many problems for tribes in Alaska, including curtailing tribal governments' ability to ensure that Native communities may subsist in clean, healthy, and safe environments.

Jurisdictional complications arise from a series of overlapping court decisions and laws regarding which entities should decide criminal cases originating on tribal land. The Major Crimes Act, enacted in 1885, granted federal courts exclusive jurisdiction over certain felonies committed on tribal land.[59] In 1953, Public Law 280 transferred jurisdiction over most criminal cases to certain states, including Alaska, though Alaska would not officially become a state until 1959.[60] Then in 1978, *Oliphant v. Suquamish Indian Tribe* removed tribal jurisdiction for non-Indigenous offenders altogether, even when the victim was Indigenous.[61] In 1999, the Alaska Supreme Court officially recognized the status of Alaska Tribes as separate governments with inherent sovereignty, and this legal view continues today.[62] The 2013 reauthorization of the Violence Against Women Act (VAWA) restored tribe's ability to prosecute non-Indigenous people for certain domestic violence offenses, but this jurisdiction was extremely limited.[63] The 2022 VAWA reauthorization restores even greater jurisdiction to tribal courts,[64] but significant limitations remain. This complex and shifting area of the law creates uncertainty over who has jurisdiction, and many cases go undecided, resulting in a culture of little accountability.[65]

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57. Marilyn J. Ward Ford, *Twenty Five Years of the Alaska Native Claims Settlement Act: Self Determination or Destruction of the Heritage, Culture, and Way of Life of Alaska's Native Americans?*, 12 J. Env't L. & Litig. 305, 328–29 (1997).

58. *Id.*

59. 18 U.S.C. § 1153(a); Ana Condes, *Man Camps and Bad Men: Litigating Violence Against American Indian Women*, 116 NW. U. L. REV. 515, 532 (2021).

60. Pub. L. No. 83–280, 67 Stat. 588 (1953); *Tribal Crime and Justice: Public Law 280*, NAT'L INST. OF JUST. (May 19, 2008), https://nij.ojp.gov/topics/articles/tribal-crime-and-justice-public-law-280.

61. Oliphant v. Suquamish Indian Tribe, 435 U.S. 191, 195 (1978).

62. John v. Baker, 982 P.2d 738, 743 (Alaska 1999).

63. Violence Against Women Reauthorization Act of 2013, Pub. L. No. 113–4, § 904, 127 Stat. 54 (2013); Condes, *supra* note 59, at 534.

64. Consolidated Appropriations Act of 2022, Pub. L. No. 117–103, 136 Stat. 49, 904–08, sub. B, §§ 811–813 (codified at 25 U.S.C. §§ 1304–1305).

65. *See* Condes, *supra* note 59, at 534–37 (discussing relevant case law and other issues that compound the difficulty of enforcing accountability for violence against Indigenous women).

C. Environmental Justice for Indigenous Americans

The essential goal of the environmental justice movement is to "create equal access to ecological resources and equal protection from environmental hazards for all persons."[66] The Environmental Protection Agency (EPA) defines environmental justice as "the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment."[67] The EPA recognizes the right of all communities to environmental justice, or "the same degree of protection from environmental and health hazards," as well as an equal opportunity to have meaningful involvement in decision-making processes.[68] Many people recognize the roots of American environmental justice in the Civil Rights Movement of the 1960s, when Black communities began to pressure city and state governments for cleaner, safer living and working conditions.[69] However, Rebecca Tsosie argues that Indigenous "'sovereignty claims' constituted the focal point of the first generation of environmental justice claims" in the United States.[70]

Environmental justice has a different meaning to Indigenous populations than to other minority and disadvantaged groups in the United States. "[T]he term 'environmental justice' has been used to highlight the distributional impacts of the dominant society's environmental decision-making process on disadvantaged communities, including the poor and racial minorities."[71] Though many Indigenous communities face environmental injustices by private companies and federal colonization of land, many tribal governments also sell natural resources and operate industrial plants to promote the economic welfare of the tribe.[72] In contracting for economic development projects on tribal land, the tribe asserts its sovereignty to provide employment opportunities and essential tax revenue.[73] Self-determination means that Indigenous nations make their own decisions about when to allow these projects on their land. "[T]he injustice faced by federally recognized tribes

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66. Julia C. Rinne & Carol E. Dinkins, *Environmental Justice: Merging Environmental Law and Ethics*, 25 NAT. RES. & ENV'T 3, 3 (2011).

67. *Learn About Environmental Justice*, EPA, https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (last visited Aug. 16, 2023).

68. *Environmental Justice*, EPA, https://www.epa.gov/environmentaljustice (last visited Nov. 15, 2023).

69. *Environmental Justice Timeline*, EPA, https://www.epa.gov/environmentaljustice/environmental-justice-timeline (last visited June 27, 2023).

70. Rebecca Tsosie, *Indigenous People and Environmental Justice: The Impact of Climate Change*, 78 U. COLO. L. REV. 1625, 1627 (2007).

71. *Id.*

72. Louis G. Leonard III, *Sovereignty, Self-Determination, and Environmental Justice in the Mescalero Apache's Decision to Store Nuclear Waste*, 24 B.C. ENV'T AFFS. L. REV. 651, 682 (1997).

73. Tsosie, *supra* note 70, at 1631.

was primarily caused by the federal government's failure to acknowledge the tribes' sovereign powers and by decades of paternalistic federal management policies, which had allowed reservation resources to be exploited without adequate compensation or mitigation." [74] Self-determination, economic independence, and environmental justice are not mutually exclusive. Rather, for Indigenous communities, each cannot exist independently of the others.

Environmental justice is not a new concept, but it is a growing concern due to the urgency of climate change. Resource extraction contributes significantly to the changing climate and loss of biodiversity,[75] affecting the long-term health of the planet as well as the short-term ability of Native communities to subsist on wild-caught and gathered food sources. "Certain groups, such as Indigenous populations in both the continental United States and non-contiguous states and territories, have a complex, historical fight over land jurisdiction that complicates their fight for justice."[76] Many of the most adversely affected communities around resource extraction projects are Indigenous American or Alaska Native.[77] This reality lowers the resiliency of the community to handle other challenges.

To achieve environmental justice, governments and agencies must acknowledge the significance of "structural causes and consequences of uneven distribution of harms across time, space and demographics."[78] Many states are now adopting their own laws and policies regarding environmental justice.[79] Alaska currently does not have any such laws.[80] The state does have many small, remote, mostly Native communities that are vulnerable to climate change and exploitation by resource extraction companies and other industrial projects.[81] In Nuiqsut, though the Kuukpik Tribal Corporation supports the Willow Project, its residents lack economic alternatives and political power to resist a "dirtier or more dangerous environment in return for the promise of jobs and economic aid."[82] Tribal Corporation boards are

74. Tsosie, *supra* note 70, at 1632.

75. *Global Outlook Highlights Resource Extraction as Main Cause of Climate Change, Biodiversity Loss*, INT'L INST. FOR SUSTAINABLE DEV. (Mar 20, 2019), https://sdg.iisd.org/news/global-outlook-highlights-resource-extraction-as-main-cause-of-climate-change-biodiversity-loss/.

76. Jasleen Shokar, *A New Hope, With a New NEPA: How Existing Environmental Impact Statements Fail to Protect People of Color at the Federal Level*, 13 ARIZ. J. ENV'T L. & POL'Y, 261, 264 (2023).

77. Cohen, *supra* note 8, at 279.

78. Miranda Forsyth et al., *A Future Agenda for Environmental Restorative Justice?* 4 INT'L J. OF RESTORATIVE JUST. 17, 24 (2021).

79. *Environmental Justice Law and Policy Database*, ENV'T JUST. STATE BY STATE, https://ejstatebystate.org/law-policy-database (last visited Mar. 10, 2024).

80. *How Alaska is Addressing Environmental Justice*, ENV'T JUST. STATE BY STATE, https://ejstatebystate.org/directory/alaska (last visited Mar. 10, 2024).

81. *Id.*

82. Leonard III, *supra* note 72, at 685–86.

made up of Native people, but sentiments differ about how best to support the Tribe even within small communities.

D. Sorting out NEPA and Regulations Regarding EISs

NEPA imposes requirements like producing an EIS for particular projects overseen by federal agencies.[83] Federal laws like NEPA bind federal agencies.[84] According to the EPA, the basic policy of the law is "to ensure that all branches of government give proper consideration to the environment" before starting projects that could significantly affect it.[85] To do this, NEPA requires that a governing agency produce an EIS before certain types of projects may move forward.[86] This is required for any proposed project that could significantly affect the "quality of the human environment."[87]

Under NEPA, all agencies must "provide meaningful opportunities for public participation."[88] Each federal agency has its own procedures for ensuring that it meets this requirement. For the Willow Project, the BLM is the governing agency.[89] The BLM is in charge of managing most of the 22.1 million acres of surface and subsurface estate of the NPR-A, as well as overseeing the title transfer for all ANCSA conveyances.[90] Because the NPR-A is federal land, the law considers all projects conducted on it "federal action."[91] Though the land is considered tribal land for subsistence hunting and fishing purposes, the federal government, through the BLM, has the power to determine whether to use it for resource extraction. For the BLM, opportunities for public participation largely manifest in producing an EIS, which provides its own requirements for public comment and participation by affected parties.[92] Executive Order 12898 also encourages public participation to further the pursuit of environmental justice in agency

83. 42 U.S.C. § 4332; 40 C.F.R. § 1502.1 (2023).

84. 42 U.S.C. § 4332 ("all agencies of the Federal Government shall—").

85. *Summary of the National Environmental Policy Act*, EPA, https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act (last visited Sep. 6, 2023) [hereinafter *NEPA Summary*].

86. 42 U.S.C. § 4332(C-G).

87. 42 U.S.C. § 4332(C); Cohen, *supra* note 8, at 287.

88. 40 C.F.R. §§ 1501.2(4)(ii), 1501.5(e) (2023); *How Citizens can Comment and Participate in the National Environmental Policy Act Process*, EPA, https://www.epa.gov/nepa/how-citizens-can-comment-and-participate-national-environmental-policy-act-process (last visited Oct. 3, 2023).

89. *Bureau of Land Management Seeks Public Input for Supplemental Analysis of Willow Project*, BUREAU OF LAND MGMT. (Feb. 3, 2022), https://www.blm.gov/press-release/BLM-seeks-public-input-supplemental-analysis-willow-project.

90. *What We Manage in Alaska*, BUREAU OF LAND MGMT., https://www.blm.gov/about/what-we-manage/alaska (last visited Mar. 10, 2024).

91. *NEPA Summary*, *supra* note 85.

92. *National Environmental Policy Act*, BUREAU OF LAND MGMT., https://www.blm.gov/programs/planning-and-nepa/what-informs-our-plans/nepa (last visited Mar. 10, 2024).

action.[93] This includes holding public meetings "for the purpose of fact-finding, receiving public comments, and conducting inquiries concerning environmental justice."[94]

NEPA also imposes other requirements such as: tribal and public participation, environmental justice considerations, impacts for the community, and EIS inclusions. Regulations for NEPA explicitly require that an agency consult with relevant tribal governments on the project proposal.[95] "Agencies shall involve the public, State, Tribal, and local governments, relevant agencies, and any applicants, to the extent practicable in preparing environmental assessments."[96] NEPA provides multiple opportunities for the public to submit comments on the project proposal.[97] NEPA does not mandate any action from the federal agency attached to an EIS, though the EIS does hold weight and provides a basis for advocacy groups and others to challenge agency actions in court.[98] The language of NEPA recommends that agencies consider social and environmental justice impacts to the community.[99] However, there is no requirement or specific guidance on how to do so.[100] Furthermore, EISs "do not exist to mediate or eradicate environmental harm . . . [t]hey are merely a public acknowledgement and notification of potential harm to a community about the environment."[101] NEPA does not contain any provisions requiring a project to halt due to the environmental impact, only that the agency complete the assessment.[102]

II. WHY THE WILLOW PROJECT'S EIS IS INADEQUATE

The Willow Project's Final Supplemental EIS does not adequately address either the potential risk to or participation of the community. Compounded by several unique aspects of Alaska related to these issues, NEPA requirements offer especially hollow protection against exploitation by extractive industries. First, the BLM's Final EIS did not provide a complete analysis of potential human rights impacts, such as the likelihood of increased violence and sexual abuse of Native women. Second, the report does not address a concern about independent research that community

93. Exec. Order No. 12898, 3 C.F.R. § 1–101 (1994).
94. *Id.* § 5–5(d).
95. 40 C.F.R. §§ 1501.2(4)(ii), 1501.5(e) (2023); Cohen, *supra* note 8, at 287.
96. 40 C.F.R. § 1501.5(e) (2023).
97. 42 U.S.C. § 4332.
98. Cohen, *supra* note 8, at 287–88.
99. 40 C.F.R. §§ 1501.2(b)(2), 1501.2(b)(4)(ii), 1501.5(e) (2023).
100. *Id.*
101. Shokar, *supra* note 76, at 267.
102. *Id.* at 267–68.

members raised on multiple occasions. These issues combine with other issues relatively unique to Alaska, such as extreme remoteness and the tenuous hold that Alaska Natives have on their ancestral lands. These failures demonstrate the inadequacy of NEPA and EIS requirements to protect communities like Nuiqsut.

A. The EIS for the Willow Project Fails to Address Increased Risk to Native Women

The environmental impacts considered for project evaluations must include all potentially significant impacts to an affected community. NEPA does not currently have any requirements that EISs include the potential for increased crime or violence against women.[103] However, the push to include more environmental justice concerns in NEPA analyses could increase recognition of how extractive industries exploit more than the land. The U.S. Department of State acknowledges the link between resource extraction and increased violence and sex trafficking of women that Indigenous communities have felt since the oil boom began.[104] Though NEPA does not expressly create a legal obligation to "evaluate the violent impacts accompanying certain resource extraction projects on Native women," federal agencies are beginning to recognize the need to do so.[105]

The goal of an EIS is to have an agency evaluate the potential impacts and alternatives of a project on the surrounding environment.[106] If that environment includes a community, the agency conducting the project must consider all impacts to such a community. According to substantial research on the risk of extraction projects resulting in increased violence against Indigenous women, the potential impacts of the Willow Project on Nuiqsut should include the likelihood of an increase in risk to the safety of women in Nuiqsut.

The increased risk of sexual violence to Alaska Native women and girls in Nuiqsut falls squarely within environmental justice considerations for federal agencies. The 1994 Executive Order 12898 charged all federal

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103. *See* 42 U.S.C. §§ 4331-4336(e) (neglecting to include the potential for increased violence in connection with environmental projects).

104. U.S. DEP'T OF STATE OFF. TO MONITOR AND COMBAT TRAFFICKING IN PERS., THE LINK BETWEEN EXTRACTIVE INDUSTRIES AND SEX TRAFFICKING (2017), https://www.state.gov/wp-content/uploads/2019/02/272964.pdf; Julia Stern, *Pipeline of Violence: The Oil Industry and Missing and Murdered Indigenous Women*, IMMIGR. AND HUM. RTS. L. REV. BLOG (May 28, 2021), https://lawblogs.uc.edu/ihrlr/2021/05/28/pipeline-of-violence-the-oil-industry-and-missing-and-murdered-indigenous-women/.

105. Cohen, *supra* note 8, at 278.

106. *What is the National Environmental Policy Act?,* EPA, https://www.epa.gov/nepa/what-national-environmental-policy-act#NEPArequirements (last visited Oct. 5, 2023).

agencies to include environmental justice considerations in their missions by "identifying and addressing . . . disproportionately high adverse human health or environmental effects of its programs, policies, and activities on minority populations . . . ."[107] The Council on Environmental Quality, the office in charge of NEPA implementation, defined the Order's direct effects on NEPA regulations.[108] These effects included determining whether minority populations or Indigenous tribes were present and recognizing "interrelated cultural, social, occupational, historical, or economic factors" that could amplify the effects of the federal action.[109] As a minority population, the effects of the Willow Project on Nuiqsut must include environmental justice considerations.

The BLM states in its Environmental Justice Implementation mission that it will consider "all potential social and economic effects" for the general population and compare that to minority and Tribal populations to determine any disproportionately adverse effects.[110] The potential risk to the Native women of Nuiqsut, and an analysis of why the danger to them is disproportionate, should be part of the social and economic effects included in the EIS for Willow. The BLM recognized the risk to Indigenous women in a previous EIS.[111] In 2020, the BLM acknowledged the correlation between extraction workers and an increase in crime in an environmental justice analysis for the Moneta Divide oil and gas project in Wyoming.[112] This analysis led to a recommendation that the oil company take extra measures to protect Indigenous women against the potential of violence.[113] Admitting that such a correlation exists for one project shows that the BLM is aware that increased risk to Alaska Native women in Nuiqsut is a possible outcome of the Willow Project as well. Therefore, the issue should be part of the environmental justice analysis.

The Willow Project EIS's environmental justice statement finds that Nuiqsut residents will bear highly adverse effects but does not mention an additional risk of violence towards women.[114] The statement summarizes the points and requests made by residents during public engagement

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107. Exec. Order No. 12898, 3 C.F.R. § 1–101 (1994).

108. FED. INTERAGENCY WORKING GRP. ON ENV'T JUST. & NEPA COMM., COMMUNITY GUIDE TO ENVIRONMENTAL JUSTICE AND NEPA METHODS 3–4 (Mar. 2019).

109. *Id.* at 4.

110. *Environmental Justice Implementation*, BUREAU OF LAND MGMT., https://www.blm.gov/policy/im2022-059 (last visited Sep. 20, 2022).

111. Cohen, *supra* note 8, at 297.

112. *Id.* at 300.

113. Angus M. Thuermer Jr., *BLM: Oilfield Developers Should Protect Indigenous Women*, WYOFILE (March 3, 2020), https://wyofile.com/blm-oilfield-developers-should-protect-indigenous-women/.

114. *Final EIS*, *supra* note 4, at 347–48.

opportunities, the proposed mitigation strategies, and the standards under which ConocoPhillips will require its employees to operate.[115] The statement's section on public health concludes that the Project's effects on public health "may be highly adverse" and would be borne by the residents of Nuiqsut.[116] The environmental justice statement determines that, regardless of the mitigating or alternative measures employed, the Willow Project would significantly reduce the ability of Nuiqsut residents to use the land for subsistence purposes.[117] The statement goes on to conclude that this loss will increase the living cost for residents who will be forced to buy more imported food.[118] It will also adversely affect "Iñupiat cultural identity, social organization, social cohesion, transmission of cultural values, and community and individual well-being."[119] These effects will also impact the way that women are treated, both by the transient extraction workers and within the community. Because the subject of violence against Native women did not come up during the opportunities for public comment about the Willow Project, if such an impact does result from the Willow Project, there is no basis on which to make a legal claim.

The mitigation strategies of impacts to the community section includes: "Minimize cultural and resource conflicts" by conducting "training developed to train employees on how to prevent transmission of communicable diseases, including sexually transmitted diseases, to the local communities."[120] This strategy is the only mention of likely sexual contact between extraction workers and local women in an over-500-page report about potential impacts to the community. Just as the BLM previously recognized the correlation between extraction projects and violence against Indigenous women, the BLM again admits there will likely be sexual contact between the two groups. Yet the EIS failed to recognize that, in addition to consensual sexual contact, violence and sexual assault are also possible.

Here again the EIS report did not include any research into the potential for increased violence against Native women residents of Nuiqsut, so there is no record of data that could support subsequent mitigating action.[121] In other words, by successfully avoiding doing the research in the first place, the BLM and ConocoPhillips avoid the blame if the problem does eventually surface. Industrial corporations, like ConocoPhillips, often fail to implement their own recommended mitigation measures because federal agencies, like

115. *Final EIS*, *supra* note 4, at 349–61.
116. *Id.* at 366.
117. *Id.* at 368.
118. *Id.*
119. *Id.*
120. *Final EIS*, *supra* note 4, at 361.
121. Aubrey, *supra* note 14, at 45–46.

the BLM, lack enforcement authority.[122] In fact, "[a]n analysis of 17 Supreme Court cases concluded the Court's interpretation is that NEPA imposes purely procedural obligations."[123] This effectively reduces the value of the EIS to the mere fact of its existence, rather than imparting any enforceable responsibilities.[124] Without any legal consequences for any damage caused by the project, ConocoPhillips is free to ignore the mitigation strategies that do make it into the EIS. Though Congress proposed several amendments to NEPA, including measures that require action and implementation of the EIS, none of them have passed.[125] This lack of accountability shows how inadequate the EIS requirement for NEPA really is.

Given the way that government agencies like the BLM implement EISs, the EISs are not a tool that provides substantial protection for the communities that need it most. Though the EIS might have begun with "thoughtful intentions," it has become instead "political fodder in the battle between economic prosperity and environmental preservation."[126] Forgotten communities like Nuiqsut get caught in the crossfire of this battle. The research shows that increased violence and sexual assault of Indigenous women results from proximity to resource extraction projects. Yet there is no specific requirement for Willow's EIS to include this danger in the sections regarding environmental justice, human health impacts, or mitigation. For an EIS involving Native communities especially, the reports on potentially harmful effects of the project and mitigation strategies must include this information. Furthermore, without legal enforcement of the mitigation strategies the EIS does propose, simple recognition of the risk is not enough. For these reasons, the Willow Project's EIS does not adequately protect the Native women of Nuiqsut.

B. The Pretense of Public Participation

Though the BLM and ConocoPhillips technically met NEPA requirements for public participation, the residents' recommendations resulted in minimal alterations to mitigation strategies and project alternatives. Regulations for NEPA and projects conducted by federal agencies require a certain amount of public participation. The conflicting interests of many parties complicate opportunities for public participation in a major project. In the Willow Project's approval process, local people frequently pointed out issues with the data collection methods

122. Shokar, *supra* note 76, at 276.
123. *Id.* at 268.
124. *Id.* at 271.
125. *Id.* at 276.
126. Shokar, *supra* note 76, at 266.

ConocoPhillips and the BLM used.[127] These issues included health data for Nuiqsut residents not being up to date; concerns about researchers collecting data without the benefit of Native knowledge or perspectives; and that independent organizations did not collect the data.[128] The BLM's EIS acknowledged that the village of Nuiqsut would likely experience irreparable harm from the Project.[129] Unfortunately, these concerns did not result in significant changes to the project plan.

Public participation for an EIS encompasses many entities that make up the "public." A large extraction project may affect or benefit many groups differently. The Tribal Corporation for the North Slope area, the Kuukpik Corporation, supports the Willow project, possibly because of the financial benefit it will bring the Corporation and the people they are responsible for supporting.[130] Though the Kuukpik Corporation represents the people's tribal interests, many Nuiqsut residents oppose the project.[131] Additionally, there are also Nuiqsut residents who must live with any consequences of the project despite not receiving benefits from the Corporation.[132]

In an early scoping meeting for the Willow Project in 2018, Nuiqsut residents believed the research did not produce enough data about current and potential effects and worried that the data produced was not the result of independent research.[133] To Nuiqsut residents, "independent research" means research conducted by scientists hired by the Tribe, the village, or another entity that does not have financial stake in ensuring the project moves forward. One resident stated that the Tribe should conduct the studies for the Health Impact Assessment in the EIS to avoid the conflict of interest by researchers hired by development companies.[134] The comment was later reflected in the final summary of public comments for the EIS but did not change the BLM's or ConocoPhillips's approach to the project.[135] This resident also observed that the studies seemed like they were "designed

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127. *Final EIS*, *supra* note 4, at 349, 352–56; *Scoping Meeting*, *supra* note 3, at 10, 11, 13, 33, 34, 36, 37, 46.

128. *Final EIS*, *supra* note 4, at 352–56.

129. *Id.* at 420.

130. Letter from Joe Nukapigak, Kuukpik Corp. President, to Hon. Deb Haaland, Sec'y of Interior (Feb. 23, 2023) (on file with author).

131. *Comments Regarding BLM Willow MDP Preliminary Final FSEIS Review*, NATIVE VILL. OF NUIQSUT & CITY OF NUIQSUT (Jan. 25, 2023), https://static1.squarespace.com/static/565291dee4b06ed63ea669d4/t/63d8287ab74e196371bdcf1f/1675110527125/City+of+Nuiqsut+and+NVN+letter+re+Willow.pdf [hereinafter *Nuiqsut Letter*].

132. *Scoping Meeting*, *supra* note 3, at 31

133. *Id.* at 36.

134. *Id.*

135. U.S. DEP'T OF THE INTERIOR, DOI-BLM-AK-0000-2018-0004-EIS, WILLOW MASTER DEVELOPMENT PLAN FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT, BUREAU OF LAND MGMT., 5 (Jan. 2023), https://eplanning.blm.gov/public_projects/109410/200258032/20073119/250079301/Willow%20FSEIS_Vol%208_App%20B%20-%20C.pdf.

for . . . development to move forward, disregarding then [*sic*] voice of Nuiqsut."[136] With such little weight given to the community feedback, the public participation requirement is little more than a publicity stunt.

In a January 2023 letter from the Native Village of Nuiqsut and the City of Nuiqsut, village and city leaders submitted their comments regarding a previous EIS for the Willow Project.[137] The comment letter laid out in great detail many issues with the process, the BLM's assumptions, and mistrust in ConocoPhillips. This letter outlined concerns about a "fundamental responsibility to protect the people of our village," and the consistent position of the residents opposing the "endless expansion of oil development."[138] The letter called the EIS process "deeply flawed" and asserted that the most recent report did not reflect local public commentary and concerns.[139] Not only was the public participation report incomplete, but the resulting mitigation proposals were not realistic methods of protecting their way of life—which most concerned the residents. For undisclosed reasons, several newly elected city council members and the new mayor of Nuiqsut have since changed their official position and now endorse the project; the position of Nuiqsut residents appears unchanged however.[140]

In a letter to the Secretary of the Department of the Interior in March of 2023, Nuiqsut village leaders again explained some of their issues with the Willow Project and the way the agency and ConocoPhillips were approaching the project.[141] The letter details the ways that the BLM failed to adequately include input from Nuiqsut, instead focusing narrowly on "justifying why the project should go forward."[142] The village leaders pointed out that a previous EIS did not even include the comments of Nuiqsut residents.[143] Like the comments from the scoping meeting and other previous public commentary, the letter also accused the agency of orchestrating the whole process to keep the project moving forward, rather than doing what is best for the community.[144] The letter outlined dire effects to livelihood and health that village residents experience because of existing oil extraction

136. *Scoping Meeting*, *supra* note 3, at 46.

137. *Nuiqsut Letter*, *supra* note 131, at 1.

138. *Id.* at 1-2.

139. *Nuiqsut Letter*, *supra* note 131, at 2.

140. Nathaniel Herz, *As ConocoPhillips' Willow Project Advances, Two Local Governments Have Withdrawn Their Criticism*, ALASKA BEACON, (Jan. 10, 2024, 6:11 PM), https://alaskabeacon.com/2024/01/10/as-conocophillips-willow-project-advances-two-local-governments-have-withdrawn-their-criticism/.

141. Letter to the Honorable Debra Haaland, Secretary, DEP'T OF THE INTERIOR 2 (Mar. 4, 2023),) https://ndncollective.org/consultation-process-inadequate-new-letter-from-nuiqsut-community-leaders-to-department-of-interior/ [hereinafter *Haaland Letter*].

142. *Id.* at 3.

143. *Id.* at 2.

144. *Id.* at 3–4.

projects.[145] It also conveyed their frustration that the federal agency appears to ignore these issues in favor of increasing the area's oil production.[146]

Under the section on environmental justice, the Final EIS proposed one mitigation measure: for ConocoPhillips to provide funding to the village of Nuiqsut to hire a third-party contractor to operate an air quality monitoring station.[147] However, since the mitigation measures proposed in an EIS are not legally enforceable, ConocoPhillips has discretion whether to implement this strategy.[148]

Though the BLM afforded Nuiqsut residents access to the approval process through scoping meetings and other opportunities for public comment, there is no evidence that the participation elicited any effect other than the checking of a box. Communities like Nuiqsut are already disproportionately excluded from privileges afforded to other citizens in more urban areas and are often excluded from making decisions about their own living environments as well. When there is significant turnout at public participation meetings, decision-makers will likely face political consequences for disregarding the public's input. But if the only affected community is small and remote, as is often the case in Alaska, their voices are easier for decision-makers to ignore.[149] Simply put, "[m]ore access to the system without power within that system means nothing."[150] The BLM only gave Nuiqsut residents the illusion of access to the system. Opportunities for public participation have limited usefulness if there is no requirement to take recommendations from the public into account when making decisions.

The reality of the people of Nuiqsut is that under their colonizers' desire for production, they are abandoned as an unfortunate but affordable casualty. "Environmental hazards are inequitably distributed in the United States," and low-income populations and people of color bear a disproportionate burden of environmental dangers.[151] If the federal government discovered oil near a wealthy white suburb, the vast differences in how the local people would be treated illustrates the profound injustice of the situation in Nuiqsut. Nuiqsut and the Willow Project reveal an ugly truth at the heart of the resource extraction industry—the economic benefits of extraction outweigh the consequences of disenfranchising and endangering populations which are already considered of low value to society. Creating "national sacrifice

145. *Haaland Letter*, *supra* note 141, at 17.
146. *Id.*
147. *Final EIS*, *supra* note 4, at 354.
148. Cohen, *supra* note 8, at 287.
149. Luke W. Cole, *Legal Service, Public Participation, and Environmental Justice*, 29 CLEARINGHOUSE REV. 449, 455 (1995).
150. *Id.* at 449.
151. *Id.*

areas"[152] allows the government to avoid similarly damaging extraction projects in areas inhabited by those it considers of higher value. To truly protect vulnerable communities, a finding of "significant impacts" to the environment or the community should trigger a full review of the project, with project termination being a real possibility. Otherwise, the EIS and project review process is just an expensive and time-consuming way to prove that the federal government will approve the project regardless of its adverse impacts.

C. Factors Unique to Alaska that Make NEPA Especially Inadequate

Legal and practical factors specific to Alaska add to the inadequacy of the Willow Project's EIS. NEPA is a federal statute written to cast a broad net over environmental policies in the country. The EIS requirement is a low bar that ensures little more than a justification for why a project should move forward, with no built-in enforcement of proposed mitigation strategies.[153] While an EIS may be enough administrative red tape to protect parts of the country under closer scrutiny, it is not enough in Alaska. The complex legal relationship that the Alaska Native Claims Settlement Act (ANCSA) creates between the state, federal government, and Alaska Native tribes is one unique legal factor. A practical factor with legal implications is the extreme remoteness of small villages like Nuiqsut. Remoteness compounds other issues, such as access to law enforcement, legal accountability for decision-makers, accurate data collection, and cost of living.[154] All these issues combine to make the Willow Project's EIS decidedly inadequate to provide any protection for the local residents.

Alaska Native history is different than the legal history of Indigenous tribes in any other state. ANCSA settled and extinguished tribal claims to aboriginal land title, but not the tribal governments themselves.[155] Because of this, tribal sovereignty in Alaska is tied not to land but to resources managed by Tribal Corporations. Alaska Native tribes have multiple governing bodies that manage different aspects of tribal government.[156] The two major entities are the Alaska Native Regional Corporations, which manage land for Native people as the shareholders, and Alaska Native Regional Non-Profit Organizations, which generally provide social services

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152. Tsosie, *supra* note 70, at 1630.

153. 40 C.F.R. §§ 1501.2(4)(ii), 1501.5(e) (2023) (lacking an enforcement provision).

154. ALASKA DEP'T OF LAB. & WORKFORCE DEV., 42 NO. 7, ISSN 0160-3345, ALASKA ECONOMIC TRENDS: THE COST OF LIVING 4 (2022) [hereinafter Alaska Economic Trends].

155. Alaska Native Claims Settlement Act, Pub. L. No. 92–203, 85 Stat. 688 (1971) (current version at 43 U.S.C. §§ 1601–1629h (2012)).

156. *See* 43 U.S.C. §§ 1601-1629h (describing the system of Native Corporations that manage tribal governance in Alaska).

and healthcare to Alaska Natives.[157] Tribal governments operate under the non-profit organizations and have inherent authority to exercise tribal jurisdiction over Native people in the villages they serve.[158] But this jurisdiction has limited power when it comes to crimes involving non-Natives.[159] Every time a new legal question arises, federal courts must decide whether it makes sense to apply federal law to Alaska Native people in the same way as Indigenous American groups in the lower 48 states.

The remoteness of many Alaska Native communities like Nuiqsut compounds many other problems: the Missing and Murdered Indigenous Women (MMIW) crisis, lack of accountability and oversight, and high costs of living and transportation. The nearest Alaska Native village to Nuiqsut is Utqiagvik, formerly known as Barrow, which is 136 miles away.[160] The only transportation to Utqiagvik is by plane, which is also how freight such as food and mail arrives.[161] The Dalton Highway connects Nuiqsut to Southern Alaska for four months out of the year, but the rest of the time the weather and snowfall make the road impassable, cutting off the village from ground access to the rest of the state.[162] This kind of extreme remoteness makes many aspects of life that most people take for granted nearly impossible.

The MMIW crisis is an ongoing issue across the country. Alaska Native communities have the additional issue of having little to no access to law enforcement and emergency resources.[163] Community organizer and Alaska Native activist Ruth Miller told Indian Country Today that Native women in Alaska "face total negligence by police and federal forces when it comes to prosecuting attackers or murderers of our women."[164] Recognizing the severe lack of law enforcement in rural communities, Alaska Governor Mike Dunleavy declared a federal public safety disaster in 2019.[165] As a result, the state promised increased funding and placement of State Troopers and police in communities off the road system, which, for the most part, communities have not seen.[166] The Alaska Department of Public Safety is primarily responsible for providing law enforcement in remote areas of Alaska but

157. 43 U.S.C. § 1601.

158. 25 U.S.C. § 2812(d)(1)(A)–(B).

159. *Id.*

160. *North Slope Borough*, *supra* note 29.

161. *North Slope Borough*, *supra* note 29.

162. *Id.*

163. Joaqlin Estus, *Striving to Make Indigenous Women, Girls Feel Safe in Alaska*, ICT NEWS (Feb. 3, 2020), https://ictnews.org/news/striving-to-make-indigenous-women-girls-feel-safe-in-alaska?redir=1.

164. *Id.*

165. Casey Grove, *The Lack of Law Enforcement in Rural Alaska Prompted Promises of More Police. Two Years Later, They Haven't Been Kept.*, ALASKA PUB. MEDIA (Dec. 16, 2021), https://alaskapublic.org/2021/12/16/the-lack-of-law-enforcement-in-rural-alaska-prompted-promises-of-more-police-two-years-later-they-havent-been-kept/.

166. *Id.*

funds only 373 positions for the entire state.[167] The huge distances, unreliable communication, and uncertain weather of rural Alaska make the job of law enforcement agencies that much more difficult.

Lack of accountability and oversight is a major challenge in remote Alaska. Alaska is vast, with a very low population density, so the state tends to focus its resources on higher-population areas. Remote regions receive very little state funding, resulting in a corresponding lack of state government oversight.[168] This allows for a lot of freedom and independence, not just for law enforcement, but for industrial projects and research teams as well. In such a remote area, it is easy to imagine that there are no consequences for one's actions. The lack of accountability for research teams compounds another issue—the historically inaccurate information on Indigenous populations.

The difficulty of collecting data about remote Alaska Native communities further complicates a process in which there is already minimal incentive for accuracy. Inconsistent census data collection and a general distrust in the government creates a marked lack of data surrounding Indigenous populations across the country.[169] In fact, "the way the U.S. government currently collects, aggregates, and publishes race and ethnicity data can lead to the exclusion of more than three-quarters of Native Americans from some official data sets." [170] Culturally, many rural communities in Alaska do not trust the government or outside organizations and do not want them collecting information about themselves or their families. [171] These sentiments are not unfounded given the brutal colonization, removal, and forced assimilation of Indigenous populations in the United States, including Alaska.[172] Alaska is especially hard to collect data for, as its many isolated populations make for expensive and slow progress.[173] Understandable as these challenges are, tribal leaders often stress the importance of census data and research for tribal communities, as it can

167. INDIAN L. & ORD. COMM'N, A ROADMAP FOR MAKING AMERICA SAFER: REPORT TO THE PRESIDENT & CONGRESS OF THE UNITED STATES 57 (2013).

168. Grove, *supra* note 165.

169. *See* Robert Maxim et al., *Why the Federal Government Needs to Change How it Collects Data on Native Americans*, BROOKINGS (Mar. 30, 2023), https://www.brookings.edu/articles/why-the-federal-government-needs-to-change-how-it-collects-data-on-native-americans/ (asserting that the current methods of collecting data about Native American population result in issues with accuracy).

170. *Id.*

171. Annie Zak, *As 2020 Census Nears, Groups Work to Ensure Accurate Numbers in Hard-to-Count Alaska*, ANCHORAGE DAILY NEWS (May 5, 2019), https://www.adn.com/alaska-news/2019/05/06/as-2020-census-nears-groups-work-to-ensure-accurate-numbers-in-hard-to-count-alaska/.

172. Aubrey, *supra* note 14, at 37, 42.

173. Zak, *supra* note 171.

result directly in thousands more dollars per household making its way into the community.[174]

Expenses are a necessary consideration of any large-scale project, but in Alaska they affect all parties involved very closely. Transportation, utilities, and store-bought groceries are extremely expensive for those living in remote regions of the state.[175] For example, a Nuiqsut resident reported in the scoping meeting that although scientists recommended that locals struggling to catch wild game should subsidize their traditional diet with food from the store, her family was unable to afford the prices.[176] The EIS for Willow acknowledged that Nuiqsut residents use subsistence hunting and fishing to supplement their diet, as well as to maintain a connection to their culture.[177] Despite this, and the conclusion that the project was likely to contribute to lasting effects on the viability of subsistence livelihoods, the EIS states that the Project would not "impact the long-term economic sustainability of the area."[178] Those high prices also contribute to access challenges for outside teams conducting research, and the availability of entertainment for extraction workers spending long periods away from home.

III. SOLUTIONS

The correct approach to balancing large-scale economic projects with environmental justice protections is a multi-faceted issue requiring an equally comprehensive solution, which is impossible to fully detail in this Note. However, there are several possible solutions that could begin to improve the current situation. The first option is to try to improve the legislation already in place, i.e., NEPA. The second option is to enact new legislation to protect communities most affected by environmental justice concerns. Third, though not a solution to environmental concerns, the reauthorization of the Violence Against Women Act (VAWA) may provide recourse for Alaska Native tribes to improve emergency response and protection of women in rural areas. Fourth, non-Indigenous people must support inherent tribal sovereignty to allow Indigenous communities the self-empowerment, resilience, and traditions to heal and decide the path forward for themselves.

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174. Matt Miller, *Census Bureau Claims Nearly All Alaska Households Have Been Counted*, KTOO (Oct. 9, 2020), https://www.ktoo.org/2020/10/09/census-bureau-claims-nearly-all-alaska-households-have-been-counted/.

175. Alaska Economic Trends, *supra* note 154.

176. *Scoping Meeting*, *supra* note 3, at 30.

177. *Final EIS*, *supra* note 4, at 370.

178. *Id.* at 300.

Reforming the current system is one option. Most broadly, a reformed NEPA could focus more directly on environmental justice issues.[179] Furthermore, Congress could change the EIS from an informational document to a legally binding one.[180] This change should include language that requires and enforces actions based on findings of irreparable harm, environmental racism, or injustice in the EIS process.[181] Congress could also add language that requires NEPA mandates to be "subject to judicial enforcement through litigation."[182] This would require the judiciary to have a clearly defined role in the new legislation. Third parties with an interest in the project should get copies of the EIS, time to conduct independent research, and time to assess the agency's findings before project approval.[183]

A not-yet-passed bill called the Environmental Justice for All Act would establish new requirements under NEPA aimed at making more concrete strides towards federal policy on environmental justice.[184] A stated goal of the bill is to "address the disproportionate adverse human health or environmental effects of federal laws or programs on communities of color, low-income communities, or tribal and [I]ndigenous communities."[185] This would impose more stringent requirements on federal agencies to assess the impact of agency actions on vulnerable communities. The bill also explicitly raises the royalty rates for extractive industries to support both dependent communities and displaced workers so they can transition away from fossil fuel.[186]

State laws based on NEPA have great potential to help communities with environmental justice struggles.[187] For example, the Montana Environmental Policy Act mirrors NEPA to ensure that state as well as federal agency actions are subject to detailed review.[188] The problem with this solution for Nuiqsut is that laws regarding Alaska Native and Indigenous Americans are federal in nature, so state legislation must be carefully worded to have the desired effect. However, this does not mean state environmental justice legislation is meritless. Alaska could still implement legislation to protect communities vulnerable to environmental injustices, thereby providing legal recourse for harmed communities at the state level.

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179. *See* Shokar, *supra* note 76 (outlining various changes Congress could make to improve NEPA).
180. *Id.* at 276.
181. *Id.* at 282.
182. *Id.* at 278.
183. *Id.* at 286.
184. *See* H.R. 2021, 117th Cong. (2021) (establishing more requirements under NEPA related to federal environmental justice policy).
185. *Id.*
186. *Id.*
187. Cole, *supra* note 149, at 451.
188. MONT. CODE ANN. § 75-1-102 (2023).

Alaska currently has no laws or policies tailored explicitly to environmental justice, despite the growing threat of climate change and the detrimental effects of big extraction and industrial projects on small, rural communities. To convince policymakers that these types of laws and policies are necessary, advocates need access to data about the most affected communities in the state. There are tools like the Climate Vulnerability Index (CVI)[189] and EJScreen,[190] that indicate environmental justice needs, but they are not very reliable when it comes to Alaska because accurate data about small, rural communities is hard to collect.[191] Collecting independent, accurate data to improve mapping tools like CVI is a necessary step towards more effective advocacy for Alaska's most vulnerable communities.

A potential solution to one aspect of the danger Willow poses to the people of Nuiqsut is the 2022 reauthorization of VAWA, which came with provisions specific to Alaska Native tribes.[192] Because it addressed only tribes in the lower 48 states, the previous reauthorization created a highly complex jurisdictional hurdle to implementing VAWA in Alaska.[193] Now, the recent reauthorization allows tribes in Alaska to apply to be part of a pilot project which would extend the tribes' jurisdiction over non-Natives for certain crimes, on a trial basis.[194] If the pilot program is successful, Alaska Native tribes may be granted extended jurisdiction over non-Natives for crimes of a violent or sexual nature committed against a Native person in order to better protect the people of remote Native villages.[195] Importantly though, this would only be possible for those tribes and villages that can demonstrate that they have the resources to protect due process rights as required in the Indian Civil Rights Act.[196]

There is a difference between choosing to sell a tribe's resources and being forced to go along with a choice that has already been made. Alaska Natives should not have to choose between funding for basic public services and a clean, healthy place to live. At the very least, legislation requiring more robust protection, research, and input from the Tribe would ensure that extraction projects near Native communities were a choice. Rebecca Tsosie writes that "[s]overeignty claims focus on the tribe's autonomy to choose,

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189. *Overall Climate Vulnerability*, THE U.S. CLIMATE VULNERABILITY INDEX, https://map.climatevulnerabilityindex.org/map/cvi_overall/usa?mapBoundaries=Tract&mapFiler=0&reportBoundaries=Tract&geoContext=State, (last visited Feb. 20, 2023).

190. *EJScreen: EPA's Environmental Justice Screening and Mapping Tool (Version 2.3),* EPA, https://ejscreen.epa.gov/mapper/ (last visited Jan. 20, 2023).

191. Zak, *supra* note 171.

192. 25 U.S.C. § 1305; ALASKA NATIVE WOMEN'S RES. CTR., VAWA 2022 AND ALASKA INDIAN TRIBES: NOW THAT VAWA IS REAUTHORIZED, WHAT NEXT? 1 (2022).

193. *Id.* at 3.

194. *Id.* at 1.

195. *Id.*

196. *Id.* at 2.

rather than on the substantive result of such a choice as favoring 'preservation' or 'development.'"[197] Whether new in part or in full, solutions must consider the effects on Indigenous and other vulnerable populations. Solutions must also account for the differences between the lifestyles of urban versus rural or remote communities, their ways of life, and how these might be affected by the proposed project.

CONCLUSION

This Note proposes that Environmental Impact Statements do not adequately protect communities particularly susceptible to exploitation by resource extraction industries. Alaska's unique legal and physical landscape compounds the inadequacies of the National Environmental Policy Act and the EIS process regarding the Willow Project. The first major failure of the EIS process was complete avoidance of the potential risk of increased violence and sexual exploitation of Native women that could reasonably result from the camps of extraction workers so close to the village. The second failure was a lack of concrete changes to the proposal in response to community comments on the project. Factors unique to Alaska escalate the effects of both these deficiencies. These factors include the complex and singular relationship between Alaska Native tribes and the federal government, plus the extreme remoteness of Willow's location. The remote location exacerbates more issues, such as the MMIW crisis, lack of access to law enforcement, lack of accountability and oversight, and high costs associated with shipping. Because the issue is so multi-faceted, there is no simple solution. However, this Note concludes that both the state and federal government must do more to support the inherent tribal sovereignty of Indigenous peoples and halt the ongoing exploitation of the forgotten communities like Nuiqsut.

197. Tsosie, *supra* note 70, at 1633.

HANDS OFF MY GRASS: POTENTIAL FIFTH AMENDMENT TAKINGS CHALLENGES TO CANNABIS CODES IN CALIFORNIA

*Caroline Smith**

INTRODUCTION

The clean-air-loving, cannabis-smoking California residents have long enjoyed being at the forefront of both environmental and cannabis law.[1] The state was the first to enact a state air pollution control statute and to legalize cannabis in any capacity.[2] These two types of law often overlap, with many cannabis codes in California focusing on mitigating the environmental impact of the industry.[3] However, these environmentally-focused codes in the cannabis industry differ from standard environmental law in an important way: there have been no Fifth Amendment regulatory takings challenges.

The Takings Clause of the Fifth Amendment has long been used to overturn environmental codes.[4] But, in the eight years since California legalized recreational cannabis, there has not been a single regulatory takings challenge to environmentally focused cannabis codes—even though the cannabis industry is subject to far more unique and burdensome codes than most industries.[5] Based on recent trends in Supreme Court property rights

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1. This Note uniformly uses the term "cannabis" rather than "marijuana" unless directly quoting a source using the term due to the racism that is inextricably intertwined with the term "marijuana." *See generally* Meredith Clark, *Marijuana is More than Just a Word*, NEWSHOUSE: HIGH STAKES, https://www.thenewshouse.com/highstakes/marijuana-is-more-than-a-word/ (last visited Mar. 15, 2024) (explaining the difference between "marijuana" and "cannabis"); Simeon Spencer, *Redressing America's Racist Cannabis Laws*, LEGAL DEF. FUND (Aug. 4, 2022), https://www.naacpldf.org/cannabis-laws-racism/ (describing how the substance was named "marijuana" to "associate the drug with Mexican immigrants"); Matt Thompson, *The Mysterious History of "Marijuana,"* NPR, https://www.npr.org/sections/codeswitch/2013/07/14/201981025/the-mysterious-history-of-marijuana (Sept. 16, 2021); Deedee Sun, *Lawmakers Strike the Word 'Marijuana' from All State Laws, Calling Term Racist*, KIRO 7 (April 22, 2022, 7:39 PM), https://www.kiro7.com/news/local/lawmakers-strike-word-marijuana-all-state-laws-calling-term-racist/MJOQZ7OCK5CUDLBA2H53CYOJXE/ (detailing how politicians intentionally created a connection between Mexican immigrants and the word "marijuana" to manufacture negative public opinion towards both Hispanic peoples and cannabis users).

2. DAVID VOGEL, CALIFORNIA GREENIN': HOW THE GOLDEN STATE BECAME AN ENVIRONMENTAL LEADER 4–5 (Princeton Univ. Press 2018) (providing multiple examples of California's innovative environmental regulations); *California's Cannabis Laws*, CAL. DEP'T OF CANNABIS CONTROL, https://cannabis.ca.gov/cannabis-laws/laws-and-regulations/ (last visited Oct. 22, 2023).

3. RIVERSIDE COUNTY, CAL. CODE OF ORDINANCES § 17.302.120(G); RIVERSIDE COUNTY, CAL. CODE OF ORDINANCES § 17.302.070(B)(3); BERKELEY, CAL. CODE OF ORDINANCES § 12.22.070(C)(3); EL DORADO COUNTY, CAL. CODE OF ORDINANCES § 130.41.300(5)(C) (regulating cannabis cultivator's non-renewable energy use).

4. U.S. CONST. amend. V.; Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922); Nollan v. Cal. Coastal Com., 483 U.S. 825, 837 (1987); Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1015-16 (1992); Lingle v. Chevron U.S.A. Inc., 544 U.S. 528, 539 (2005).

5. Medicinal and Adult-Use Cannabis Regulation and Safety Act, CAL. BUS. & PROF. CODE § 26000.

jurisprudence, the lack of challenges is likely to change.[6] Commercial cannabis businesses are the perfect candidates to bring takings claims to a sympathetic Court because cannabis businesses are economically oppressed by restrictive tax requirements and competition with an illicit market.

This Note explores potential Fifth Amendment regulatory takings challenges to local environmentally focused cannabis codes. Section I introduces cannabis law, California's cannabis and environmental law, and regulatory takings law. Section II details three potential regulatory takings claims to cannabis codes from Riverside County, the city of Berkeley, and El Dorado County, California. Section III provides recommendations to avoid these potential takings challenges, largely through holistic regulation of all industries. This Note concludes there are budding claims in the cannabis industry that could upend cannabis regulation throughout the country if successful; thus, regulators should use their authority to reduce the likelihood of success for these challenges.

I. BACKGROUND

A. Cannabis Law

The United States has a tumultuous history with cannabis. This history officially began in 1937 with the first federal action relating to cannabis: the Marihuana Tax Act.[7] The Marihuana Tax Act effectively banned recreational cannabis use via a series of taxes and penalties. In order to be taxed under the Act, cannabis possessors were required to declare their cannabis, and thus required to admit to an activity that was illegal at the state level.[8] Approximately three decades after it was enacted, the Court deemed the Act unconstitutional under the Fifth Amendment right against self-incrimination.[9] The federal government responded quickly to this sudden per se legalization of cannabis by passing the Controlled Substances Act (CSA), which criminalizes most drug activity, the following year.[10] The Controlled Substances Act and the Drug Enforcement Agency (DEA) labeled cannabis a Schedule I drug, meaning it is a drug with no recognized medical use and

6. Koontz v. St. Johns River Water Mgmt. Dist., 570 U.S. 595, 607 (2013) (clarifying that takings are not limited to forcing private citizens to give up physical land); Horne v. Dep't of Agric., 576 U.S. 351, 357 (2015) (expanding takings law to apply to personal property just as it does real property); Cedar Point Nursery v. Hassid, 594 U.S. 139, 152 (2021) (expanding the idea of per se takings to incorporate regulations allowing labor organizations onto private land).

7. Marihuana Tax Act of 1937, 75 P.L. 238.

8. *Id.* at § 2(a); Stephen Siff, *The Illegalization of Marijuana: A Brief History*, OHIO STATE UNIV.: ORIGINS (May 2014), https://origins.osu.edu/article/illegalization-marijuana-brief-history.

9. Leary v. United States, 395 U.S. 6, 53 (1969) (reversing a conviction under the Marihuana Tax Act because it violated Petitioner's 5th Amendment right against self-incrimination).

10. 21 U.S.C. § 801 (1970).

carries a high potential for abuse.[11] The CSA and the DEA also created hefty penalties for cannabis-related crimes, with sentences for cannabis trafficking—for even a minuscule amount of cannabis—beginning at five years minimum.[12]

States have not always agreed with the federal government's views of cannabis. In 1996, states began legalizing cannabis at a state level—an action that directly opposed federal law.[13] States did not legalize cannabis to create preemption issues; cannabis had a reputation for therapeutic uses.[14] During the height of the AIDS epidemic, THC via cannabis was known for "pain relief, control of nausea and vomiting, and appetite stimulation," a relief that was invaluable to AIDS patients. State legalization was often an effort to lessen the impacts of this epidemic.[15]

Although the federal government did not take immediate action in response to the AIDS epidemic, it did begin the process of protecting cannabis users.[16] In 2001, five years after the first state legalized medicinal cannabis, the House of Representatives introduced the Farr Amendment, which prohibited the Department of Justice from interfering with state medical cannabis regulatory schemes.[17] It passed 15 years later.[18]

In the interim, many states took cannabis legalization up another step and legalized recreational cannabis use for adults over the age of 21.[19] Although still in the midst of its 15-year journey to grapple with medical cannabis, the federal government was able to act quicker on recreational cannabis. Just one year after California passed the first recreational cannabis law, the United States Deputy Attorney General James Cole—appointed by then-President Barack Obama—released what is known colloquially as the Cole Memo.[20] The Cole Memo is a non-binding memorandum meant to give guidance to

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11. 21 U.S.C. § 812(b)(1)–(c)(10).

12. *Id.* at § 841(b)(1)(D); DRUG ENF'T ADMIN., DRUGS OF ABUSE: A DEA RESOURCE GUIDE (2020) at 37.

13. COMPASSIONATE USE ACT, CAL. HEALTH & SAFETY CODE § 11362.5(b)(1); *California's Cannabis Laws*, CAL. DEP'T OF CANNABIS CONTROL, https://cannabis.ca.gov/cannabis-laws/laws-and-regulations/ (last visited Oct. 22, 2023).

14. NAT'L CONF. OF STATE LEGISLATORS, STATE MED. CANNABIS L. (Nat'l Conf. of State Legislators, July 12, 2024).

15. *Id*. (quoting MARIJUANA AND MEDICINE: ASSESSING THE SCIENCE BASE, INST. OF MED. (Janet E. Joy et al. eds., 1999)); Cyrus Dioun, *How the HIV/AIDS Epidemic Gave Rise to Today's Medical Marijuana Markets*, JAKE JABS CENTER FOR ENTREPRENEURSHIP, https://jakejabscenter.org/hiv-epidemic-medical-marijuana/ (last visited Oct. 27, 2024).

16. Dioun, *supra* note 15.

17. Michael "the Aging Ent" Schroeder, *Medical Cannabis Protection: The Rohrabacher-Farr Amendment*, CANNACON (Jan. 26, 2018), https://cannacon.org/medical-cannabis-protection-rohrabacher-farr-amendment/.

18. Commerce, Justice, Science, and Related Agencies Appropriations Act of 2016, H.R. 2578, 114th Cong. § 542 (2016): Consolidated Appropriations Act, 2016, Pub. L. No. 114-113 (2016).

19. *State Laws*, NORML https://norml.org/laws/legalization/ (last visited 24 Feb. 2024).

20. Memorandum from James M. Cole, Deputy Att'y Gen., Off. of U.S. Dept. of Just., to all U.S. Attorneys (Aug. 29, 2013) (on file with U.S. Dept. of Just.) [hereinafter "Cole"].

law enforcement regarding the enforcement of federal cannabis laws.[21] The Cole Memo generally states that law enforcement officers should avoid interfering with state cannabis regulatory schemes unless the scheme does not advance the eight federal interests laid out in the memo.[22] The list of federal interests includes preventing underage consumption, minimizing illicit cannabis sales, and eliminating adverse public health concerns associated with cannabis.[23] Essentially, the Cole Memo gave states that had legalized recreational cannabis some security against federal prosecution of their cannabis industries.

However, in 2018, five years after the Cole Memo, the United States Attorney General Jeff Sessions—appointed by then-President Donald Trump—revoked the Cole Memo and other Obama-era cannabis protections.[24] Although the Sessions Memo initially caused some uncertainty with potential federal prosecutions in legal states, the Memo did not materially alter how state cannabis regulatory schemes operate. Both federal and state law enforcement officers still largely abide by the guidance in the Cole Memo; thus cannabis industry members in legal states are still generally safe from federal prosecution as long as they operate within the bounds of the Cole Memo.[25] This implicit continuation of the Cole Memo, even after its reversal, demonstrates the growing acceptance of cannabis as more and more states legalize it.

Cannabis remains a Schedule I drug under the CSA, but the federal government has recently begun loosening its criminalization of cannabis. In May 2024 the DEA proposed a rule to reclassify cannabis as a Schedule III substance rather than a Schedule I substance.[26] The DEA proposed the reclassification because of cannabis' accepted medical uses and low abuse potential.[27] The hearing for the proposed rule is scheduled for December 2, 2024.[28] Other examples include a law proposed in 2023 that would have

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21. Memorandum from James M. Cole, Deputy Att'y Gen., Off. of U.S. Dept. of Just., to all U.S. Attorneys (Aug. 29, 2013) (on file with U.S. Dept. of Just.) [hereinafter "Cole"].

22. *Id*.

23. *Id*.

24. Memorandum from Jefferson B. Sessions, III, Att'y Gen., Off. of U.S. Dept. of Just., to all U.S. Attorneys (Jan. 4, 2018) (on file with U.S. Dept. of Just.).

25. Yucel Ors, *Three Major Impacts of Jeff Sessions' Legal Marijuana Memo*, NAT'L LEAGUE OF CITIES (Jan. 10, 2018), https://www.nlc.org/article/2018/01/10/three-major-impacts-of-jeff-sessions-legal-marijuana-memo (explaining that after the Sessions Memo, localities were unsure how to, and if they should, work within the bounds of the Sessions Memo); Tom Firestone, *2 Years After Sessions Rescinded Cole Memo, Prosecutors Continue to Adhere to Obama-Era Enforcement Guidelines*, BENZINGA (Jan. 8, 2020), https://www.benzinga.com/markets/cannabis/20/01/15093079/2-years-after-sessions-rescinded-cole-memo-prosecutors-continue-to-adhere-to-obama-era-enforceme.

26. Schedules of Controlled Substances: Rescheduling of Marijuana, 89 Fed. Reg. 70148, 70149 (proposed May 21, 2024).

27. *Id.*

28. Schedules of Controlled Substances: Rescheduling of Marijuana, 89 Fed. Reg. 70148, 70149.

provided legal protections for federally regulated banks that work with state-legal cannabis industries.[29] Neither of these changes has had any binding, legal effects, but they demonstrate growing federal recognition of the cannabis industry.

Although acceptance of cannabis is increasing, the cannabis industry still faces immense economic challenges because it is federally illegal. First and most burdensome is Internal Revenue Service Code 280E, which prevents cannabis businesses from deducting ordinary business expenses from their taxes.[30] Although it is difficult to quantify exactly how 280E impacts the cannabis industry as a whole, an economics research firm based in Oregon estimated that cannabis businesses operating under a state cannabis regulatory scheme "paid over $1.8 billion in additional taxes when compared to ordinary businesses" in 2022 alone.[31] Further, because cannabis is federally illegal, there are no protections for people and industries that may collaborate with the cannabis industry, such as landlords, investors, and banks. Because these people and industries are deterred from working with cannabis, the industry suffers more.

The impacts of federal illegal status would lessen if the DEA rescheduled cannabis. Most notably, 280E—which only applies to Schedule I and Schedule II substances—would no longer apply to the cannabis industry, removing a high financial burden for the cannabis industry.[32] Additionally, Schedule III substances can be distributed as prescriptions if the Food and Drug Administration (FDA) approves.[33] Although the FDA does not currently approve of cannabis as a prescription drug, there is potential for a fully legal medical cannabis industry if the FDA alters its approval status.[34] Cannabis businesses would benefit greatly from rescheduling, but decreased economic opportunities would persist due to continued federal illegal status as a Schedule III substance.

The Cole Memo lessened some of the burden cannabis businesses face, but operating within the bounds of the federal interests listed in the Cole Memo requires the cannabis industry to jump through many additional hoops that other industries can avoid.[35] The Cole Memo helped usher in an era of painfully detailed state cannabis regulatory schemes, making it much more

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29. Secure and Fair Enforcement Banking Act of 2023, H.R. 2891, 118th Cong. § 5(a) (2023).

30. 26 U.S.C. § 280E.

31. Whitney Economics, *Economic Analysis Indicates Cannabis Industry Paid $1.8 Billion in Excess Taxes in 2022*, PR NEWSWIRE (May 8, 2023, 9:00 AM), https://www.prnewswire.com/news-releases/economic-analysis-indicates-cannabis-industry-paid-1-8-billion-in-excess-taxes-in-2022--301817848.html.

32. 26 U.S.C. § 280E.

33. JOANNA R. LAMPE, CONG. RSCH. SERV., LSB11105, LEGAL CONSEQUENCES OF RESCHEDULING MARIJUANA (2024).

34. *Id*.

35. Cole, *supra* note 20.

difficult to comply with the law when compared to non-cannabis industries, such as technology and transportation.[36] And if the people operating a legal cannabis business misstep while attempting to comply with the law, they risk spending the rest of their lives in jail.[37] After cannabis businesses successfully jump through regulatory hoops and begin operating legally, they must still compete with the ever-present illicit cannabis market not abiding by laws and offering much cheaper prices.[38]

B. Cannabis in California

California has a long history with cannabis law. State-level action on cannabis began just two years after the CSA in 1972 when California residents failed to pass Prop 19, an initiative to legalize recreational adult-use cannabis.[39] Local-level action on cannabis began the following year when the city of Berkeley, California passed an initiative ordering city police to prioritize other crimes over cannabis offenses.[40] Largely fueled by the AIDS epidemic and other painful diseases, California was the first state to legalize medicinal cannabis in 1996 under the Compassionate Use Act.[41] In the decades following the passage of the Compassionate Use Act, California voters struggled to pass a recreational cannabis use initiative, but voters

36. LAMPE, *supra* note 33.

37. DRUG ENF'T ADMIN., DRUGS OF ABUSE: A DEA RESOURCE GUIDE (2020) at 37 (showing that many cannabis-related offenses carry life sentences).

38. Joseph Detrano, *Cannabis Black Market Thrives Despite Legalization*, RUTGERS CTR. OF ALCOHOL & SUBSTANCE USE STUDIES, https://alcoholstudies.rutgers.edu/cannabis-black-market-thrives-despite-legalization (last visited Feb. 24, 2024).

39. Cameron A. Brown, *Getting it Right: Marijuana Policy in California*, STANFORD L. SCH. BLOG, https://www.latimes.com/projects/la-pol-ca-prop-64-last-time-california-tried-to-legalize-weed/. (last visited Oct. 27, 2024).

40. Earl Caldwell, *Marijuana Issue Stirs Up Berkeley*, N.Y. TIMES (May 6, 1973), https://www.nytimes.com/1973/05/06/archives/marijuana-issue-stirs-up-berkeley-council-restrained-order-of-one.html.

41. Compassionate Use Act, CAL. HEALTH & SAFETY CODE § 11362.5(b)(1)(A) (1996); *California's Cannabis Laws*, CAL. DEP'T OF CANNABIS CONTROL, https://cannabis.ca.gov/cannabis-laws/laws-and-regulations (last visited Oct. 22, 2023); Richard Sandomir, *Dennis Peron, Early Medical Marijuana Advocate, Dies at 71*, N.Y. TIMES (Jan. 30, 2018), https://www.nytimes.com/2018/01/30/obituaries/dennis-peron-early-medical-marijuana-advocate-dies-at-71.html (discussing how the loss of a partner to AIDS led a man to become an advocate for medicinal cannabis in California); Carey Goldberg, *Medical Marijuana Use Winning Backing*, N.Y. TIMES (Oct. 30, 1996), https://www.nytimes.com/1996/10/30/us/medical-marijuana-use-winning-backing.html (explaining that medicinal cannabis was supported because it was beneficial to the sick).

eventually succeeded with Prop 64 in 2016.[42] California was the fifth state to legalize recreational adult-use cannabis.[43]

Throughout the years, California has built and maintained a reputation for being cannabis-friendly, and this reputation has only been bolstered by the state's legal action.[44] California is so experienced with cannabis that it is currently tackling legal issues no other state has considered.[45] However, things are not always positive for the cannabis industry in California. Many county and city governments strain the cannabis industry by regulating it more stringently than the state government.[46] This oversight often leads to cannabis-industry-members bearing economic burdens that their counterparts in other regions do not.

This Note highlights three California localities that regulate cannabis more stringently than the state. First, Riverside County only grants permits to indoor cannabis cultivators that have an on-site renewable energy source.[47] Second, the City of Berkeley requires all cannabis cultivators to purchase 100% renewable energy from the local utility.[48] And finally, El Dorado County requires indoor cultivators to source their power from renewable sources or to purchase off-site carbon offsets for any non-renewable energy usage.[49] Although modern cannabis-related challenges in California focus on

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42. Medicinal and Adult-Use Cannabis Regulation and Safety Act, Cal. Bus. & Prof. Code § 26000; Thomas Suh Lauder & Jon Schleuss, *The Last Time California Tried to Legalize Weed it Failed. What Happened?*, L.A. TIMES (Nov. 4, 2016, 1:16 PM), https://www.latimes.com/projects/la-pol-ca-prop-64-last-time-california-tried-to-legalize-weed/.

43. NAT'L. CONF. OF STATE LEGISLATURES, STATE MEDICAL CANNABIS LAWS REPORT (July 12, 2024).

44. *17 Stoner States: Where's Marijuana Use Highest?*, CBS NEWS (Oct. 25, 2011), https://www.cbsnews.com/pictures/17-stoner-states-wheres-marijuana-use-highest (explaining that California is among the top ten states with the highest cannabis consumption); DJ Summers & Alix Martichoux, *4 California Cities Among Nation's Best for Weed: Report*, KTLA, https://ktla.com/news/nexstar-media-wire/new-city-earns-title-of-nations-top-city-for-weed-report (last updated Apr. 16, 2023, 10:28 AM) (showcasing that four California cities are among the top ten best cities for cannabis in the US); Piper McDaniel*, Pay No Attention to the Crime Behind the Emerald Curtain*, NAT'L FOREST FOUND., https://www.nationalforests.org/blog/pay-no-attention-to-the-crime-behind-the-emerald-curtain (explaining that three counties in Northern California are known for having the perfect environment to grow the best cannabis).

45. See, e.g., CAL. GOV'T CODE § 12954(a)(1) (2024) (making it unlawful for employers to discriminate against employees for off the job cannabis consumption); *Cannabis*, GREENBURG GLUSKER, https://www.greenbergglusker.com/cannabis (last visited Sept. 8, 2024) (showcasing a law firm in California that has dealt with novel cannabis issues, such as intellectual property concerns).

46. *Where Cannabis Businesses Are Allowed*, CAL. DEP'T OF CANNABIS CONTROL, https://cannabis.ca.gov/cannabis-laws/where-cannabis-businesses-are-allowed (last visited Sept. 8, 2024).

47. RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 7.302.120(G); RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.070(B)(3).

48. BERKELEY, CAL., CODE OF ORDINANCES § 12.22.070(C)(3).

49. EL DORADO COUNTY, CAL., CODE OF ORDINANCES § 130.41.300(5)(C) (2024).

other legal issues, the likelihood of challenges to codes of all sorts increases as the juvenile cannabis industry grows.[50]

C. Environmental Law and Regulation in California

California has long been a leader in mitigating negative environmental impacts, and many of its actions have withstood legal challenges. The state became notable for its environmental action in 1884 when the Ninth Circuit affirmed a California court's order that banned gold miners from dumping mining debris into rivers flowing into the Sacramento Valley.[51] But this was just the beginning. From 1947 to 1977, California was the first state to enact a state air pollution control statute, enact emissions standards for motor vehicle pollutants, establish a coastal protection agency, and adopt energy efficiency standards for appliances.[52] The hallmark of California's efforts to protect the environment happened in 1970 when the state passed the California Environmental Quality Act, which requires localities to evaluate and mitigate the environmental impacts of proposed development projects.[53]

California still strives to protect the environment. In 2022, California became the first state to host an auction for offshore wind leases on the West Coast.[54] The state has also recently imposed stringent requirements for single-use plastic to reduce waste from packaging materials.[55] And perhaps its boldest move yet, California has set a goal of 60% renewable energy by 2030 through its Renewable Portfolio Standard.[56]

California's effort to protect the environment is clear through both state action and local laws and regulations. County and city codes throughout California have specific environmental protection provisions, such as limited waterfront development to protect shoreline ecology, timber harvesting regulation to protect timberlands, and floodplain management to minimize

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50. United States v. Daniels, 77 F.4th 337, 355 (5th Cir. 2023) (reasoning that habitually using cannabis is not grounds for revocation of 2nd Amendment rights); Kidder v. Cnty. of Los Angeles, No. CV 14-06218-SVW-E, 2015 U.S. Dist. LEXIS193582 at *8 (C.D. Cal. Mar. 9, 2015) (defining the power of the police to arrest people for cannabis possession after the legalization of medical cannabis); AK Futures LLC v. Boyd St. Distro, LLC, 35 F.4th 682, 695 (9th Cir. 2022) (challenging a copyright and a trademark for a cannabis-related product, Delta-8); People v. Whalum, 50 Cal. App. 5th 1, 3, 15 (Cal. App. 4th, 2020) (describing the scope of sentence dismissal under Prop 64); HNHPC, Inc. v. Dep't of Cannabis Control, 94 Cal. App. 5th 60, 67 (Cal. App. 4th, 2023) (granting an injunction against the Department of Cannabis Control due to their failure to perform statutory duties).

51. Woodruff v. North Bloomfield Gravel Mining Co., 18 F. 753, 809 (9th Cir. 1884); VOGEL, *supra* note 2, at 4.

52. *Id.* at 4–5.

53. CAL. PUB. RES. CODE § 21000 (1970).

54. *California Ramps Up Commitment to Clean Energy with Historic Offshore Wind Sale*, OFF. OF GOVERNOR GAVIN NEWSOM (Dec. 6, 2022) https://www.gov.ca.gov/2022/12/06/california-ramps-up-commitment-to-clean-energy-with-historic-offshore-wind-sale/.

55. CAL. PUB. RES. CODE §§ 42050-42057.

56. CAL. PUB. RES. CODE § 399.11.

future flood damage.[57] Localities in California also protect the environment by regulating cannabis—a high energy-consuming industry—more stringently than other industries to reduce greenhouse gas emissions.[58] California courts appear sympathetic to local environmental restrictions and often uphold them against takings challenges.[59] Although some local environmental laws in California have been struck down in both state and federal courts, most takings challenges in California are unsuccessful for plaintiffs.[60]

D. Fifth Amendment Regulatory Takings Law

1. The Beginning of Regulatory Takings

Takings claims to cannabis codes stem from the Framers of the Constitution.[61] The Fifth Amendment forbids the government from taking private property for public use "without just compensation."[62] The legal meaning of this short provision has been hotly debated. The Supreme Court first interpreted this clause as it relates to regulations in the 1922 case *Pennsylvania. Coal Co. v. Mahon*.[63] In *Penn. Coal*, the Court considered the constitutionality of a law prohibiting mining that could impact the integrity of the land above the operation. The Court held that the law was an unconstitutional taking, determined regulations that go too far are a Fifth Amendment regulatory taking requiring just compensation.[64]

This rule stood unaltered for over 50 years, until the Court handed down *Pennsylvania Central Transportation Co. v. New York*.[65] In *Penn. Central*,

57. BERKELEY, CAL., CODE § 11.56.020 (1986); SANTA CRUZ COUNTY, CAL., CODE § 16.52.010 (1982); SANTA BARBRA, CAL., CODE § 22.24.020 (2018).

58. RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.120(G); RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.070(B)(3); BERKELEY, CAL., CODE OF ORDINANCES § 12.22.070(C)(3); EL DORADO COUNTY, CAL., CODE OF ORDINANCES § 130.41.300(5)(C); Jocelyn Durkay & Duranya Freeman, *Electricity Use in Marijuana Production*, NAT'L CONF. OF STATE LEGISLATURES, https://www.ncsl.org/energy/electricity-use-in-marijuana-production (Aug. 1, 2016) (showing California's electricity use).

59. Allegretti & Co. v. Cnty. of Imperial, 138 Cal. App. 4th 1261, 1285 (Cal. App. 4th, 2006) (upholding a county ordinance limiting the amount of water a landowner could extract from an aquifer under a takings claim); Lindstrom v. Cal. Coastal Comm'n, 40 Cal. App. 5th 73, 112 (Cal. App. 4th, 2019) (upholding a required permit for applicants to waive any future right to build a seawall under a takings claim); Ocean Harbor House Homeowners Ass'n v. Cal. Coastal Comm'n, 163 Cal. App. 4th 215, 245–46 (Cal. App. 6th, 2008) (holding a seawall mitigation fee under a takings claim).

60. Monks v. City of Rancho Palos Verdes, 167 Cal. App. 4th 263, 310 (Cal. Ct. App. 2d 2008) (upholding a seawall mitigation fee under a takings claim); Nollan v. Cal. Coastal Comm'n, 483 U.S. 825, 837 (1987).

61. U.S. CONST. amend. V.

62. *Id*.

63. Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922).

64. *Id*. at 413.

65. Pa. Cent. Transp. Co. v. New York City, 438 U.S. 104, 124 (1978).

the Court upheld a development restriction on Grand Central Station based on its landmark status, even though the restriction significantly diminished its property value. *Penn. Central* both functionally overruled *Penn. Coal* and established a new analysis for takings claims.[66] Since *Penn. Central*, regulatory takings claims have been analyzed under a three-factor analysis: (1) the economic impact of the regulation in question on the owner, (2) the interference with the property owner's reasonable investment backed expectations, and (3) the character of the government action involved in the regulation.[67] This test significantly alters the previous *Penn. Coal* test and no longer allows for property owners to succeed on claims based solely on the negative economic consequences of regulations.

2. The Evolution of Regulatory Takings

The Court has continued to adapt its regulatory takings jurisprudence to better suit modern property concerns. In the 1980s and 90s, the Court established a new category of regulatory takings—takings per se.[68] In the 1982 case of *Loretto v. Teleprompter Manhattan CATV Corp.*, the Supreme Court expanded takings law to bypass the *Penn. Central* factors for regulations resulting in permanent physical occupations on private property. Eliminating the multi-factored test makes it easier to bring a successful takings claim in these situations.[69] The New York law at issue in *Loretto* prohibited property owners from interfering with cable line installation on rental properties.[70] Functionally, this law required property owners to allow cable lines on their property, regardless of their desires or intentions with their rental property. The plaintiff, a New York City landlord, did not want cable lines on her rental units and subsequently brought a takings challenge to the law in New York state court.[71] The claim moved through the judicial system, culminating with the Supreme Court granting certiorari in 1981.[72] The Court reasoned that the New York regulation resulted in a permanent physical occupation because the cable lines had to remain on Loretto's property if she continued to use it as a rental property.[73] This permanent occupation removed Loretto's right to exclude others from her property—a

66. Pa. Cent. Transp. Co. v. New York City, 438 U.S. 104, 124 (1978).
67. *Id*.
68. Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 434–35 (1982); Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1015–16 (1992); Nollan v. Cal. Coastal Comm'n, 483 U.S. 825, 837 (1987); Dolan v. City of Tigard, 512 U.S. 374, 390 (1994).
69. *Loretto*, 458 U.S. at 433–35.
70. *Id.* at 421.
71. *Id.* at 424.
72. Loretto v. Teleprompter Manhattan CATV Corp., 454 U.S. 938 (1981) (granting certiorari).
73. *Loretto*, 458 U.S. at 439.

right essential to owning private property.[74] The Court determined that regulatory takings jurisprudence up to this point did not satisfactorily deal with issues such as Loretto's. Therefore, it held that laws resulting in permanent physical occupations of private property violated the Fifth Amendment Takings Clause.[75]

The Court did not cease its exploration into the Fifth Amendment after creating takings per se. Regulatory takings expanded one more time before the turn of the century through the creation of regulatory takings via exactions. Generally, an exaction is a demand for compensation.[76]

The Supreme Court first recognized exactions as a taking in the 1987 case of *Nollan v. California Coastal Commission*.[77] In *Nollan*, the California Coastal Commission granted a development permit to a homeowner with the mandatory condition to create an easement on the property allowing the public to reach the beach behind their property.[78] The Coastal Commission based this condition on the government's interest in maintaining the public's ability to view the beach.[79] The Court struck down this permit condition as an unconstitutional exaction under the Fifth Amendment because the condition—allowing the public to access the beach via Petitioner's property—did not further the government interest of allowing the public to view the beach.[80] The Court then created the first requirement for a constitutional exaction: there must be an "essential nexus" connecting the condition in the permit to the state interest exacerbated by the development.[81]

The Court created the second requirement for a constitutional exaction in 1994 with *Dolan v. City of Tigard*.[82] In *Dolan*, a city granted a development permit with the condition that a portion of the private property must be turned into a public greenway.[83] The condition was the city's attempt to mitigate the increase in storm water runoff that would result from the development; but the Court struck it down because the requirement for a greenway was disproportionality burdensome compared to the risk of stormwater runoff.[84] In doing so, it created the second requirement for a constitutional exaction: there must be "rough proportionality" between the condition and the impact of the proposed development.[85]

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74. *Loretto*, 458 U.S. at 433.
75. *Id*. at 434–35.
76. *Exaction*, BLACK'S LAW DICTIONARY, (11th ed. 2019).
77. Nollan v. Cal. Coastal Comm'n., 483 U.S. 825, 837, 841–42 (1987).
78. *Id*. at 827.
79. *Id*. at 828.
80. *Id*. at 836.
81. *Id*.
82. Dolan v. City of Tigard, 512 U.S. 374, 390 (1994).
83. *Id.* at 377.
84. *Id*. at 377, 394–95.
85. *Dolan*, 512 U.S. at 391.

3. The Expansive View of Exactions

Courts today continue the Supreme Court's trend of stretching regulatory takings beyond what *Penn. Central* initially laid out, particularly with relation to exactions. Although the Court's view on exactions in *Nollan* and *Dolan* was already a carve-out from *Penn. Central*, some state courts have gone further by broadly interpreting what can qualify as an unconstitutional exaction.[86] In 2010, a court in Texas defined an exaction as "a condition to obtaining governmental approval of a requested land development."[87] By applying to allow government approval, this case took a more inclusive view of exactions than *Nollan* and *Dolan*, which both only pertain to permit conditions.[88]

Ten years later, another Texas court expanded on this view, reasoning that "any demand for an action the landowner is not already legally required to take might qualify as an exaction."[89] The court did not stop there. It further emphasized its logic by explaining: "we find no cases holding a government's demand for land owner action qualifies as an exaction only if the demand is for a present monetary payment or land dedication."[90] This definition of "any demand for an action" and the accompanying logic is far broader than the original understanding of "permit conditions."[91] Following this pattern of definitional expansion, modern legal scholars have defined an exaction as: "The wrongful act of a[] . . . person in compelling payment of a fee or reward for his services, under color of his official authority, where no payment is due."[92] This definition, once again, is a drastic expansion from the original understanding of exactions in the 1980s.

The continued generalization of the definition of exactions algins with modern property law expansion. The Supreme Court has been expanding property rights generally via the Fifth Amendment. This trend began in 2013 when the Court decided *Koontz v. St. John's River Water Management District*, which held that monetary exactions are still exactions.[93] This case affirmed the idea that exactions expand beyond land dedications, the kind of dedication at issue in *Nollan,* o also include monetary dedications.[94] Thus,

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86. Selinger v. City of McKinney, No. 05-19-00545-CV, 2020 Tex. App. LEXIS 4849 at *2, *9 (Tex. App. 2020); City of Carrollton v. RIHR Inc., 308 S.W.3d 444, 449–50 (Tex. App. 2010).

87. *City of Carrollton*, 308 S.W.3d at 449 (citing Town of Flower Mound v. Stafford Ests., L.P., 71 S.W.3d 18, 30 (Tex. App.-Fort Worth 2002), *aff'd*, 135 S.W.3d 620, 630 (Tex. 2004)).

88. Nollan v. Cal. Coastal Comm'n., 483 U.S. 825, 837 (1987); *Dolan*, 512 U.S. at 390.

89. *Selinger*, 2020 Tex. App. LEXIS 4849 at *11 (citing *City of Carrollton*, 308 S.W.3d at 449).

90. *Id*.

91. *Id*.; *Nollan*, 483 U.S. at. 836–37.

92. BLACK'S LAW DICTIONARY, *supra* note 76.

93. Koontz v. St. Johns River Water Mgmt. Dist., 570 U.S. 595, 618 (2013).

94. *Koontz*, 570 U.S. at 618; *Nollan*, 483 U.S. at 837.

more private landowners can bring Fifth Amendment takings claims after the Court handed down *Koontz*.

The Court continued to open the doors of the judicial system to more aggrieved landowners as the 21st century continued. In 2015, the Court decided *Horne v. Department of Agriculture*, in which it determined that the Fifth Amendment applies to personal property, although historically it has only applied to real property.[95] Fifth Amendment expansion has carried on through the 2020s, when, in 2021, the Court determined that allowing labor organizers onto private land is an unconstitutional taking of private property.[96]

These cases, taken together, demonstrate the potential for an oncoming shift in regulatory taking law to a broader scale than what has already been accomplished. Although these trends favor interpreting a broader variety of regulations and laws as takings, no court has interpreted industry-specific energy requirements—as are at issue in California—as a taking yet. Further, no cannabis code in a state with a legal cannabis industry, whether medicinal use or adult use, as interpreted any cannabis code as a taking. But patterns in the judicial system are likely to be indicators of future case decisions; no court has interpreted takings this way, but that does not preclude the ever-changing judicial system from ever interpreting takings this way. There is no explicit, binding precedent compelling courts to rule in favor of cannabis property owners in takings cases. However, anti-environmental takings challenges in the cannabis industry are not unfounded because the Court appears sympathetic to property rights, and therefore sympathetic to a novel, pro-property rights claim brought under the Fifth Amendment.

II. TWO FIFTH AMENDMENT TAKINGS CHALLENGES TO CANNABIS CODES IN CALIFORNIA

A. Unconstitutional Taking Per Se in Riverside County, CA

The first potential takings-challenge victim is Riverside County. Riverside's cannabis codes may run afoul to takings jurisprudence, which prohibits government-induced permanent physical intrusions on private property.[97] Riverside County code requires all indoor cannabis cultivators to have on-site renewable energy.[98] Without this, cannabis cultivators are unable to obtain a permit to operate in Riverside County.[99] These

95. Horne v. Dep't of Agric., 576 U.S. 351, 357 (2015).
96. Cedar Point Nursery v. Hassid, 594 U.S. 139, 162 (2021).
97. Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 434–35 (1982).
98. RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.120(G).
99. *Id.*

requirements are analogous to the law that the Supreme Court determined to be a taking under the Fifth Amendment in *Loretto*.[100]

Just as in *Loretto* where New York City landlords were required to allow cable lines on their property, cannabis cultivators in Riverside County are required to allow renewable energy sources on their property.[101] Although there are differences between the New York law and the Riverside County code, the crux of *Loretto*—permanent physical occupation—is clearly present in the Riverside County code.[102] The renewable energy source must be on private property to obtain a permit in Riverside County. In other words, cannabis cultivators must allow a permanent physical occupation—a renewable energy source—on their property to operate legally in the county.

The extent of the word "permanent" may complicate this analysis. Legally, "permanent" is commonly understood as "not subject to fluctuation, or alteration, fixed or intended to be fixed."[103] Here, the on-site renewable energy source likely can be removed, albeit cumbersomely, due to the inherent non-permanence of renewable energy sources.[104] At face value, this would lead to an unsuccessful takings claim in Riverside County because the physical occupation is not permanent. However, permanence was relevant to the analysis in *Loretto* as well; the cable lines on plaintiff's property could be removed by the cable company, but they were functionally permanent if she wanted to continue to use her property as rental units.[105] Here, the renewable energy source is functionally permanent because, although it can technically be removed, it cannot be removed if the property owner wants to continue to use the property for the cannabis industry. Thus, just as in *Loretto*, the physical occupation is functionally permanent and is likely a taking that requires just compensation.

B. Unconstitutional Exactions in Berkeley, CA and El Dorado County, CA

Riverside County is not the only municipality in California that is vulnerable to takings challenges due to its cannabis regulatory scheme. The City of Berkeley and El Dorado County are also potentially susceptible to Fifth Amendment exaction challenges based on current judicial trends. These

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100. *See Loretto*, 458 U.S. at 421 (requiring an installment of cable lines on a property is an unconstitutional taking).

101. *Id.*; RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.120(G).

102. RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.120(G).

103. *Permanent*, BLACK'S LAW DICTIONARY (5th ed. 1983).

104. Jessi Wyatt, *Repowering and Decommissioning: What Happens in Communities When Solar and Wind Projects End?*, GREAT PLAINS INST. (April 1, 2020), https://betterenergy.org/blog/repowering-and-decommissioning-what-happens-in-communities-when-solar-and-wind-projects-end/ (explaining that renewable energy sources have non-perpetual lifespans and can be removed from the project site when the lifespan ends).

105. *Loretto*, 458 U.S. at 452.

trends suggest that courts may be willing to expand their definition of an exaction to encompass the codes at issue in the City of Berkeley and El Dorado County. Berkeley requires all cannabis cultivators in the city to purchase 100% renewable energy from the local community choice energy provider.[106] Similarly, El Dorado County requires cannabis cultivators to power their entire operation through renewable energy in one of three forms: (1) on-grid power, (2) on-site zero net energy power, or (3) off-site carbon offsets.[107] Cannabis cultivators cannot operate legally in either of these municipalities unless these conditions are met.[108] A court would likely find that these city codes would constitute exactions.

Local California governments like Berkeley and El Dorado County are demanding that private property owners obtain full renewable energy to power their cannabis operation—an action that no other industry or private landowner is legally required to take. In some lower courts throughout the country, this alone would constitute the codes as exactions.[109] Furthermore, these municipalities are compelling cannabis cultivators to make a payment, in the form of renewable energy purchases, where no payment is due for any other industry to develop property. Based on the common legal understanding of an exaction, the California codes are likely to be considered exactions.[110]

Even based on the historic parameters in *Nollan* and *Dolan*, a court would likely find the Berkeley and El Dorado County codes unconstitutional exactions.[111] *Nollan* and *Dolan* require an essential nexus between a state interest and the condition, and rough proportionality between the conditions of the exaction and the impact of the development.[112] Put simply, if exactions do not closely support a state interest or if they are too burdensome compared to the burden of the permitted project, just compensation is required.

Berkeley and El Dorado County likely tailored their cannabis regulatory schemes to a government interest enough to prevent a successful takings challenge under *Nollan*. This case requires an essential nexus between a state interest and the exaction, or a connection between the exaction's reasoning and effect.[113] Many local governments justify portions of their cannabis regulatory scheme as ways to minimize negative impacts to both the people

106. BERKELEY, CAL., CODE OF ORDINANCES § 12.22.070(C)(3).

107. EL DORADO COUNTY, CAL., CODE OF ORDINANCES § 130.41.300(5)(C).

108. *Id*.; BERKELEY, CAL., CODE OF ORDINANCES § 12.22.070(C)(3).

109. Selinger v. City of McKinney, No. 05-19-00545-CV, 2020 Tex. App. LEXIS 4849 at *11 (Tex. App. 2020) (citing City of Carrollton v. RIHR, Inc., 308 S.W.3d 444, 449 (Tex. App. 2010)).

110. *See* BLACK'S LAW DICTIONARY, *supra* note 76; *see also Carrollton*, 308 S.W.3d at 448–451 (discussing exactions).

111. Nollan v. Cal. Coastal Comm'n., 483 U.S. 825, 837 (1987); Dolan v. City of Tigard, 512 U.S. 374, 390 (1994).

112. *Nollan*, 483 U.S. at 837 (essential nexus); *Dolan*, 512 U.S. at 391 (rough proportionality).

113. *Nollan*, 483 U.S. at 837.

and the environment in the locality.[114] Specifically, Berkeley and El Dorado County's codes at issue here likely further the government's interest in minimizing negative environmental impacts because renewable energy sources emit less greenhouse gas emissions than nonrenewable energy sources.[115] Thus, the *Nollan* essential nexus requirement is likely satisfied, and a court would not deem these codes unconstitutional solely under a *Nollan* analysis.

However, *Dolan*—the other half of takings-by-exactions analysis—is likely not satisfied by the Berkeley and El Dorado County codes. For an exaction to be constitutional, the *Dolan* Court reasons, "the city [promulgating the code] must make some sort of individualized determination that the required dedication is related . . . to the impact of the proposed development." [116] Said concisely, there must be rough proportionality between the exaction and the impacts of the proposed development. The Court further explains that "[n]o precise mathematical calculation is required" to determine rough proportionality.[117] But rough proportionality is not always as simple to determine as it was in *Dolan*—keeping a floodplain open clearly limits the pressures on neighboring bodies of water. [118] But what is the most effective way of measuring the proportionality of the codes at hand?

Logically, many justify codes such as Berkeley's and El Dorado County's as proportional because the cannabis cultivators are only required to bear the burden of their own greenhouse gases. The renewable energy requirements offset the energy being used at the cultivation site; and thus, the cannabis industry is reducing greenhouse gas emissions in proportion to their greenhouse gas usage. However, cannabis is the only high-energy industry that is required to bear the burden of their own greenhouse gas emissions by having to purchase renewable energy. Thus, the traditional proportionality analysis created in *Dolan* is ineffective here because of the complexities surrounding modern property concerns. Instead, courts should adopt one of two novel analysis methods moving forward: the currently situated approach or the historically situated approach.

These two approaches would provide clearer guidelines for judges when ruling on codes similar to the two at issue here. They also represent a more

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114. RIVERSIDE COUNTY, CAL., CODE OF ORDINANCES § 17.302.010.

115. *Carbon Dioxide Emissions from Electricity,* WORLD NUCLEAR ASS'N, https://world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity.aspx (Sept. 3, 2024) (showcasing that fossil fuel energy sources emit almost half of all CO2 emissions in the country, but non-fossil fuel energy sources typically only produce CO2 during construction phases).

116. *Dolan*, 512 U.S. at 391.

117. *Id*. at 395.

118. *Id*. at 393.

fair and just approach to judicial review of codes for polluting industries. The currently situated approach determines proportionality based on the burden placed on other similarly situated regulated entities. For instance, the energy impacts of the cannabis industry should be compared to other high-energy consumers—such as chemical manufacturers.[119] Under this analysis, the Berkeley and El Dorado County requirements would likely be deemed not proportional because they do not evenhandedly distribute the burden of reducing greenhouse gas emissions among industries that negatively contribute to emissions. In other words, the cannabis industry is the only high-energy consuming industry that must pay more for the environmental impacts of its high-energy use.

The second approach—the historically situated approach—is a broader version of the currently situated approach. This approach determines proportionality based on the burden placed on industries that have historically contributed the most to the problem the state is attempting to remedy. Thus, when looking at codes targeting an industry's greenhouse gas emissions, proportionality would be determined by looking at the codes targeting the industries that have historically contributed the most to greenhouse gas emissions. Under this analysis, the two local codes at hand would not be proportional because, as a newly legal industry, cannabis has not historically contributed a large amount of greenhouse gas emissions into the atmosphere. Rather, the historically situated approach would call for higher burdens on industries that have historically produced more greenhouse gas emissions, such as construction and transportation.[120] Under both modern approaches, the Berkeley and El Dorado County codes would be disproportionate, unconstitutional exactions that require just compensation from the state.

III. RECOMMENDATIONS

The warming environment and excessive use of fossil fuels in both the United States and the earth at large has led to an extreme need for new technologies that reduce planet-warming emissions—such as renewable energy. The codes discussed in this Note, though susceptible to constitutional challenges, help reduce greenhouse gas emissions by reducing fossil fuel usage. Although states may have to abandon the specific codes at issue here

119. *Energy- and Emissions-Intensive Industries*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/iedo/energy-and-emissions-intensive-industries (last visited Mar. 17, 2024).

120. Hannah Ritchie et al., *Breakdown of Carbon Dioxide, Methane and Nitrous Oxide Emissions by Sector*, OUR WORLD IN DATA, https://ourworldindata.org/emissions-by-sector (January 2024).

to avoid legal challenges, they should not be forced to abandon their interest in reducing fossil fuel usage.

Localities in California can alter their methods to avoid constitutional challenges while still reducing fossil-fuel usage within state lines. First, Riverside County can avoid *Loretto* claims regarding their on-site renewable energy requirement by requiring cannabis businesses to obtain the same amount of renewable energy in another way. Other approaches include requiring businesses to buy community choice energy, buy in to community solar, or help fund state solar or wind projects. These approaches all reduce fossil fuel usage and greenhouse gas emissions while satisfying the *Loretto* test but would run into the same potential constitutional issues as the codes in Berkeley and El Dorado County.

The constitutional issues in Berkeley and El Dorado County can also be avoided while still furthering state interests. Under either of the two recommended approaches—the currently situated or the historically situated approach—localities can avoid takings challenges by regulating in a holistic manner. In other words, the localities could satisfy the rough proportionality requirement for exactions by either regulating all similarly situated industries equally or regulating all industries equally by increasing the state Renewable Portfolio Standard. In California, this would entail regulating all high-energy consuming industries or high-greenhouse-gas-emitting industries as strictly as cannabis is regulated. Cannabis businesses could still be required to purchase additional renewable energy but so would data centers, indoor greenhouses, etc. These approaches would do more to truly further the state interests in reducing emissions, rather than just singling out an industry that is already oppressed due to a lack of federal legalization.

CONCLUSION

The cannabis industry has struggled to operate efficiently under the law since primary legalization, and those struggles persist to this day. The struggle is the perfect catalyst for a lawsuit that, although potentially economically beneficial, may destroy local, pro-environment regulation as it stands today. The Fifth Amendment takings clause protects those in the US from arbitrary government overreach through the law laid out in *Loretto*, *Nollan*, and *Dolan*. But it is also a potential weapon for industries—like cannabis—that are overwhelmed by regulation. To avoid chaos at the hands of this weapon, courts should interpret *Dolan* proportionality more holistically, and regulators should craft more rounded laws within similarly situated industries. There are budding claims in the bud industry, but it is not too late to nip them before they blossom.

BLUE BLOOD MONEY: DRAINING HORSESHOE CRABS FOR PROFIT

*Mei Brunson**

ABSTRACT

Most Americans, even those that consider themselves vegan, are implicated in the morally deplorable practice of harvesting and bleeding horseshoe crabs. In the U.S., the biomedical industry collects the distinctive blue blood of horseshoe crabs to test the safety of most injectable medicines, vaccines, and implantable medical devices. In 2022, the industry harvested more than 900,000 horseshoe crabs from the Atlantic coast and bled them for biomedical purposes. While most are returned to the sea afterwards, an estimated 20-35% of horseshoe crabs perish from the bleeding process, and the released survivors often suffer lasting health consequences after the removal of up to half of their blood. Currently, there is only a patchwork of federal, state, and interstate regulation addressing the taking, treatment, and use of horseshoe crabs collected for biomedical purposes. These anthropocentric regulations fall drastically short of protecting horseshoe crabs' interest in living free from human exploitation.

Fortunately, recent developments may soon encourage an industry shift to a non-animal-derived alternative toxicity test. This paper argues the replacement of the horseshoe crab-dependent test, rather than improved welfare regulations, would best protect the interests of horseshoe crabs. The latter only further entrenches the exploitative biomedical horseshoe crab industry.

> Horseshoe crabs are not charismatic animals like cats, dogs or orcas. As arthropods, they will rank quite low on the scale of moral worth for many. Even conservation efforts may be more informed by their toxicological utility than their status as a keystone species. But ethics at its best requires us to move beyond charisma, convenience, or utility and respond to what ethically matters.[1]

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1. Andrew Fenton & Lori Marino, *The Blood Harvest of Horseshoe Crabs is a Moral Fiasco*, KIMMELA CTR. FOR ANIMAL ADVOC., https://www.kimmela.org/wp-content/uploads/2020/08/The-Blood-Harvest-of-Horseshoe-Crabs-is-a-Moral-Fiasco.pdf (last visited Nov. 29, 2023).

INTRODUCTION

Every American has benefited from the eerily invisible yet ubiquitous industry that annually removes nearly one million horseshoe crabs from the Atlantic shores.[2] This industry extracts the crabs from their environment before strapping them to metal tables in sterilized facilities, plunging a thick syringe directly into their hearts, draining them of up to half of their blood, and (usually) releasing them back to the sea.[3] Due to its unique ability to detect toxins, the blue blood of horseshoe crabs has become a lucrative commodity in the U.S. biomedical industry.[4] The industry uses the fluid to test the safety of most injectable medicines, vaccines, and implantable medical devices, from which Americans collectively benefit.[5] Unfortunately, federal, state, and interstate law anthropocentrically and inadequately regulates the exploitation of horseshoe crabs for biopharmaceutical purposes. Consequently, these ancient creatures, to which we owe the development of many lifesaving medicines, suffer greatly as individuals and as a species.[6] We cannot ignore this reality any longer.

After all, every American is implicated in the industrialized harvesting and bleeding of horseshoe crabs for biomedical use. Even vegans ethically opposed to animal exploitation are not exempt if they use insulin, have a pacemaker, receive vaccines (including COVID-19 vaccines), or, if vaccine-free, reap the benefits of herd immunity.[7] Nonetheless, horseshoe crabs carry intrinsic value and an interest in living free from human exploitation, which society and the law fail to consider.[8] Especially given that there is an available animal-free alternative to the horseshoe crab-derived toxicity test, ethical obligations to promptly end the biomedical horseshoe crab industry exist.[9] Despite existing regulatory barriers, measures can be implemented to

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2. Ben Levitan, *A Pathway to End the Medical Harvest of Horseshoe Crabs*, EARTH JUST. (July 29, 2024), https://earthjustice.org/experts/ben-levitan/a-pathway-to-end-the-medical-harvest-of-horseshoe-crabs.

3. Chiara Eisner, *Coastal biomedical labs are bleeding more horseshoe crabs with little accountability*, NAT'L PUB. RADIO, https://www.npr.org/2023/06/10/1180761446/coastal-biomedical-labs-are-bleeding-more-horseshoe-crabs-with-little-accountabi (last visited Nov. 09, 2024).

4. *See* Sebastian B. Okun, *Mating in the Moonlight: The Battle to Save the American Horseshoe Crab*, 18 OCEAN & COASTAL L.J. 195, 201 (2012) (discussing how horseshoe crabs are a lucrative commodity in the U.S. biomedical industry).

5. Jordan Krisfalusi-Gannon et al., *The Role of Horseshoe Crabs in the Biomedical Industry and Recent Trends Impacting Species Sustainability*, 5 FRONTIERS MARINE SCI. 1, 2 (2018).

6. *Id.* at 2–5.

7. *See* Ariel Wittenberg, *Got Your COVID-19 Vaccine? Thank a Horseshoe Crab*, E&E NEWS (Jan. 8, 2021), https://www.eenews.net/articles/got-your-covid-19-vaccine-thank-a-horseshoe-crab/ (last visited May 14, 2024) (noting that injectable medicine and implantable devices necessitate endotoxin testing—for which the horseshoe crab-derived test has become standard).

8. Fenton, *supra* note 1.

9. *Id.*

incentivize biopharmaceutical manufacturers to transition away from an antiquated test dependent on extracting horseshoe crab blood.[10]

Part I provides background information on the horseshoe crab species related to their biology and use by humans. Part II discusses how the biomedical industry uses and abuses horseshoe crabs. Part II also covers the development of the horseshoe crab-derived toxicity test, as well as the structure and impacts of the multi-million-dollar industry that is bleeding horseshoe crabs dry. Part III reveals a regulatory failure to acknowledge and protect the well-being of horseshoe crabs. Part IV describes the development, availability, and recent approval of an animal-free alternative. Finally, Part V argues that anything short of completely phasing out the horseshoe crab-dependent test contravenes our moral obligation to protect these ancient mariners' interests. It also presents recommendations for accomplishing industry-wide change. The paper concludes by reflecting on the U.S.'s moral obligations owed to horseshoe crabs.

I. BACKGROUND ON HORSESHOE CRABS

Horseshoe crabs are "living fossils" that have inhabited Earth for over 450 million years.[11] Contrary to their common name, these aquatic invertebrates are more closely related to scorpions and spiders than crabs.[12] They belong to the arthropod family.[13] There are four species of horseshoe crabs, three of which inhabit the coastal waters of Asia.[14] This paper focuses upon the "American" horseshoe crab: *Limulus polyphemus*.[15] This species ranges along the North American Atlantic coast but is most prolific around the central Atlantic coast.[16] These animals are particularly abundant in the Delaware Bay region straddling New Jersey and Delaware.[17] Hereinafter, "horseshoe crab" refers to the American variety.

Studies estimate that these animals have a natural life expectancy of at least 14-18 years, with females reaching reproductive maturity around 10 years.[18] Due to the large size and tough exoskeleton of horseshoe crabs,

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10. Fenton, *supra* note 1.

11. Mark L. Botton et al., *Horseshoe Crabs: "Living Fossils" Imperiled in the Anthropocene*, IMPERILED: THE ENCYCLOPEDIA OF CONSERVATION 1, 1 (2021).

12. *Id.*

13. CHESAPEAKE BAY PROGRAM, *Horseshoe Crab: Limulus polyphemus*, https://www.chesapeakebay.net/discover/field-guide/entry/horseshoe-crab (last visited Oct. 26, 2024).

14. These three species are the *Tachypleus tridentatus*, *Tachypleus gigas*, and *Carcinoscorpius rotundicauda*. *Id.*

15. *Id.*

16. *Id.* at 8.

17. *Id.*

18. *Id.* at 3.

natural predation of adults is relatively rare.[19] However, various animals rely on horseshoe crab eggs as a vital food source, making them a keystone species.[20] In fact, the limited conservation measures for horseshoe crabs are typically driven not by the intrinsic value of the horseshoe crabs themselves, but rather to safeguard the threatened Rufa Red Knot shorebirds that rely on protein-rich horseshoe crab eggs for their annual migration.[21] The horseshoe crab is classified as "vulnerable" by the International Union for the Conservation of Nature (IUCN).[22]

Humans have historically and contemporarily exploited horseshoe crabs in a myriad of ways.[23] Once harvested for fertilizer and livestock feed, today, these creatures are now collected primarily for use as commercial bait and for biomedical purposes.[24]

Horseshoe crabs' dogged survival over hundreds of millions of years, through multiple mass extinction events, can be attributed in part to their being "ecological generalists."[25] These creatures can tolerate wide ranges in water salinity, temperature, and other environmental variables.[26] However, these "living fossils" are not invincible.[27] Like many other species that have survived until the Anthropocene,[28] their well-being and existence are now threatened by human greed.[29] A team of international scientists suggested that "[p]erhaps the best-known factor contributing to commercial

19. CHESAPEAKE BAY PROGRAM, *supra* note 13.

20. To get an idea of just how intense this egg predation is, consider that "it has been estimated that as few as one out of 100,000 American horseshoe crab eggs survive to the end of their first summer of life." *Id.*

21. *See* Okun, *supra* note 4, at 203 (stating that "[i]t is largely due to the tireless efforts of those interested in protecting the feeding grounds of migratory shorebirds that great measures have been taken to protect horseshoe crabs"); *see generally* Lawrence J. Niles, *Effects of Horseshoe Crab Harvest in Delaware Bay on Red Knots: Are Harvest Restrictions Working*, 59 BIOSCIENCE 153, 155–60 (2009) (analyzing the effects of overharvesting horseshoe crabs on the *Rufa* population, and suggesting increased protection of horseshoe crabs to meet the "[r]ecovery goal that is a 'restored' *rufa* population").

22. The IUCN is an international environmental organization that maintains the IUCN Red List of Threatened Species, "the world's most comprehensive information source on the global extinction risk status of animals, fungus and plant species." *IUCN Red List of Threatened Species*, IUCN, https://iucn.org/resources/conservation-tool/iucn-red-list-threatened-species (last visited Nov. 21, 2023).

23. Krisfalusi-Gannon et al., *supra* note 5, at 2.

24. *Id.*

25. Botton, *supra* note 11, at 1–3; AM. MUSEUM NAT. HIST., *Horseshoe Crabs are One of Nature's Greatest Survivors*, PHYS. ORG. (Jan 24, 2012), https://phys.org/news/2012-01-horseshoe-crabs-nature-great-survivors.html (last visited Oct. 26, 2024).

26. Botton, *supra* note 11, at 1–3.

27 *Id.* at 10.

28. The Anthropocene generally refers to the "human-dominated geological epoch" that we currently live in, marked by human-induced ecological crises. *See generally* Simon Lewis & Mark Andrew Maslin, *Defining the Anthropocene*, 519 NATURE 171, 171 (2015) (assessing competing perspectives on what the Anthropocene Epoch is and when it began).

29. *See* Botton, *supra* note 11, at 1 ("Our current human-dominated era, the Anthropocene, poses a unique set of challenges for horseshoe crabs that stem from overexploitation and habitat loss.").

exploitation of horseshoe crabs comes from their biomedical importance."[30] In 2022 alone, the biomedical industry captured nearly one million horseshoe crabs off the Atlantic coast and drained up to half of their blue blood[31]—nearly double the "blood harvest" in 2017.[32]

II. THE BIOMEDICAL HORSESHOE CRAB INDUSTRY AND ITS IMPACTS

Before analyzing the regulations pertaining to the biomedical exploitation of horseshoe crabs—or the lack thereof—it is important to first understand several things: (1) the biomedical value of horseshoe crab blood; (2) the structure of the multi-million-dollar industry erected around this blue substance; and (3) this industry's drastic welfare impacts on horseshoe crabs, both on the individual and species levels. This section explores each facet in turn.

A. The LAL Test

While the biomedical industry has capitalized on horseshoe crabs for several decades,[33] this paper focuses on the discovery of a novel application for the animals' blue blood in the late 20th century.[34] Horseshoe crabs' 450 million years of survival on Earth can partly be attributed to their "innate immunity" arising from their unique blood, which contains only one type of cell: the amoebocyte.[35] When a horseshoe crab suffers an injury and bacteria enters their bloodstream, these amoebocyte cells coagulate and form a blood clot.[36] This reaction, one of the earliest evolutionary immune systems, transformed the biomedical industry in the 1960s and 1970s.[37] The scientific community's discovery of this ancient immune response led to the development of the *Limulus* amebocyte lysate (LAL) test, which relies on horseshoe crab blood to detect endotoxins.[38]

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30. Botton, *supra* note 11, at 1.

31. Levitan, *supra* note 2.

32. *Lawsuit Demands Maryland's Crucial Horseshoe Crab Death, Injury Data*, CTR. FOR BIOLOGICAL DIVERSITY (May 22, 2024), https://biologicaldiversity.org/w/news/press-releases/lawsuit-demands-marylands-crucial-horseshoe-crab-death-injury-data-2024-05-22/.

33. *See, e.g.,* Okun, *supra* note 4, at 199 ("For over seventy years, horseshoe crab eyes have been considered valuable experimental models in vision research.").

34. *Id.* at 200.

35. Krisfalusi-Gannon, *supra* note 5, at 2; Okun, *supra* note 4, at 199; AM. MUSEUM NAT. HIST. *supra* note 25. For comparison, mammals have two: red and white blood cells. Laura Dean, *Blood Groups and Red Cell Antigens*, NAT'L CTR. FOR BIOTECHNOLOGY INFO., 1 (2005), https://www.ncbi.nlm.nih.gov/books/NBK2263/.

36. Okun, *supra* note 4, at 199.

37. *Id.* at 199–200.

38. Krisfalusi-Gannon, *supra* note 5, at 2.

Endotoxins are highly toxic molecules existing in bacterial cells that can sicken and kill humans—even after the bacteria that produced them have been eliminated.[39] The LAL test relies on horseshoe crab blood, which is centrifuged to amass the amebocytes before water is added to break apart the invaluable coagulation proteins for quick and accurate endotoxin testing.[40] The LAL clots around the endotoxins on pharmaceuticals and medical devices.[41] This reaction reveals any endotoxin contamination and, if so, to what extent.[42]

The Food & Drug Administration (FDA) requires that endotoxin levels are tested in injectable drug products (e.g., vaccines and insulin), and implantable medical devices.[43] Prior to FDA approval of LAL in 1983 for endotoxin testing, pharmaceutical and biomedical companies tested intravenous drugs and medical devices for these harmful endotoxins on live rabbits.[44] These companies were more than happy to transition to the LAL test, given that the rabbit method was "costly, sometimes inaccurate, and created poor publicity."[45] Today, the LAL test is the primary method used in the U.S. for endotoxin testing.[46] It is also increasingly used to assess environmental quality, as the test can detect endotoxins in freshwater, sea water, and surrounding sediment.[47] The biopharmaceutical sector's reliance on the LAL test has fueled a lucrative industry that profits off the capture and bleeding of horseshoe crabs.

B. The Structure of the Biomedical Horseshoe Crab Industry

Once composed of family businesses that owned smaller facilities, today, there are only five federally licensed manufacturers that process horseshoe crab blood.[48] These are owned by giant multinational firms like Fujifilm and Charles River Laboratories (Charles River Lab).[49] These five facilities are located along the East Coast in South Carolina, New Jersey, Massachusetts,

39. James Gorman, *Tests for Coronavirus Vaccine Need This Ingredient: Horseshoe Crabs*, N.Y. TIMES (June 3, 2020), https://www.nytimes.com/2020/06/03/science/coronavirus-vaccine-horseshoe-crabs.html.

40. *Id.*

41. Chris Iovenko, *Horseshoe Crabs are in Danger Because Everyone Wants Their Blood*, THE VERGE (Dec. 17, 2021), https://www.theverge.com/2021/12/17/22840263/horseshoe-crab-blood-medical-industry-controversy.

42. *Id.*

43. Sarah A. Robinson et al., *Bacterial Endotoxin Testing of Drugs and Biologics in the US: Ensuring Patient Safety*, REGUL. FOCUS (Aug. 18, 2023), https://rapsprod.blob.core.windows.net/rapsk13/raps/media/news-images/23-8_robinson-et-al_rev-2.pdf.

44. Okun, *supra* note 4, at 200.

45. *Id.*

46. *Id.*

47. Krisfalusi-Gannon, *supra* note 5, at 2.

48. Eisner, *supra* note 3.

49. *Id.*

Virginia, and Maryland, where they enjoy convenient proximity to horseshoe crab habitat.[50] These facilities obtain the horseshoe crabs through various means before siphoning their precious blood.[51] Depending on the state, fishermen either harvest the creatures directly from the sea with trawling nets or pluck them off the beaches by hand.[52] A blend of middleman and bounty hunter, these fishermen then deliver the horseshoe crabs to the bleeding facilities.[53]

In recent years, there has been controversy over Charles River Lab's practice of allowing its suppliers to store captured horseshoe crabs in holding ponds before bleeding them, a practice legal only in South Carolina.[54] In 2022, Defenders of Wildlife and the Coastal Conservation League filed a lawsuit against Charles River Lab seeking to enjoin the use of these "temporary containment ponds" during the horseshoe crab spawning season.[55] Plaintiffs argued that Charles River Lab violated the Endangered Species Act (ESA) through impermissibly "taking" the threatened Rufa Red Knot.[56] This alleged taking included depriving the threatened shorebirds of their "critical food source"—horseshoe crab eggs.[57] In August 2023, the parties reached a settlement.[58] The settlement ended the placement of female horseshoe crabs in holding ponds prior to their bleeding, which allows them to lay their eggs on beaches.[59] The resulting protection to horseshoe crabs, but notably only females, evidences the limited protections afforded to horseshoe crabs are often secondary effects of Rufa conservation efforts.

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50. Eisner, *supra* note 3; Patrick Whittle, *There's a Growing Conflict Over Horseshoe Crab Blood Harvesting. Find Out Why*, DEL. ONLINE (Aug. 1, 2023), https://www.delawareonline.com/story/news/2023/08/01/horseshoe-crabs-blue-blood-harvesting-medicine/70506964007.

51. Eisner, *supra* note 3.

52. *Id.*

53. *Id.*

54. *Historic Limits on Horseshoe Crab Harvest Will Protect Threatened Shorebirds*, S. ENV'T L. CTR. (May 5, 2023), https://www.southernenvironment.org/news/historic-limits-on-horseshoe-crab-harvest-will-protect-threatened-shorebirds.

55. *Defenders of Wildlife and Conservation Groups Sue Regulators, Pharmaceutical Company Over Crab Pens*, DEFS. OF WILDLIFE (Jan. 13, 2022), https://defenders.org/newsroom/defenders-of-wildlife-and-conservation-groups-sue-regulators-pharmaceutical-company-over; Defs. of Wildlife v. Boyles, No. 2:22-CV-112-RMG, slip op. at 1 (D.S.C. Apr. 4, 2023) (Westlaw).

56. Defs. of Wildlife v. Boyles, No. 2:22-CV-112-RMG, slip op. at 1 (D.S.C. Apr. 4, 2023).

57. *See id.* (describing the lawsuit's basis in denying the defendant's motion to strike expert evidence).

58. *Charles River Labs Signs Joint Agreement for Protection of Crabs Used in Medical Tests*, REUTERS (Aug. 25, 2023), https://www.reuters.com/business/healthcare-pharmaceuticals/charles-river-lab-signs-joint-agreement-protection-crabs-used-medical-tests-2023-08-24 (last visited Nov. 21, 2023).

59. *Id.*

Society and the legal community fail to acknowledge the intrinsic value and interests of horseshoe crabs to be free from exploitation.[60]

Regardless, whether temporarily kept in a facility holding pond or not, all captured horseshoe crabs meet the same fate during the bleeding process. Lab technicians puncture the crabs' hearts with syringes before draining them alive.[61] The bleeding process can last up to eight minutes and extract over half the volume of horseshoe crabs' blue blood.[62] After the bleeding process, the biomedical industry delivers most bled horseshoe crabs back to the fishermen and harvesters.[63] As investigative reporter Chiara notes:

> [This] makes the bleeding business unique among the [fishing and biomedical] industries it straddles. It's an unusual fishery, because the animals are not sold to be eaten. It's an atypical utilization of animals in medicine, since the crabs are not bled in the research stage . . . . The business is also different from extractive industries like mining and logging, because the harvested natural resource is often supposed to be returned to the environment alive.[64]

The uniqueness of the biomedical horseshoe crab industry allows it, in part, to occupy a profitable legal gray area with little regulatory oversight.[65]

Unfortunately, secrecy and a lack of transparency marks the bleeding companies.[66] State governments can also play a role in shielding the industry from the public eye, evidenced by a lawsuit filed by the Center for Biological Diversity (CBD) in May 2024 against the Maryland Department of Natural Resources.[67] CBD sued the agency for violating the state's public records law when the agency failed to disclose "exactly how" the thousands of horseshoe crabs are harvested, bled, killed, or injured by the biomedical industry and fishermen each year.[68] In a press release concerning its lawsuit, CBD asserted that "because Maryland shrouds in secrecy the process it uses to determine

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60. There has been scientific research that examines the physiological and mortality impacts of time spent in holding ponds on harvested horseshoe crabs. *See* Kristin Linesch Hamilton et al., *Physiological Impacts of Time in Holding Ponds, Biomedical Bleeding, and Recovery on Atlantic Horseshoe Crab, Limulus Polyphemus*, 239 COMPAR. BIOCHEMISTRY & PHYSIOLOGY 1, 1 (2020).

61 . Eisner, *supra* note 3.

62. *Id.*

63. Eisner, *supra* note 3; Tom Maloney et al., *Saving the Horseshoe Crab: A Synthetic Alternative to Horseshoe Crab Blood for Endotoxin Detection*, PUB. LIBR. OF SCI. BIOLOGY, 2 (2018).

64. Eisner, *supra* note 3, at 4.

65. Eisner, *supra* note 3.

66. Eisner, *supra* note 3, at 2; *see also* Caren Chesler, *Medical Labs May Be Killing Horseshoe Crabs*, SCI. AM. (June 9, 2016), https://www.scientificamerican.com/article/medical-labs-may-be-killing-horseshoe-crabs/ (reporting that four of the five harvesting facilities did not respond to requests to be interviewed).

67. CTR. FOR BIOLOGICAL DIVERSITY, *supra* note 32.

68. *Id.*

when crabs can be harmed, the Center [for Biological Diversity] and other parties can't meaningfully participate in protecting the imperiled animals" from corporate interests.[69]

Behind closed doors, industry actors are raking in an exorbitant amount of money from the blood of horseshoe crabs.[70] The high demand for horseshoe crab blood for endotoxin testing can price a quart of LAL at $15,000.[71] Economic revenue gained from the biomedical use of horseshoe crabs "far out-shadows" all other methods of exploiting these animals for profit (such as for bait harvesting).[72] More specifically, the biomedical industry captures an estimated $220 million of the $260 million generated annually by horseshoe crab-related industries.[73] The harvesters who comb the beaches and seas for horseshoe crabs can earn ten times more by selling their live catches to the biomedical industry as opposed to selling dead horseshoe crabs as bait.[74] With the profit margin so vast for both the horseshoe crab harvesters and five industry bleeders, it is no wonder that the number of horseshoe crabs exploited for biomedical use only increases each year.[75] This exploitation is perpetually sustained by the biopharmaceutical industry's insatiable demand for the LAL test. But the use and abuse necessarily entangled with extracting the crab's precious blue blood takes a toll on these prehistoric creatures.

C. The Biomedical Industry's Severe Impact on Horseshoe Crabs

The profits to be made off the horseshoe crab-derived LAL test have led to increasing harvests each year that devastate horseshoe crabs as individuals and as a species.[76] One researcher notes that "[g]iven the high use of [horseshoe crabs], it is surprising that so little empirical evidence about sentience [and pain] is available."[77] However, horseshoe crabs do possess a central nervous system.[78] Consequently, these animals may very well suffer

69. CTR. FOR BIOLOGICAL DIVERSITY, *supra* note 32.
70. Iovenko, *supra* note 41, at 5.
71. *Id.* at 2.
72. Okun, *supra* note 4, at 201.
73. *Id.*
74. *Id.*
75. Eisner, *supra* note 3.
76. *Id.*
77. Robert W. Elwood, *Behavioural Indicators of Pain and Suffering in Arthropods and Might Pain Bight Back*, 13 ANIMALS 2602, 8 (2023).
78. *Basic Anatomy*, DEL. BAY HORSESHOE CRAB SURV., https://www.delawarebayhscsurvey.org/anatomy (last visited Nov. 22, 2023).

during every step of their industrialized biomedical exploitation: from harvest, to bleeding process, to after their post-bleed release.[79]

At the beginning of the cycle, harvesters, by hand or net, remove live horseshoe crabs from their habitat.[80] Then, they stack the animals on top of one another by the hundreds for delivery to the bleeding facilities—an undoubtedly jarring experience for these creatures.[81] The horseshoe crabs are transported "not in tanks of cold salt water, but in the back of open pickup trucks" that are "dry and hot."[82] They may experience hypoxia[83] after just five minutes out of the water, which reduces their survival time by an average of 74%.[84] Research indicates that picking horseshoe crabs up by their tails can prevent their ability to right themselves when flipped over, which can prove fatal for the animals post-release.[85] Despite this, lifting horseshoe crabs by their tails is a common harvesting practice.[86] Further, before Charles River Labs ended its use of holding ponds, bleeding facilities left captured horseshoe crabs to languish in confinement with no requirement that they be fed prior to their bleeding.[87] Charles River Labs self-reported that the mortality rate of its horseshoe crabs was "just 4%" during the handling and transportation of crabs to and from the facility.[88] From 2004 to 2012, the percentage of horseshoe crabs that perished prior to bleeding jumped by 75%, which scientists attribute to potential "deleterious harvest and transportation practices."[89]

Horseshoe crabs' circumstances do not improve during the bleeding process, which exposes them to more time outside water, rough handling,

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79. There is a lack of research into horseshoe crabs' capacity to feel pain, which would better illuminate the welfare impacts of their biomedical use. Elwood, *supra* note 77, at 8. However, given the ever-growing research unsettling long-held assumptions that many non-human animals do not feel pain, such as crustaceans, fish and insects, it would be prudent to adopt the precautionary principle and proceed as if the horseshoe crabs do experience pain. Andrew Crump et al., *Is It Time for Insect Researchers to Consider Their Subjects' Welfare?*, PUB. LIBR. OF SCI. BIOLOGY, at 3 (2023); Seth Millstein, *Fish Feel Pain, Science Shows—But Humans Are Reluctant To Believe It*, SENTIENT (Jan. 12, 2024), https://sentientmedia.org/do-fish-feel-pain/; Robert W. Elwood, *Potential Pain in Fish and Decapods: Similar Experimental Approaches and Similar Results*, 8 FRONTIERS VETERINARY SCI. 1, 6 (2021).

80. Eisner, *supra* note 3, at 4.

81. *Id.*

82. Bill Schutt, *How Horseshoe Crab Blood Became One of the Most Valuable Liquids in Medicine*, BIG THINK (Oct. 3, 2022), https://bigthink.com/health/horseshoe-crab-blood-clott/.

83. Hypoxia is a state of low-oxygenated blood, which can cause long-term physiological impairments. Beenish S. Bhutta et al., *Hypoxia*, STATSPEARLS, https://www.ncbi.nlm.nih.gov/books/NBK482316/ (Mar. 4, 2024).

84. Krisfalusi-Gannon, *supra* note 5, at 4.

85. Eisner, *supra* note 3.

86. *Id.*

87. *Id.*

88. Chesler, *supra* note 66, at 4.

89. Krisfalusi-Gannon, *supra* note 5, at 4.

and extreme temperatures.[90] Lab technicians scrub the crabs with disinfectant, strap the crabs to metal tables, and bend their hinged shells back,[91] all before piercing the horseshoe crabs' hearts with a large-gauge syringe and removing 5–400 mL of their blood.[92]

The harm inflicted upon horseshoe crabs continues after the blood extraction procedures. Typically, the horseshoe crabs are released far from where they were initially picked up one to three days prior.[93] While this practice is intended to prevent the animals from being recaptured and re-bled,[94] it disrupts the horseshoe crabs' autonomy over their lives and movements. Research suggests that because horseshoe crab harvest often occurs during spawning season, and egg production is energy intensive, the bleeding process takes a greater physiological toll on the already-weakened females.[95] An estimated 15-30% of horseshoe crabs die because of biomedical bleeding after their release.[96] Of course, the mortality rate for the 13% of horseshoe crabs bled before being later sold as bait is 100%, as their use as bait necessitates their killing.[97]

The industrial bleeding of horseshoe crabs not only affects the health and well-being of individual animals, but it also likely impairs the survivability of the species. Research indicates females that survive blood extraction exhibit diminished spawning activity, with some failing to spawn completely.[98] The bleeding process also likely takes its toll on males' ability to produce the next generation of horseshoe crabs.[99] Thus, research suggests that post-bleeding impairs horseshoe crabs' spawning abilities, which could

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90. Krisfalusi-Gannon, *supra* note 5, at 3.

91. Schutt, *supra* note 82.

92. Eisner, *supra* note 3.

93. Alexis C. Madrigal, *The Blood Harvest*, ATLANTIC (Feb. 26, 2014), https://www.theatlantic.com/technology/archive/2014/02/the-blood-harvest/284078/.

94. *Id.*

95. Sami B. Ghubril, *Saving the Horseshoe Crab: The Case for the Oft-forgotten, Critically Important Living Fossil*, VA. ENV'T L.J. 272, 278–79 (2019).

96. *Id.* at 278 (estimating that up to 30% of horseshoe crabs may die following bleeding). The Atlantic States Marine Fisheries Commission (ASMFC), the interstate body charged with regulating the take of horseshoe crabs for the biomedical industry, maintains the 15% mortality rate at the lowest end of the range, despite research indicating otherwise. ATL. STATES MARINE FISHERIES COMM'N, STOCK ASSESSMENT OVERVIEW: HORSESHOE CRAB, at 3 (2019).

97. Maloney et al., *supra* note 63, at 2; *See also* Barbara Moran, *Mass. Proposes New Protections for Horseshoe Crabs*, WBUR NEWS (Feb. 14, 2024), https://www.wbur.org/news/2024/02/15/mass-proposes-new-protections-for-horseshoe-crabs (noting that bait harvest of horseshoe crabs results in 100% mortality).

98. Ghubril, *supra* note 95, at 279.

99. *See* David R. Smith et al., *The Long-Term Effect of Bleeding for Limulus Amebocyte Lysate on Annual Survival and Recapture of Tagged Horseshoe Crabs*, 7 FRONTIERS MARINE SCI. 1, 11 (noting that bleeding may have a greater negative effect on the spawning activity of male rather than female horseshoe crabs, even if the impact on individuals is "short-lived").

potentially impair the reproduction rate at a species level[100]—the species' spawning has decreased by a staggering 72% in the past three decades.[101] Case studies indicate that human predation is the primary cause of collapsing horseshoe crab populations[102] and climate change will cause even greater strain on the horseshoe crab population.[103] In February 2024, CBD, the Humane Society of the United States, and the American Bird Conservancy petitioned the National Oceanic and Atmospheric Administration's National Marine Fisheries Services (NOAA Fisheries) to list the horseshoe crab as an endangered species under the ESA.[104]

However, based on current trends related to horseshoe crab mortality and population, the demand for LAL over the next two decades is likely to reach "unsustainable levels."[105] U.S. regulatory response has been grossly insufficient to protect horseshoe crabs.

III. THE ANTHROPOCENTRIC REGULATORY FRAMEWORK OF THE BIOMEDICAL HORSESHOE CRAB INDUSTRY

The federal government, an interstate compact known as the Atlantic States Marine Fisheries Commission (ASMFC), and the individual states all play a role in regulating the biomedical horseshoe crab industry. The FDA regulates the LAL test manufacturing process to ensure product safety.[106] The regulation of the biomedical horseshoe crab fishery, concerning the harvest and bleeding processes, largely occurs within a cooperative federalism framework.[107] FDA approval of the LAL test resulted in a substantial uptick in horseshoe crab harvesting; the ASMFC began regulating the commercial harvesting of horseshoe crabs in the late 1990s with support from the federal government.[108] This section discusses three things: (1) FDA

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100. Smith, *supra* note 99, at 11 (noting the scientists' research "*could* indicate reduced spawning activity and, in turn, reduced population productivity" but also that "an effect at the population level would require sufficient numbers relative to abundance to reduce their fecundity or spawning activity") (emphasis added).

101. *Petition to List the American Horseshoe Crab (Limulus Polyphemus) under the U.S. Endangered Species Act as an Endangered or Threatened Species and to Concurrently Designate Critical Habitat*, CTR. FOR BIOLOGICAL DIVERSITY (Feb. 27, 2024), https://www.biologicaldiversity.org/species/invertebrates/pdfs/20240212-American-horseshoe-crab-petition.pdf.

102. Krisfalusi-Gannon, *supra* note 5, at 5.

103. NOAA, *Horseshoe Crab—Limulus polyphemus* 143 (2016), https://www.st.nmfs.noaa.gov/Assets/ecosystems/climate/images/species-results/pdfs/Horseshoe_Crab.pdf (last visited Sept. 25, 2024).

104. CTR. FOR BIOLOGICAL DIVERSITY, *supra* note 101.

105. Krisfalusi-Gannon, *supra* note 5, at 5.

106. *See* Okun, *supra* note 4, at 204–13 (providing an overview of the regulatory framework for horseshoe crabs from a conservation perspective).

107. *Id.*

108. *Id.* at 200–06.

oversight of LAL test manufacturing; (2) the cooperative federalism model that involves the ASMFC and federal agencies in regulating the biomedical horseshoe crab fishery; and (3) individual states' ability to supplement the few regulations mandated by the ASMFC. However, current regulations neglect horseshoe crabs' well-being and interest in freedom from human exploitation. Rather, these laws emphasize an anthropocentric objective of managing these ancient creatures as an exploitable "fishery resource" across all regulatory levels.

A. FDA Regulation of LAL Test Manufacturing

Honoring the states' traditional exercise of primary regulatory authority over their wildlife and natural resources,[109] the federal government generally plays a secondary role in regulating biomedical use of horseshoe crabs.[110] An exception is the FDA, which maintains primary oversight of LAL test manufacturing because the process implicates consumer safety rather than fishery management.[111] Naturally, the limited federal regulations in place related to LAL test production are strictly anthropocentric, revolving around consumer safety rather than horseshoe crab welfare. There are no federal standards providing for horseshoe crab welfare during their capture and bleeding for biomedical use.[112]

The FDA oversees the manufacture of the LAL test to protect public health.[113] In 1983, the FDA first approved the LAL test for endotoxin detection after extensive testing and validation by U.S. Pharmacopeia (USP), a scientific nonprofit.[114] The FDA relies on USP to set federal quality

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109. Jean O. Melious, *Enforcing the Endangered Species Act Against the States*, 25 WM. & MARY ENV'T L. & POL'Y R. 605, 609 (2001).

110. *See* David Favre, *American Wildlife Law—An Introduction*, ANIMAL LEGAL & HIST. CTR., https://www.animallaw.info/article/american-wildlife-law-introduction (last visited Nov. 28, 2023) (describing how states have primary jurisdictional authority over fish and wildlife on state lands).

111. *See What Does FDA Regulate*, U.S. FOOD & DRUG ADMIN., https://www.fda.gov/about-fda/fda-basics/what-does-fda-regulate (last visited Nov. 28, 2023) (providing an overview of FDA's broad regulatory authority, inclusive of drugs, and biologics).

112. Notably, the Animal Welfare Act entirely excludes horseshoe crabs from the Animal Welfare Act's purview by narrowly defining "animal. " *See* Animal Welfare Act, 7 U.S.C. § 2132(g) ("The term "animal" means any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, or such other warm-blooded animal").

113. Allen L. Burgenson, *Confidence for Adopting the rFC Method in Your Lab*, LONZA, 1 (2022), https://bioscience.lonza.com/lonza_bs/US/en/download/content/asset/35191; *See also* Status of Biological Substances Used for Detecting Bacterial Endotoxins, 38 FED. REG. 1371, 1404 (Jan. 12, 1973) (announcing FDA would regulate LAL as a biologic under the Public Health Service Act); Reyes Candau-Chacon, FDA, *FDA Perspectives on Recombinant Endotoxin Detection Systems*, 31 (Nov. 16, 2021), https://www.usp.org/sites/default/files/usp/document/events-training/03-fda-perspective-on-recombinant-reyes-candau-chacon-final.pdf (explaining why FDA licenses LAL).

114. Okun, *supra* note 4, at 200.

standards for pharmaceuticals.[115] Thus far, USP—and thereby the FDA—has only approved the rabbit and LAL tests for endotoxin assessment for which the industry can forgo additional validation.[116]

Due to LAL's "animal nature" and "intrinsic variability,"[117] the FDA licenses LAL manufacturers.[118] By licensing only five processors throughout the U.S.,[119] the federal government has effectively created a "federally mandated monopoly" of LAL production.[120] Further, FDA regulations offer no guidance for treating bled horseshoe crabs—despite stipulating baseline manufacturing practices for pharmaceutical processing[121] and finished pharmaceuticals to ensure the safety, quality, and purity of LAL tests for human benefit.[122]

No federal animal welfare standards apply to the biomedical use of horseshoe crabs. The Animal Welfare Act (AWA) sets minimal standards for the "humane handling, care, treatment, and transportation" by "research facilities."[123] Yet, bled horseshoe crabs fall outside the scope of AWA regulations for two reasons. First, bleeding facilities, occupying a legal gray space between the fishery and biomedical research domains,[124] likely do not fit the "research facilities" definition as they do not use live animals in "research, tests, or experiments."[125] Second, and more importantly, the AWA narrowly defines those animals afforded its protections to the exclusion of non-warm-blooded animals and invertebrates.[126] Considering the welfare concerns implicated in the biomedical exploitation of horseshoe crabs, the lack of federal regulation is troublesome.

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115. In fact, "[t]he USP-FDA relationship dates back to the 1906 Pure Food and Drug Act, which deemed the United States Pharmacopeia and the National Formulary official compendia under federal law." *USP and FDA Working Together to Protect Public Health*, USP, https://www.usp.org/public-policy/usp-fda-roles (last visited Nov. 28, 2023).

116. *Bacterial Endotoxins/Pyrogens*, FDA (Nov. 11, 2014), https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-technical-guides/bacterial-endotoxinspyrogens; *See also Guidance for Industry Pyrogen and Endotoxins Testing: Questions and Answers*, FDA (June 2012), https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-pyrogen-and-endotoxins-testing-questions-and-answers.

117. Candau-Chacon, *supra* note 113, at 31.

118. *Id.*; Maribeth Donovan Janke & Allen L. Burgenson, *The FDA Withdrew the LAL Guidance Document, What Are the Implications?*, LONZA, 1 (2011); *See also* ATL. STATES MARINE FISHERIES COMM'N, *Best Management Practices for Handling Horseshoe Crabs for Biomedical Purposes*, 3 (2023) (referring to "FDA-licensed LAL manufacturers") [hereinafter *Best Management Practices*].

119. *Best Management Practices*, *supra* note 118, at 3.

120. Brendan Tindall & Kevin Williams, *The Impact of Supply Chain Risks and LAL Reliance*, EUR. PHARM. REV. (June 26, 2020), https://www.europeanpharmaceuticalreview.com/article/121766/the-impact-of-supply-chain-risks-and-lal-reliance/ (explaining that existence of the monopoly might hamper industry innovation and transition to animal-free alternatives).

121. 21 C.F.R. §§ 210.1–210.3 (2023).

122. 21 C.F.R. §§ 211.1–211.208 (2023).

123. 7 U.S.C. § 2143 (1985).

124. Eisner, *supra* note 3.

125. 7 U.S.C. § 2132(e) (2014).

126. 7 U.S.C. § 2132(g) (2014).

In sum, the federal government plays a peripheral role in regulating the biomedical use of horseshoe crabs. Though the FDA ensures the safety of the LAL test manufacturing process to benefit consumers, the federal government largely lets states take the lead when it comes to the harvest and handling of the bled horseshoe crabs through a cooperative federalism model.

B. Cooperative Federalism and Interstate Regulation

In contrast to the management of the LAL manufacturing process discussed previously, Congress has spoken more directly to the management of horseshoe crab fisheries. In 1993, Congress passed the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA or "Act")[127] with the stated purpose "to support and encourage the development, implementation, and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources."[128] More specifically, the Act charges NOAA Fisheries and United States Fish and Wildlife Service (USFWS) with "supporting the interstate fisheries management efforts of the Atlantic States Marine Fisheries Commission (ASMFC)."[129]

The ASMFC is an interstate compact predating the ACFCMA by over five decades.[130] The ASMFC member states recognized the need for "cooperative stewardship" when managing shared migratory fishery resources on the Atlantic seaboard.[131] As such, they formed the ASMFC in the 1940s before its approval by Congress in 1942.[132] Today, its member states are: Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida.[133] Despite the biomedical harvest of horseshoe crabs constituting "an unusual fishery, because the animals are not sold to be eaten," the industry's regulation still falls primarily to this ASMFC fishery management body.[134]

The 1993 ACFCMA created a cooperative federalism model for the management of many Atlantic fishery species. The Act directs ASMFC to "prepare and adopt coastal fishery management plans to provide for the

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127. 16 U.S.C. §§ 5101–5108 (2018); NOAA FISHERIES, ATLANTIC COASTAL FISHERIES COOPERATIVE MANAGEMENT ACT: FY 2017–2018 REPORT TO CONGRESS, 1 (2018) [hereinafter NOAA FISHERIES FY 2017–2018 REPORT].

128. 16 U.S.C. § 5101(b) (2018).

129. NOAA FISHERIES FY 2017–2018 REPORT, *supra* note 127, at 1.

130. *About Us*, ATL. STATES MARINE FISHERIES COMM'N, https://asmfc.org/about-us/program-overview (last visited Nov. 28, 2023).

131. *Id.*

132. *Id.*

133. *About Us, ASMFC Member States*, ATL. STATES MARINE FISHERIES COMM'N, http://www.asmfc.org/about-us/links (last visited Nov. 28, 2023).

134. Eisner, *supra* note 3.

conservation of coastal fishery resources," like the horseshoe crab, that the federal government then helps implement through enforcement, funding, and other means.[135] After the ASFMC adopts a fishery management plan for a given coastal fish "resource," member states implement and enforce the fishery management plan on the state level.[136] The ASMFC, in turn, annually reviews each state for fishery management plan compliance and reports its findings to the Secretary of Commerce.[137] Thus, through the ASFMC, states retain primary regulatory authority over commercial horseshoe crab industries—whether horseshoe crabs are harvested for bait or for bleeding.

FDA approval of LAL in 1983 drove increasing commercial use of horseshoe crabs, devastating migratory shorebird populations.[138] To address this issue, the ASMFC adopted the Horseshoe Crab Fisheries Management Plan (Horseshoe Crab FMP) in 1998.[139] The Horseshoe Crab FMP and its Addenda are the main regulations governing the commercial harvest of horseshoe crabs in the U.S. for bait and biomedical use. Despite the 1998 FMP's establishment of an annual biomedical mortality limit of 57,500 horseshoe crabs, this threshold has been exceeded every year since 2008.[140]

Pursuant to the ACFCMA, states must comply with specified ASMFC FMP regulations.[141] Currently the biomedical industry harvests horseshoe crabs in six states: Maryland, Massachusetts, New Jersey, Rhode Island, South Carolina, and Virginia.[142] First, the ASMFC requires states to issue special permits for the biomedical harvesting of horseshoe crabs.[143] Second, permit holders must return bled horseshoe crabs to the same state or federal waters from where they were collected.[144] Finally, states must monitor and report the following: the number of biomedically harvested horseshoe crabs, harvest-to-release mortality rate, [145] harvest method, harvested male-to-female ratio, bled horseshoe crabs' disposition, and condition of bled horseshoe crabs' holding environment prior to their release.[146] Notably, there is no requirement to report post-release numbers, where upper mortality rate estimates hover around 30%.[147]

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135. 16 U.S.C. § 5104(a)(1) (2018).
136. 16 U.S.C. § 5104(b)(1) (2018).
137. 16 U.S.C. § 5104(c) (2018).
138. Okun, *supra* note 4, at 205.
139. *Id.*
140. *Review of the Interstate Fishery Management Plan—Horseshoe Crab (Limulus Polyphemus): 2022 Fishing Year*, ATL. STATES MARINE FISHERIES COMM'N, 16 (Oct. 2023) http://www.asmfc.org/uploads/file/6539318aHSC_FMP_Review_FY2022.pdf.
141. 16 U.S.C. § 5104(a)(1) (2018).
142. *Best Management Practices*, *supra* note 118, at 3.
143. *Id.*
144. *Id.*
145. *Id.* at 5.
146. *Id.*
147. *See supra* note 96.

Federal agencies like NOAA Fisheries and USFWS fulfill their role in the ACFCMA cooperative federalism model by supporting ASMFC's Horseshoe Crab FMP through enforcement, funding, and other measures.[148] While some parts of the Horseshoe Crab FMP are mere suggestions for states, much of it is binding upon states under federal law.[149] A state's failure to comply with a fishery management plan allows the Secretary of Commerce to instate a moratorium on the subject fishery within the noncompliant state's waters.[150] In addition, federal agencies distribute funds to ASMFC member state fisheries to support their management programs; presumably, the federal government helps implement the ASMFC's Horseshoe Crab FMP through funding.[151]

The cooperative federalism model has prompted a few notable federal actions regarding horseshoe crab conservation. ASMFC recommended action to protect "local stocks" of horseshoe crabs and the declining population of migratory shorebirds relying on horseshoe crab eggs for sustenance.[152] Honoring the states' primary regulatory authority, in 2001, NOAA Fisheries created the Carl N. Shuster, Jr. Horseshoe Crab Reserve, which closed off 1,500 square nautical miles north of Delaware Bay to all horseshoe crab harvesting, including biomedical collection.[153] Responding to an August 2023 lawsuit brought by environmentalists, the USFWS banned horseshoe crab harvesting in the Cape Romaine National Wildlife Refuge during their spawning season to better protect the Rufa Red Knot.[154] Nevertheless, these federal limits on biomedical horseshoe crab harvesting, tailored to specific habitats or spawning periods, ignore the horseshoe crabs' interest to be free from human exploitation regardless of time or place. Instead, these protective measures serve as proxies for anthropocentric concerns, aiming to conserve natural resources like the threatened Rufa or the horseshoe crabs themselves for sustainable use.

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148. 16 U.S.C. §§ 5104–5106 (2018); NOAA FISHERIES, ATLANTIC COASTAL FISHERIES COOPERATIVE MANAGEMENT ACT: FY 2021-2022 REPORT TO CONGRESS 1 (2023), https://www.fisheries.noaa.gov/s3//2023-09/ACA-FY21-22-Report-combined-508compliant.pdf.

149. Okun, *supra* note 4, at 206.

150. 16 U.S.C. § 5106(c)(1) (2018).

151. *About Us*, *supra* note 130.

152. *Id.* (quoting Michelle Baldwin et al., *A Review of Developments in Ocean and Coastal Law 2000–2001*, 6 OCEAN & COASTAL L.J. 413, 429 (2001)).

153. Okun, *supra* note 4, at 211.

154. Victoria Hansen, *Federal Agency Limits Horseshoe Crab Harvesting in National Wildlife Refuge Near Charleston*, S.C. PUB. RADIO (Aug. 10, 2023, 2:50 PM), https://www.southcarolinapublicradio.org/sc-news/2023-08-10/federal-agency-limits-horseshoe-crab-harvesting-in-national-wildlife-refuge-near-charleston. However, the South Carolina Attorney General is challenging the federal agency's jurisdiction over the refuge and authority to ban the horseshoe crab harvest. *Horseshoe Crab Harvest Stopped in Cape Romain National Wildlife Refuge*, DEFENDERS OF WILDLIFE (Aug. 7, 2023), https://defenders.org/newsroom/horseshoe-crab-harvest-stopped-cape-romain-national-wildlife-refuge.

Last, but certainly not least, the ASMFC also recently promulgated non-binding Best Management Practices for Handling Horseshoe Crabs for Biomedical Purposes (BMP) in May 2023.[155] The ASMFC created the BMP "to recommend broadly applicable industry standards that are expected to minimize mortality and injury of horseshoe crabs associated with the biomedical process."[156] Among other suggestions, the BMP recommends keeping collected horseshoe crabs cool and moist, minimizing exposure to direct sunlight, avoiding overcrowding, handling them to minimize injury, ceasing blood collection once blood flow rate slows, and returning bled horseshoe crabs to the ocean as quickly as possible to minimize holding time.[157] The guidelines are not enforceable laws, and they are vague by design to help shield the industry from scrutiny.[158] However, some state fishery bodies, like Massachusetts of Marine Fisheries (Massachusetts DMF), have voluntarily codified the BMP through regulations.[159] The BMP claims its recommendations "represent standard practices used by the licensed manufacturers."[160] However, biomedical horseshoe crab industry participants "often disregard[]" the guidelines at every step of the process.[161] The BMP does not adequately address the absence of federally applicable animal welfare standards for horseshoe crabs collected and drained for biomedical purposes.

The cooperative federalism model, established by the ACFCMA and primarily carried out by the ASMFC, affirms state regulatory power over the horseshoe crab fishery. However, managing the horseshoe crab biomedical industry as a "fishery" inadequately protects horseshoe crabs as a species and as individuals. Both at the federal and state level, there are no binding regulations protecting horseshoe crab welfare during the invasive—and sometimes lethal—bleeding process.

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155. *Best Management Practices*, *supra* note 118, at 1–9.

156. *Id.* at 2.

157. *Id.*

158. Eisner, *supra* note 3 (describing a meeting where the best practices were being formulated, at which an industry participant stated that "if we give too much detail [in the guidelines], we're opening ourselves up for scrutiny").

159. Press Release, MASS. DEP'T OF FISH & GAME, Division of Marine Fisheries Announces New Conservation and Management Measures for the Commercial Horseshoe Crab Fishery, (Jul. 10, 2023), https://www.mass.gov/news/division-of-marine-fisheries-announces-new-conservation-and-management-measures-for-the-commercial-horseshoe-crab-fishery [hereinafter Press Release].

160. *Best Management Practices*, *supra* note 118, at 5.

161. Eisner, *supra* note 3.

C. Minor Variances in State Regulations

Under the ACFCMA cooperative federalism framework, the ASMFC first designs the Horseshoe Crab FMP.[162] Next, states implement that FMP within their borders, and finally, the federal government helps support and enforce the FMP.[163] Horseshoe crabs are currently harvested for biomedical use in six states.[164] Of those six, Massachusetts uniquely administers a "rent a crab program" where harvesters collecting horseshoe crabs under bait permits can "lease" captured crabs to a biomedical facility before returning them to the bait market.[165] For these horseshoe crabs, their last moments alive will consist of being seized from their habitats, stabbed, and siphoned of their blood, then killed to be sold as bait.[166]

Some states, like South Carolina in 1991 and New Jersey in 2008, have completely banned harvesting horseshoe crabs for bait, but allow biomedical harvesting to continue in their waters.[167] In August 2023, Connecticut went a step further.[168] The state passed a total ban on harvesting horseshoe crabs and their eggs.[169] Similarly, the New York legislature passed a landmark bill prohibiting all commercial and biomedical harvesting in the state in July 2024.[170] The drafters cited the species' imperiled "unique ecological role" as justification for the measure.[171] As of September 2024, the legislation still awaits the Governor's signature.[172] However, the Connecticut law and New York bill's impact on horseshoe crabs appears negligible, given the historical lack of biomedical harvesting in these states.[173] At the very least, however,

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162. Okun, *supra* note 4, at 205–06.

163. *Id.* at 205–13.

164. *Best Management Practices*, *supra* note 118, at 3.

165. Memorandum from Daniel J. McKiernan, Mass. DMF Director, to MASS. MARINE FISHERIES ADVISORY COMM'N (Feb. 8, 2023), https://www.mass.gov/doc/2023-dmf-horseshoe-crab-memo/download.

166. *See* Moran, *supra* note 97 (noting that bait use of horseshoe crabs results in 100% mortality).

167. Deborah Cramer, *When the Horseshoe Crabs are Gone, We'll Be in Trouble*, N. Y. TIMES (Feb. 16, 2023), https://www.nytimes.com/2023/02/16/opinion/drug-safety-horsehoe-crab.html.

168. Tricia Ennis, *Harvesting Horseshoe Crabs is Now Illegal in Connecticut*, INSIDE INVESTIGATOR (Aug. 11, 2023), https://insideinvestigator.org/harvesting-horseshoe-crabs-is-now-illegal-in-connecticut/.

169. CONN. GEN. STAT. ANN. § 26-292d (2023).

170. S.B. S3185--A, 2023–2024, 638 Legis. Sess. (N.Y. 2023).

171. *Id.*

172. *Id.*

173. Before Connecticut and New York progressed on their harvesting ban laws, ASMFC published a report listing the six states hosting biomedical collection of horseshoe crabs. Connecticut and New York were not among them. *See Best Management Practices*, *supra* note 118, at 3. Further, a survey of ASMFC Horseshoe Crab FMP Reviews from the past decade (2014–22) demonstrates that Connecticut and New York were consistently exempted from the biomedical harvest reporting required of states permitting biomedical harvest per FMP Addenda III. Each of the eight annual reviews designate the biomedical harvesting requirement to be "not applicable" to Connecticut and New York

these states are taking a step in the right direction. By flatly prohibiting the horseshoe crab harvest, they preemptively prevent the biomedical industry from establishing a foothold within their waters. At bottom, no state actively facilitating the biomedical horseshoe crab trade has outright banned the harvesting practice.[174]

Where the biomedical harvesting of horseshoe crabs persists, states must issue special harvesting permits as required under the ASMFC Horseshoe Crab FMP—separate from those permits issued for bait harvesting.[175] States are free to attach more stringent permit restrictions beyond those mandated by the Horseshoe Crab FMP. For example, Rhode Island requires biomedical horseshoe crabs to be returned to the waters from which they were taken within 72 hours of their bleeding.[176] However, enforcement is a separate issue. If violated, Rhode Island may revoke the holder's biomedical harvesting permits for, at most, the current and subsequent year.[177] Virginia requirements go beyond the Horseshoe Crab FMP, mandating that owners of biomedical facilities participate in the state's tagging program to evaluate the post-release mortality of bled horseshoe crabs.[178] Typically, state regulations do not stray far from one another or the Horseshoe Crab FMP—and certainly not with regards to affording greater welfare protections to the horseshoe crabs exploited for biomedical use within their borders.

However, in July 2023, Massachusetts DMF implemented the country's "first-ever biomedical harvest quota" of 200,000 horseshoe crabs per year, to cap total harvest and mortality across both bait and biomedical industries.[179] Massachusetts distributes this quota equally among active biomedical processors, but the previous year's biomedical harvest—

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for the relevant year. ATL. STATES MARINE FISHERIES COMM'N, ADDENDUM III TO THE INTERSTATE FISHERY MANAGEMENT PLAN FOR HORSESHOE CRAB 7 (2024), http://www.asmfc.org/uploads/file//56d7670dAddendumIII.pdf (imposing monitoring and reporting requirements on states facilitating biomedical harvesting). All ASMFC Horseshoe Crab FMP Reviews are available for download at ATL. STATES MARINE FISHERIES COMM'N, *Horseshoe Crab*, http://www.asmfc.org/species/horseshoe-crab. *See also* CITIZENS CAMPAIGN FOR ENV'T, *Protect Horseshoe Crabs Before It's Too Late* (June 20, 2024), https://www.citizenscampaign.org/whats-new-at-cce/protect-horseshoe-crabs-before-its-too-late (stating New York has not issued biomedical harvest permits in "over a decade"). One final note: Even if harvesters illicitly collected horseshoe crabs for biomedical use in Connecticut, the state ban's efficacy is doubtful. Violations rack up a measly $25 fine per unlawfully harvested "specimen." CONN. GEN. STAT. ANN. § 26-292d. The New York bill lacks any penalty provision whatsoever. N.Y. S.B. S3185–A.

174. Cramer, *supra* note 167.

175. *Best Management Practices*, *supra* note 118, at 4.

176. 250 R.I. CODE R. 90-00-5.7(C)(2)(c)(1) (2023).

177. 250 R.I. CODE R. 90-00-5.7(C)(2)(c) (2023).

178. 4 VA. ADMIN. CODE § 20-900-35(G) (2023) (supporting that such tagging programs are voluntary.) *See, e.g.*, *Horseshoe Crab Cooperative Tagging Program*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/project/horseshoe-crab-cooperative-tagging-program (last visited Nov. 29, 2023) (describing the voluntary federal horseshoe crab tagging program).

179. Press Release, *supra* note 159.

175,000—undercuts the quota's significance.[180] That is, the quota does not set a meaningful limit on biomedical use; it still allows for increased biomedical harvest over the current baseline.[181] In addition, Massachusetts DMF formally codified the otherwise non-binding ASMFC BMP in its regulations, and began requiring "daily reporting by all commercial harvesters to improve accountability and prevent quota overages." [182] Massachusetts DMF's new regulations increase transparency and accountability within a biomedical industry that has been described as a "black box of information."[183] However, Massachusetts DMF enacted these measures to "eliminate[] the potential for uncontrolled growth in the biomedical fishery, which could negatively impact the resource moving forward."[184] Thus, these regulations maintain an anthropocentric framework under which horseshoe crabs continue to be viewed as a "resource" to be conserved and managed for human benefit.

In April 2024, responding to public outcry about unsustainable harvesting of breeding horseshoe crabs, Massachusetts DMF promulgated regulations prohibiting the harvest of horseshoe crabs for both bait and biomedical use during the animals' spawning season. [185] Although a commendable step, the harvesting ban was not motivated by concern for the animals' inherent right to live free of human exploitation, but by a desire to efficiently manage a fishery resource for sustainable use. Massachusetts DMF's director stated that the agency focuses on conserving fisheries, and the spawning closures intend to "sustain[] [horseshoe crab] populations into the future."[186] But for whom? It is certainly not horseshoe crabs in their own right. Massachusetts DMF serves the recreational and commercial fishing industries—not the fished.[187] Even the group that spearheaded the advocacy for the spawning ban noted, while announcing its victory, that they will "keep fighting for stronger protections until shorebirds can once again feed on horseshoe crab eggs at beaches all over Massachusetts."[188] The horseshoe crab is, once again, missing.

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180. Press Release, *supra* note 159.

181. *Id.* (noting that the biomedical use quota is offset through a reduction—of 25,000 horseshoe crabs—in the state's bait crab quota).

182. *Id.* at 2.

183. Eisner, *supra* note 3.

184. Press Release, *supra* note 159.

185. 322 Mass. Code Regs. § 6.34(3)(b); *See also* MASS. AUDUBON*, We Won! Harvest of Spawning Horseshoe Crabs Banned in Massachusetts* (Mar. 22, 2024), https://www.massaudubon.org/news/latest/we-won!-harvest-of-spawning-horseshoe-crabs-banned-in-massachusetts (last visited May 23, 2024) (detailing, in brief, the history of the campaign that contributed to stronger regulations on horseshoe crab harvesting in Massachusetts) [hereinafter MASS. AUDOBON].

186. Moran, *supra* note 97.

187. Press Release, *supra* note 159.

188. MASS. AUDUBON, *supra* note 185.

Without a doubt, Massachusetts stands out in its implementation of biomedical regulations that surpass ASMFC FMP requirements and codifying the otherwise unenforceable BMP.[189] Though these welfarist measures better protect the well-being of horseshoe crabs within Massachusetts' borders, they remain anthropocentric and fail to fundamentally challenge the biomedical exploitation of these creatures. Massachusetts is more concerned with ensuring the sustained exploitation of horseshoe crabs as a fishery resource rather than safeguarding these animals' interest in avoiding capture, bleeding, and death for human benefit. Especially given that there exists an animal-free alternative to the LAL test, there should be a stronger push to replace, rather than refine, the biomedical use of horseshoe crabs. This shift would challenge the prevailing anthropocentric regulations and policies related to the biomedical horseshoe crab industry.

IV. REPLACING BIOMEDICAL HORSESHOE CRAB USE WITH AN EXISTING ANIMAL-FREE ALTERNATIVE: THE RFC TEST

The Reduction, Refinement, and Replacement (3Rs) framework, internationally accepted for governing "ethical" animal-dependent science, emphasizes reducing, refining, and replacing animal use "where possible."[190] Oftentimes, this triad of objectives are pursued simultaneously.[191] However, unlike many other instances of animal-based science and research, an available alternative to the horseshoe crab-dependent LAL test currently exists: the recombinant factor C (rFC) test.[192] This section first describes the development of the rFC test and explains the recently overcome bureaucratic roadblocks hindering widespread adoption of rFC for endotoxin testing within the U.S. biopharmaceutical industry.[193] Next, this section argues that due to an existing animal-alternative, efforts to improve horseshoe crab welfare should focus solely on replacing the LAL test with this alternative, rather than concurrently advocating for reduction or refinement—which risks legitimizing anthropocentricism and further entrenching the biomedical horseshoe crab industry.[194]

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189. Press Release, *supra* note 159.

190. Melanie L. Graham & Mark J. Prescott, *The Multifactorial Role of the 3RS in Shifting the Harm-Benefit Analysis in Animal Models of Disease*, 759 EUR. J. PHARMACOLOGY 19, 19 (2015).

191. *See* Paolo Verderio et al., *3Rs Principle and Legislative Decrees to Achieve High Standard of Animal Research*, 13 ANIMALS 277, 277 (2023) (explaining that the 3Rs principle requires a researcher to pay attention to all three prongs when planning an animal experiment).

192. Maloney et al., *supra* note 63, at 6.

193. *Id.* at 2.

194. In contrast, many other environmental or wildlife advocacy groups adopt the traditional 3Rs framework in their approach to the biomedical use of horseshoe crabs. For example, the Horseshoe Crab

A. Regulatory Roadblocks of rFC Development

In the 1990s, scientists synthesized a protein called rFC that can detect endotoxins, similar to the horseshoe crab blood-derived LAL.[195] Despite rFC's commercial availability since 2003, it has yet to displace the LAL test in the U.S.[196] Initially, concerns over its efficacy or a lack of data hindered the widespread adoption of this animal-free alternative for many years.[197] However, a 2018 review of multiple studies concluded that rFC tests identify endotoxins "equivalent to or better than LAL," and that rFC shows "strong efficacy across a range of uses and demonstrated high sensitivity [and] strong reliability."[198]

Notwithstanding the scientific community's endorsement of the rFC test's efficacy, U.S. pharmaceutical companies remain unlikely to switch over to the animal-free alternative. However, change appears to be just around the corner. All FDA-approved drugs must undergo endotoxin testing due to the significant public health concerns posed by these contaminants.[199] Naturally, biopharmaceutical manufacturers prioritize selecting a reliable and affordable endotoxin detection method to ensure product safety and obtain FDA approval for their products.[200] The intense federal regulation of endotoxin testing disincentivizes pharmaceutical manufacturers from innovating and deviating from recognized and tested methods.[201]

The FDA relies on the scientific nonprofit U.S. Pharmacopeia (USP) to develop national quality standards for pharmaceuticals.[202] As of September

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Recovery Coalition, which is "dedicated to ensuring the future of the American Horseshoe Crabs." *Our Goals*, HORSESHOE CRAB RECOVERY COAL., https://hscrabrecovery.org/goals/ (last visited May 23, 2024). While the coalition seeks to speed up adoption of synthetic alternatives to the LAL test, it also advocates for ending the harvest of *female* horseshoe crabs (but not male) so that their eggs can sustain other wildlife populations and *reforming* (but not ending) the horseshoe crab bleeding industry to require transparency and reduce mortality to zero. *Id.* These measures condone the *refinement* and *reduction* of the biomedical horseshoe crab industry, and therefore the industry's endurance. *Id.*

195. Maloney et al., *supra* note 63, at 2–3. Interestingly, a University of Pennsylvania Student, Aravind Krishnan, is developing a plant-based technology that might serve as an additional LAL test alternative. Dubbed "ToxiSense," the technology relies on a plant that, like horseshoe crab blood, reacts to endotoxins. Zoë Read, *'Blue-Blood' Horseshoe Crabs Suffer from Commercial Bloodletting. One Penn Student Says He Has an Answer*, NJ SPOTLIGHT NEWS (Mar. 28, 2024), https://www.njspotlightnews.org/2024/03/horseshoe-crabs-suffer-from-commercial-bloodletting-this-student-is-developing-an-alternative/ (last visited May 23, 2024).

196. Maloney et al., *supra* note 63, at 4, 6.

197. *Id.*

198. *Id.* at 4–5.

199. *Id.* at 2.

200. *Id.* at 6.

201. *Id.*

202. *Legal Recognition—Standards Categories*, USP, https://www.usp.org/about/legal-recognition/standard-categories (last visited Nov. 29, 2023); *USP and FDA Working Together to Protect Public Health*, USP, https://www.usp.org/public-policy/usp-fda-roles (last visited Nov. 28, 2023). In fact,

2024, U.S. biopharmaceutical companies that use a LAL alternative still must expend greater resources during the FDA approval process.[203] They must undergo a more burdensome and expensive process to validate their use of rFC in contrast to the "streamlined method of verification" for those means already endorsed by USP.[204] This extra regulatory hurdle discourages pharmaceutical companies from using available animal-free alternatives like rFC.[205] Casting itself as an "industry leader," Eli Lilly began transitioning to rFC in 2016 and currently tests 80% of its medicines using rFC rather than LAL.[206]

B. USP Approval of rFC

In August 2023, the USP Microbiology published a proposal on using animal-free alternatives, which included the rFC test and other similar synthetic reagents, in addition to current methods for endotoxin testing.[207] A year later, on July 26, 2024, USP finally approved the inclusion of these alternative endotoxin detection methods in the USP compendia via Chapter <86>.[208] The USP announced that this update to the USP compendia aligned with the organization's "commitment to expanding the use of animal-free methods and materials."[209] Prior to July 2024, the live rabbit and LAL tests were the only USP-endorsed methods of endotoxin testing in the U.S.[210] However, these animal-free endotoxin tests will merely supplement, not replace, Chapters <85> and <151> of the USP compendia, which respectively reflect USP endorsement of the horseshoe crab-derived LAL test and live rabbit-reliant pyrogen test.[211] USP will publish Chapter <86> for

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USP "sets standards for drug manufacturing in 150 countries." Freda Kreier, *Is an End to Using Imperiled Horseshoe Crabs for U.S. Drug Testing in Sight*, SCI. (Aug. 25, 2023), https://www.science.org/content/article/end-using-imperiled-horseshoe-crabs-u-s-drug-testing-sight (last visited Nov. 29, 2023).

203. Maloney et al., *supra* note 63, at 6.

204. *Id*.

205. *Id*.

206. Eli Lilly, *Sustainability Report: Biodiversity*, 42 (2023), https://sustainability.lilly.com/environmental/biodiversity (last visited Sept. 26, 2024).

207. *Expert Committee Proposes Chapter for Endotoxin Testing Using Non-Animal Derived Reagents*, USP (Aug. 22, 2023), https://www.usp.org/news/expert-committee-proposes-chapter-for-endotoxin-testing-using-non-animal-derived-reagents. This was not the first effort by USP to approve animal-free endotoxin tests. Two previous proposals were rejected due to insufficient data and committee infighting. Kreier, *supra* note 202; Cramer, *supra* note 167.

208. *Expert Committee Proposes Chapter for Endotoxin Testing Using Non-Animal Derived Reagents*, *supra* note 207.

209. *Id.*

210. Okun, *supra* note 4, at 200.

211. *Bacterial Endotoxin Test*, USP-NF/PF (May 1, 2018), https://online.uspnf.com/uspnf/document/1_GUID-F9D9BFA5-099F-452C-9711-47674B37C1CC_2_en-US; *Pyrogen Test*, USP-NF/PF (May 1, 2017),

early adoption in November 2024 and officially add it to the USP compendia in May 2025.[212]

Once USP formally includes rFC in the USP compendia, it is likely that the FDA will no longer require additional validation for biopharmaceutical manufacturers' use of rFC for endotoxin detection.[213] USP's approval effectively provides guidance that "will help place recombinant testing on equal footing with LAL."[214] Thus, biopharmaceutical companies will be more apt to transition to a horseshoe crab-free alternative when testing their medical drugs and devices for endotoxins.[215] However, placing rFC "on equal footing" as the LAL test fails to absolve us of our moral obligations owed towards horseshoe crabs.

V. RECOMMENDATIONS: DISRUPTING ANTHROPOCENTRICISM BY REPLACING LAL WITH RFC

Horseshoe crabs have an intrinsic interest in avoiding human exploitation, and their biomedical use blatantly violates this principle and upholds anthropocentricism. Particularly in light of rFC's pending approval, USP or government actors should implement measures strongly incentivizing drug manufacturers to fully replace LAL endotoxin testing with existing and reliable animal-free alternatives. Such affirmative means are preferable to merely allowing market forces to promote change, which reinforces anthropocentric logic.

A. Request USP Retract Its Endorsement of LAL

The approved chapter merely sets out "additional techniques" for endotoxin testing, namely, the LAL test laid out in Chapter <85>.[216] When announcing rFC's approval, USP makes it clear that "[m]anufacturers that currently use [LAL] for endotoxin testing can continue to do so and Chapter <86> has no impact on them."[217] The compendia update falls short of

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https://online.uspnf.com/uspnf/document/1_GUID-162C7E78-8A02-4423-970C-5DF047F57DC2_1_en-US.

212. *Expert Committee Proposes Chapter for Endotoxin Testing Using Non-Animal Derived Reagents*, *supra* note 207.

213. *See Guidance for Industry Pyrogen and Endotoxins Testing: Questions and Answers*, *supra* note 116, at 5 (noting that manufacturers using alternatives endotoxin methods "to those *in a USP compendial article*" must undergo additional validation measures) (emphasis added).

214. *Horseshoe Crab Recovery Coalition Celebrates U.S. Pharmacopeia Recognition of Synthetic Alternatives to Horseshoe Crab Blood*, HORSESHOE CRAB RECOVERY COAL. (July 27, 2024), https://hscrabrecovery.org/wp-content/uploads/2024/07/HCRC.USP_.pdf.

215. *Id.*

216. *Expert Committee Proposes Chapter for Endotoxin Testing Using Non-Animal Derived Reagents*, *supra* note 207.

217. *Id.*

mandating the complete replacement of the LAL test with animal-free alternatives. Instead, it condones the continued use of LAL, despite the LAL test's anthropocentric undergirding and severe negative impact on horseshoe crabs. In short, USP's guidelines fail to meaningfully encourage U.S. biopharmaceutical companies to transition away from LAL, and it is likely that the FDA will uncritically adopt USP's approach.[218]

Instead of approving synthetic reagents like rFC in addition to LAL, USP should instead remove LAL from the USP compendia to better align with its stated objective of "expanding the use of animal-free methods and materials."[219] In addition, the FDA should update its industry guidance for endotoxin testing to include rFC as an approved endotoxin test, subject to the same verification method that the LAL test has long benefited from. In its guidance, the FDA should put forth a recommendation, albeit nonbinding, that the industry transition away from LAL to rFC endotoxin testing. These measures would, in effect, turn the current regime on its head—switching out the long-held inferior status of animal-free endotoxin tests like rFC and the horseshoe crab-dependent LAL test. Biopharmaceutical manufacturers that use USP-endorsed toxicity tests during the FDA product-approval process save significant time and resources. By not only approving rFC but also delisting LAL, USP could create extra regulatory and financial hurdles for biopharmaceutical companies continuing to use LAL endotoxin testing. This would nudge the industry toward animal-free alternatives while avoiding harsher top-down measures (like an outright federal LAL ban) that would be more vulnerable to backlash.

B. Extend ESA Protections to Horseshoe Crabs

The federal government should also leverage the ESA to strongarm the industry into transitioning to animal-free endotoxin methods. As expressed by the Supreme Court, the ESA "represent[s] the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[220] While indisputably grounded in anthropocentric values,[221] the ESA can shield wildlife from human greed and exploitation. In the case of horseshoe crabs, an ESA listing could hasten the biomedical industry's adoption of rFC.

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218. *See* Candau-Chacon, *supra* note 113, at 20, 22 (demonstrating influence of USP compendia on FDA's regulatory approach to endotoxin testing).

219. *Expert Committee Proposes Chapter for Endotoxin Testing Using Non-Animal Derived Reagents*, *supra* note 207.

220. Tenn. Valley Auth. v. Hill, 437 U.S. 153, 180 (1978).

221. 16 U.S.C. § 1531(a)(3) (justifying the ESA on the basis that endangered and threatened "species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value *to the Nation and its people*") (emphasis added).

The ESA authorizes federal wildlife services to protect "any subspecies of fish or wildlife," (which expressly includes arthropods) that are endangered or threatened.[222] NOAA Fisheries is responsible for most marine species, while USFWS implements the ESA for terrestrial and freshwater species.[223] When determining whether a species warrants listing, the statute requires the services evaluate the following five factors: (1) "the present or threatened destruction, modification, or curtailment of its habitat or range;" (2) "overutilization for commercial, recreational, scientific, or educational purposes;" (3) "disease or predation;" (4) "the inadequacy of existing regulatory mechanisms;" and (5) "other natural or manmade factors affecting its continued existence."[224]

The ESA affords listed species robust protections. Crucially, ESA § 9 prohibits the "take" of endangered species from the wild.[225] Here, "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[226] Regulations extend the "take" prohibition to most threatened species as well.[227]

NOAA Fisheries retains the authority to list horseshoe crabs under the ESA, and these creatures certainly merit either an endangered or threatened listing.[228] Various advocacy groups have already petitioned NOAA Fisheries to list the horseshoe crab. Friends of Animals filed their petition in December 2023, while a broader CBD-led coalition of animal and environmental groups filed theirs in February 2024.[229] Notwithstanding NOAA Fisheries' statutory obligation to respond to petitions within 90 days (at least "[t]o the maximum extent practicable"[230]), both petitions remain pending as of September 2024.[231]

CBD's petition compellingly presents data supporting the species listing, with an emphasis on the following statutory considerations: (1) the present or threatened destruction, modification, or curtailment of the horseshoe

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222. 16 U.S.C. §§ 1532(8), (16), 1533. "Endangered species" are those "in danger of extinction throughout all or a significant portion of its range," while "threatened species" are those "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. §§ 1532(6), (20).

223. NOAA, *Endangered Species Conservation: ESA Implementation*, https://www.fisheries.noaa.gov/topic/endangered-species-conservation/endangered-species-act-implementation (last visited Sept. 26, 2024).

224. 16 U.S.C. § 1533(a)(1)(A)–(E).

225. 16 U.S.C. § 1538(a)(1)(B).

226. 16 U.S.C. § 1532(19).

227. 50 C.F.R. § 17.31(a).

228. *See Endangered Species Conservation: ESA Implementation*, *supra* note 223.

229. NOAA, *Petitions Awaiting 90-Day Findings*, https://www.fisheries.noaa.gov/national/endangered-species-conservation/petitions-awaiting-90-day-findings (last visited Sept. 26, 2024).

230. 16 U.S.C. § 1533(b)(3)(A).

231. *Petitions Awaiting 90-Day Findings*, *supra* note 229.

crabs' habitat or range; (2) the overutilization for commercial purposes, particularly by the biomedical industry; (3) the inadequacy of existing regulatory mechanisms; and (4) other factors affecting the species' continued existence, such as climate change.[232] With the listing process already set in motion and the best available science conveniently compiled before it by the petitioners, [233] NOAA Fisheries must extend the ESA's protections to horseshoe crabs before it is too late.

By listing horseshoe crabs pursuant to the ESA, the federal government could undercut the biomedical industry's unjustified reliance on LAL for endotoxin detection. The ESA's blanket prohibition on the "take" of listed species would surely prevent the devastating collection and bleeding of horseshoe crabs. While the ESA allows exceptions for educational, scientific, and incidental take, the biomedical use of horseshoe crabs does not appear to fall under any of these categories.[234] By listing horseshoe crabs as either threatened or endangered and thereby prohibiting their "take," NOAA Fisheries could—and should—implement an immediately enforceable federal ban on their biomedical harvest. This would force the industry to rapidly transition to animal-free endotoxin methods like rFC.

C. Push for State Harvesting Bans

Under the cooperative federalism framework governing fishery management, states can leverage their primary regulatory authority to drive change by imposing blanket bans on horseshoe crab harvesting for biomedical use within their waters. For the six states steadfastly engaged in biomedical harvesting and others along the Atlantic coast, state legislatures should implement similar bans to those passed in Connecticut and sitting before New York's governor.

Some states can build upon existing efforts to protect horseshoe crabs by completely outlawing harvesting in their waters. South Carolina and New Jersey, which already prohibit bait harvesting, should expand their bans to encompass biomedical harvesting. Finally, in the wake of rFC's recent approval by USP, Massachusetts should replace its newly enacted biomedical

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232. CTR. FOR BIOLOGICAL DIVERSITY, *supra* note 101, at 54–120.

233. *Id.* at 3.

234. 16 U.S.C. § 1539(a)(1)(A)–(B). Although the biomedical use of horseshoe crabs could arguably fall within the "scientific purposes" exception to unlawful take, a distinction can be drawn between biomedical purposes as opposed to scientific purposes. Even if the biomedical use of horseshoe crabs *could* be exempted, NOAA Fisheries would retain *discretion* over whether to permit such scientific take. 16 § U.S.C. § 1539(a)(1). Hopefully, should horseshoe crabs achieve listing status, the existence of a USP-approved animal-free alternative to LAL would deter NOAA Fisheries from permitting any biomedical harvest to continue. *See also* Ghubril, *supra* note 95, at 298–301 (arguing listing horseshoe crabs under ESA would cause "production of LAL [to] cease").

harvesting quota with an outright ban on the practice. Legislatures in other states bordering horseshoe crab habitat should initiate similar bans.

While state-by-state efforts may curb the biomedical exploitation of horseshoe crabs within their borders, this approach risks reinforcing the ineffective patchwork of regulations that has long plagued the industry. Without uniform regulations, some states—including those along the Eastern seaboard that currently do not facilitate any biomedical harvest—stand to benefit economically by attracting more harvesting activity as others impose stricter protections. That is, states that resist bans could see increased biomedical harvesting in their waters, to the detriment of horseshoe crabs and their interests.

D. A Method of Last Resort: Leave it to the Market

If the above three measures fail, the subsequent challenge will be convincing the biopharmaceutical industry to uniformly shift from LAL to non-animal-derived toxicity tests without external pressure from either USP or the government. Though the ultimate goal is complete replacement, even a gradual transition driven by market changes would decrease demand for horseshoe crab blood and potentially undermine the biomedical horseshoe crab industry. Already, rFC pricing "is competitive with horseshoe crab-derived products and . . . likely to become even more advantageous [as] new suppliers enter[] the field."[235] The FDA's position that it will not license rFC suppliers, unlike LAL where only five suppliers are federally licensed,[236] also encourages healthy market competition that will further drive down rFC costs.[237]

On the bright side, biopharmaceutical industry leadership appears open to converting to animal-free endotoxin testing due to the potential for financial savings once USP approval removes bureaucratic barriers.[238] Yet, relying solely on market forces to drive change presents a drawback: the transition will likely be slow and motivated primarily by a desire to cut costs. The interests of horseshoe crabs are conspicuously absent—lost in the shadows of profit margins.

In sum, with USP's pending finalization of rFC standards in 2025, the biopharmaceutical industry must completely replace LAL with animal-free endotoxin testing. Ideally, USP can incentivize this shift by withdrawing its endorsement of LAL. Alternatively, NOAA Fisheries could list horseshoe

235. Maloney et al., *supra* note 63, at 7.

236. *Best Management Practices*, *supra* note 118, at 3.

237. Candau-Chacon, *supra* note 113, at 31.

238. *See* Maloney et al., *supra* note 63, at 7–8 ("rFC presents potential cost savings, and these are expected to become more significant now that patent protections have expired and more rFC manufacturers are expected to enter the market").

crabs pursuant to the ESA and effectively make the biomedical industry's "take" of horseshoe crabs in all federal waters unlawful. This would force a rapid industry-wide adoption of rFC. At a minimum, states should enact biomedical harvesting bans and take a clear stance to protect horseshoe crabs in their waters. Absent these top-down measures, market dynamics will likely promote a gradual industry shift. However, allowing the anthropocentric desire to cut costs to drive the replacement of LAL neglects our ethical duty to recognize the interests of horseshoe crabs and accelerate the shift via affirmative means.

As a team of scientists imploring an industry-wide transition to animal-free endotoxin testing methods stated, "[t]he move from rabbits to crabs occurred in the late 1970s; it is now time for the industry to modernize its methods and embrace a more humane and ecologically sustainable method of endotoxin testing."[239] This time, instead of merely changing the species and method of animal use, a transition to animal-free endotoxin testing like rFC fundamentally disrupts the anthropocentric assumption that animals can be harmed and exploited for toxicity testing. Mere refinement of the innately cruel, anthropocentric, exploitative, and wholly unnecessary biomedical horseshoe crab industry is insufficient. Rapid replacement of the antiquated horseshoe crab-derived LAL test is presently feasible and ethically mandatory.

CONCLUSION

Ever since scientists discovered the unique endotoxin-detecting properties of horseshoe crab blood during the late 20th century, the assumption that these prehistoric creatures can be used, abused, and drained of their blood for human benefit has rarely been questioned. Existing regulations remain hopelessly anthropocentric and insufficient in addressing the animal welfare concerns implicated in the multi-million-dollar industry that is raking in—quite literally—blood money.

We are fortunate that the biomedical exploitation of horseshoe crabs presents no ethical quagmire pitting the interests of humans against those of animals, which then must be balanced to arrive at an imperfect compromise. Here, humans can both forgo animal exploitation *and* continue advancing biomedical objectives. We already possess an animal-free alternative that is commercially available and as effective as the LAL test at detecting endotoxins. Although USP's recent approval of alternatives may spur widespread LAL replacement, USP and government actors should assume a

239. Maloney et al., *supra* note 63, at 7.

greater role in compelling industry-wide abandonment of LAL to adequately safeguard horseshoe crabs' interests.

For too long, we have forcibly extracted blue blood from live horseshoe crabs, and from that blood, we have developed countless life-saving medicines for human benefit. Now we have the opportunity to respond in kind—though unlike these living fossils (which are now dying), we have the distinct luxury of agency over the matter. Let us not squander this privilege, or this power. We gave horseshoe crabs no choice but to relinquish their blue blood. We, however, can choose to save the lives and honor the interests of these ancient mariners.

CONSERVATION GERRYMANDERING

*Avery E. Emery**

ABSTRACT

In 2022, in response to degrading habitats and species extinction caused by human activities, the international community pledged to protect 30% of Earth's land and waters by 2030. On its face, this pledge is intuitive; human activity is destroying the land and polluting the water, so the "natural" must be protected from the "human." But this conservation model is flawed. The underlying premise—gerrymander nature into its own discreet areas to save it from humanity—erases millennia of Indigenous practices that shaped and reshaped our environment. The forced relocation of Indigenous groups from their lands threatens the biodiversity of the areas that NGOs and nation-states seek to protect. More importantly, this expulsion is a human rights violation. Protecting 30% of the planet within six years without rethinking old conservation strategies would lead to unimaginable human suffering. This Comment blends biodiversity literature that is increasingly critical of 19th and 20th century conservation practices with a discussion of these methods as a modern form of colonialism. In doing so, it advocates for a new vision of conservation that centers sovereignty of Indigenous peoples and the wisdom of their practices: Indigenous Protected and Conserved Areas.

INTRODUCTION

Human activities including agriculture, overfishing, and mining have wiped out roughly 20% of the biodiversity in many of the planet's large habitats.[1] At the same time, species like the Bengal tiger face extinction because they cannot adapt to a changing climate and the resulting loss of the ecological niche they evolved to inhabit.[2] While the mass extinction of so many species is itself unconscionable, this loss will exacerbate the effects of human-caused climate change worldwide. For example, each additional acre of deforestation in the Amazon will lead to a corresponding decrease in biodiversity. Likewise, deforestation will decrease the world's largest forest's ability to capture carbon dioxide from the atmosphere, thus aggravating the climate crisis.

In response to this biodiversity crisis, the international community agreed in late 2022 to conserve 30% of the world's land and water by 2030.[3] This goal of "30x30" falls short of the goal set by the biologist E.O. Wilson. Wilson's 2016 book "Half-Earth" called for half of the planet's land and water to be set aside and conserved to protect it from humans. Wilson explained this ambitious goal by invoking the practice of gerrymandering—drawing voting district boundaries in contorted shapes to strengthen the electoral power of one political party or racial group over another—as a "fruitful technique."[4] One of the common tactics of gerrymanderers is to "pack" as many of their opponents into one district as possible, limiting their ability to win elections in other districts. Rather than packing supporters of a party or members of a particular racial group into a district, these "conservation gerrymanderers" seek to pack nature into reserves.

Despite good intentions, these conservation goals have been met with alarm from some Indigenous peoples and their allies as potential harbingers

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1. Brad Plumer, *Humans Are Speeding Extinction and Altering the Natural World at an 'Unprecedented' Pace*, N.Y. TIMES (May 6, 2019), https://www.nytimes.com/2019/05/06/climate/humans-are-speeding-extinction-and-altering-the-natural-world-at-an-unprecedented-pace.html.

2. *Id.*

3. Justine Calma, *Nearly Every Country on Earth Just Agreed to Protect 30 Percent of the Planet*, THE VERGE (Dec. 19, 2022), https://www.theverge.com/2022/12/19/23516592/united-nations-biodiversity-conference-framework-protected-areas-30.

4. Kara Manke, *Naturalist E.O. Wilson on the Fight to Save Half the Planet for Wildlife*, BERKELEY NEWS (Oct. 3, 2019), https://news.berkeley.edu/2019/10/03/naturalist-e-o-wilson-on-the-fight-to-save-half-the-planet-for-wildlife.

of human rights abuses.[5] Achieving the 30x30 goal requires scaling up the number of areas protected; as of 2021, conserved areas encompass roughly 17% of land and inland water ecosystems and less than 8% of coastal ecosystems and the ocean.[6] Governments achieved previous conservation goals through forcibly relocating the people who inhabited and stewarded the land for generations.[7] Using the same strategies to achieve the 30x30 goal would mean mass displacement of Indigenous peoples worldwide. But Indigenous leadership and knowledge are critical to effective conservation.[8]

This article neither rejects the importance of conservation nor advocates for a "new conservation" framework primarily concerned with continued economic development.[9] Instead, it advocates for a new conservation framework that prioritizes the human rights, sovereignty, and traditional practices of Indigenous peoples as the most effective way to promote biodiversity. This article begins by introducing a model of conservation that this article calls conservation gerrymandering, and the critiques of this model's ability to foster biodiversity. Following this discussion, the article calls attention to the human rights abuses Indigenous peoples have suffered in the name of conservation. The article concludes by calling for the adoption of Indigenous Protected and Conserved Areas—a conservation framework founded upon respect for Indigenous peoples and the knowledge that they embody.

I. THE BIODIVERSITY PROBLEMS WITH CONSERVATION GERRYMANDERING

The United States developed what has become the most common conservation model worldwide, best exemplified by the National Park

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5. *Biodiversity: Plan to Declare 30% of the World Protected Areas by 2030 Must Place Indigenous Peoples' Rights at Its Heart*, AMNESTY INT'L (Dec. 6, 2022), https://www.amnesty.org/en/latest/news/2022/12/biodiversity-plan-to-declare-30-of-the-world-protected-areas-by-2030-must-place-indigenous-peoples-rights-at-its-heart/.

6. *World Met Target for Protected Area Coverage on Land, but Quality Must Improve,* IUCN (May 19, 2021), https://iucn.org/news/protected-areas/202105/world-met-target-protected -area-coverage-land-quality-must-improve.

7. Chris Aadland, *How Tribes Are Reclaiming and Protecting Their Ancestral Lands From Coast to Coast*, AUDUBON MAG., https://www.audubon.org/magazine/winter-2022/how-tribes-are-reclaiming-and-protecting-their (last visited Oct. 23, 2024).

8. Alvaro Fernández-Llamazares et al., *A Baseless Statistic Could Harm the Indigenous People it is Meant to Support*, 633 NATURE 32, 35 (2024) ("The global conservation community must . . . acknowledge more comprehensively the crucial roles of Indigenous Peoples in biodiversity conservation, restoration and stewardship.").

9. *See* Michelle Marvier et al., *Conservation in the Anthropocene: Beyond Solitude and Fragility*, BREAKTHROUGH INST. (Feb. 1, 2012), https://thebreakthrough.org/journal/issue-2/conservation-in-the-anthropocene (introducing "new conservation" and defining it as "seek[ing] to enhance those natural systems that benefit the widest number of people, especially the poor").

System.[10] This model preserves "wilderness" in protected areas (PAs), so that human development and interactions never threaten their pristine biodiversity.[11] In 1864, the law that made Yosemite a public trust stated that PAs are "for resort and recreation . . . to be left inalienable for all time."[12] The lands worthy of this protection are typically those perceived to be wild, untouched by mankind. The United States, for example, defines "wilderness" in strict opposition to people. Wilderness is "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."[13] PAs are therefore seen as allowing native species to exist and thrive as they would without human interaction.[14]

This framework is still the preferred model among conservationists, with some seeking to go even further with "a new wave of strictly enforced nature protection."[15] Implicit in this view of conservation are certain assumptions "the moral imperative of nature protection . . . the mythical status of harmonious, ecologically friendly local people . . . [and] the immediate need for strictly enforced protection measures."[16] The first of these assumptions is that nature has the intrinsic right to exist and communities—both present and future—have a right to share in its aesthetic beauty.[17] The second assumption challenges the increasingly common view that Indigenous peoples are "natural conservationists."[18] For example, one author, stated that "wherever people have had the tools, techniques, and opportunities to exploit natural

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10. Joseph Lee, *How the World's Favorite Conservation Model was Built on Colonial Violence*, GRIST (Apr. 13, 2023), https://grist.org/indigenous/30x30-world-conservation-model-colonialism-indigenous-peop/.

11. Peter R. Wilshusen et al., *Reinventing a Square Wheel: Critique of a Resurgent "Protection Paradigm" in International Biodiversity Conservation*, 15 SOC'Y & NAT. RES. 17, 18 (2002) ("[L]oss of species continues to occur at an alarming pace as a result of human activities... Given this situation, many conservation biologists view national parks and other protected areas as the last safe havens for large tracts of tropical eco-systems.").

12. MARK DOWIE, CONSERVATION REFUGEES: THE HUNDRED-YEAR CONFLICT BETWEEN GLOBAL CONSERVATION AND NATIVE PEOPLES 5 (2011).

13. 16 U.S.C. § 1131(c).

14. Wilshusen et al., *supra* note 11, at 22–24.

15. *Id.* at 18.

16. *Id.* at 22.

17. *Id.* at 24.

18. *Id.* at 32. Wilshusen and his coauthors note "that [while] much of the conservation literature *does* tend to glorify Indigenous peoples[,]" conservation gerrymanderers can "overgeneralize in the opposite direction." *Id.* at 31–32. Authors challenging the common view that Indigenous peoples are "natural conservationists" often note that rapid social changes have forced some Indigenous groups to abandon the "qualities that historically allowed them to live in relative harmony with nature compared to modern societies[.]" *Id.* at 31. At the same time, this view fails to recognize that traditional practices can be adapted for sustainability even in a changing world, especially if outside entities provide support. *Id.* at 32. In sum, it is important to acknowledge that Indigenous peoples are not a monolith, and we should not rely on stereotypes when making decisions regarding conservation. At the same time, conservation must make space for the "decision making, organizational, and governance processes—both customary and modern—that structure resource use within and among rural communities." *Id.*

systems they have done so."[19] The final assumption rests largely on the first two. If there is a moral requirement to protect nature and no guarantee that Indigenous peoples will engage in sustainable practices, then conservationists themselves are morally justified in stepping in as nature's protectors.[20]

The conservation gerrymanderers' assumptions begin to fall apart when one pulls at the loose thread of how "nature" is defined. The early photographers who captured the stunning beauty of the Yosemite Valley and whose works helped catalyze public support for its protection, for example, intentionally avoided photographing the local Miwok people.[21] Omitting the Miwok people from the photographs allowed these photographers to erase their contributions to the valley over countless generations. They were not viewed as stewards of the land whose crops, pruning, and periodic burns shaped the landscape. Instead, they were portrayed as mere nomads passing through Yosemite's "unoccupied virgin wilderness."[22]

The United States' very definition of wilderness codified this misconception of Indigenous peoples as "mere nomads." Thus, the government erased Indigenous peoples from the histories of areas like Yosemite, the Grand Canyon,[23] and Yellowstone.[24] This whitewashing of Indigenous contributions to these landscapes allows the United States to claim that the areas "where the earth and its community of life are untrammeled by man."[25] This lie, sometimes called "the myth of the pristine environment," is at work all over the world, obfuscating the contributions of Indigenous peoples in shaping the so-called "natural" world.[26] For example,

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19. Wilshusen et al., *supra* note 11, at 31 (quoting JOHN OATES, MYTH AND REALITY IN THE RAIN FOREST 55 (1999)).

20. *Id.* at 32 ("Their arguments seem to imply that since all 'traditional' peoples (whomever they may be) are not the 'natural conservationists' they are made out to be, then conservationists should abandon feel-good, bottom-up approaches and get back to the business of nature protection.").

21. DOWIE, *supra* note 12, at 16.

22. *Id.* at 8.

23. *See* Jeremy Hobson, *'Guardians of the Grand Canyon': The Havasupai Tribe's Long Connection to The Canyon's Red Rocks*, WBUR (Aug. 13, 2019), https://www.wbur.org/hereandnow/2019/08/13/grand-canyon-havasupai-tribe (noting "'[The Havasupai Tribe] decided to stay even through the long history of struggle with the national park and then trying to push us out of the area. They persevered, and they actually still live inside the national park today.'").

24. Richard Grant, *The Lost History of Yellowstone*, SMITHSONIAN MAG. (Jan. 2021), https://www.smithsonianmag.com/history/lost-history-yellowstone-180976518/ ("The big myth about Yellowstone is that it's a pristine wilderness untouched by humanity… Native Americans were hunting and gathering here for at least 11,000 years.") (internal quotation marks omitted).

25. 16 U.S.C. § 1131(c).

26. Clark L. Erickson, *Amazonia: The Historical Ecology of a Domesticated Landscape*, *in* THE SOCIAL LIVES OF FORESTS: PAST, PRESENT, AND FUTURE OF WOODLAND RESURGENCE 199, 200 (Susanna B. Hecht et al. eds., 2014); Erle C. Ellis et al., *People Have Shaped Most of Terrestrial Nature for at Least 12,000 Years*, 118 PNAS 1, 7 (2021) (first noting depictions of the "natural world" are incorrect; and then noting "[O]nly about 17% of Earth's land was without evidence of prior human

this erases 11,000 years of Indigenous efforts "involving transplanting of plants and animals, selective culling of noneconomic species and encouragement of useful species, burning, settlement, farming, agroforestry . . . and other activities," which built the Amazon we know today.[27]

So, when conservation gerrymanderers advocate for protection of "nature," they are often referring to an imagined vision of nature where people have never cast a shadow. To protect this nature, humans, including the Indigenous peoples who live in the area, must necessarily be excluded from the landscape. But this exclusion threatens the very biodiversity that the conservationists seek to protect, because Indigenous peoples are the ones best equipped to protect Earth's biodiversity.

One recent study, for instance, found that "some of the highest quality forest lands worldwide" are on Indigenous peoples' lands.[28] The study went on that "[i]t follows that Indigenous peoples are stewards of a substantial proportion of Earth's biodiversity."[29] Likewise, another study highlighted that "[a]reas under Indigenous management today are recognized as some of the most biodiverse areas remaining on the planet."[30] The same study found that "[t]he primary cause of declining biodiversity, at least in recent times, is the appropriation, colonization, and intensifying use of lands already inhabited, used, and reshaped by current and prior societies."[31] Finally, a third study observed that many Indigenous institutions for managing the land have proven to be "remarkably persistent and resilient, suggesting that such governance forms can shape sustainable human-landscape relationships in many places."[32]

Some of the biodiverse Indigenous lands have received formal protection, while others are simply managed in sustainable ways by Indigenous peoples adhering to the beliefs and practices of those who came before them.[33] Central to many Indigenous cultures is the recognition that humans are not separate from nature.[34] There is an understanding "that if we

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habitation or use over the past 12,000 y[ears]. Yet, even this low percentage is certainly an overestimate[.]").

27. Erickson, *supra* note 26, at 199–200.

28. Christopher J. O'Bryan et al., *The Importance of Indigenous Peoples' Lands for the Conservation of Terrestrial Mammals*, 35 Conservation Biology 1002, 1006 (2021).

29. *Id.*

30. Ellis et al., *supra* note 26, at 7.

31. *Id.*

32. Stephen T. Garnett et al., *A Spatial Overview of the Global Importance of Indigenous Lands for Conservation*, 1 Nature Sustainability 369, 370 (2018).

33. Steve Nitah, *Indigenous Peoples Proven to Sustain Biodiversity and Address Climate Change: Now It's Time to Recognize and Support This Leadership*, 4 ONE EARTH 907, 907 (2021); *See also* Garnett et al., *supra* note 32, at 370 (noting that roughly 20% of Indigenous lands are located in PAs, representing roughly 40% of the PAs worldwide).

34. Nitah, *supra* note 33, at 907.

take care of the land, the land will take care of us."[35] This understanding prompts Indigenous communities worldwide to invest "their limited resources on conservation efforts [which are] achieving outcomes that are at least equivalent to those of government-funded protected areas."[36]

Indigenous-led conservation stands in stark contrast to the conservation gerrymanderers' assumption that Indigenous peoples are not "natural conservationists."[37] This perception stems, again, from the conservation gerrymanderers' definition of nature as an area without people. When the historic contributions of Indigenous peoples were erased, all that was left were the "natural" processes, such as tectonic plate movement, evolution, and storms. Under the gerrymandering model of conservation, these are the only processes that should be impacting PAs today. Because Indigenous conservation practices do not fit the conservation gerrymanderers' definition of natural, the practices cannot be true conservation.

These conservationists fail to recognize that using the land, or even changing the landscape, does not necessarily lead to biodiversity loss. In fact, disregarding Indigenous stewardship practices can actually threaten biodiversity. Take, for instance, fires in the Western United States. Fire is an incredibly important process for "restoring nutrients to the soil, clearing decaying brush, and helping plants germinate."[38] For thousands of years, Native Americans utilized controlled burns across the United States, until European colonizers drove them from the land and suppressed the practice, often violently.[39] As the dead underbrush accumulated in the forests of the American West and droughts became more common and more severe, unintentional fires became more violent and more uncontrollable.[40] The controlled fires helped to reduce the overall number of trees, thus allowing each tree to have more water and become more fire resistant.[41] Suppressing controlled burns allowed more trees to grow, increasing the likelihood of "massive blazes that can wipe out almost all of the living trees in an area . . . ."[42] At the same time, suppressing burns enabled invasive species to overcome native plants, thereby reducing biodiversity.[43]

But even small practices can have big impacts for the biodiversity of a given species. Robin Wall Kimmerer, an enrolled member of the Citizen

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35. Nitah, *supra* note 33, at 907.
36. VICTORIA TAULI-CORPUZ ET AL., CORNERED BY PROTECTED AREAS 4 (2018).
37. Wilshusen et al., *supra* note 11, at 31–32.
38. Umair Irfan, *We Must Burn the West to Save It*, VOX (July 13, 2021), https://www.vox.com/21507802/wildfire-2020-california-indigenous-native-american-indian-controlled-burn-fire.
39. *Id.*
40. *Id.*
41. *Id.*
42. *Id.*
43. Irfan, *supra* note 38.

Potawatomi Nation and plant ecologist, discusses this in her book "Braiding Sweetgrass." Several Indigenous women asked Kimmerer to do a study about which method of harvesting sweetgrass was better for the health of the sweetgrass patches.[44] The women disagreed about whether to take just the leaves and leave the roots or harvest the entire plant.[45] Based on conventional wisdom, the University denied funding to Kimmerer's graduate student, Laurie, for the sweetgrass experiment. The scientific community believed that harvesting a plant would obviously be deleterious for its population no matter how it was harvested.[46] Undeterred, Laurie performed the study.[47] At the end of the study, plants in the unharvested plots were smothered by dead stems, while both of the harvested plots teemed with growth.[48] Contrary to the conventional scientific wisdom, "it didn't seem to matter how the grass was harvested, only that it was."[49]

Conservation methods that do not integrate the teachings and practices of Indigenous peoples will threaten the very biodiversity that they seek to protect. These conservation methods create a divide between "human" and "natural" processes that is contrary to most of history. But there are other ecological concerns and limitations associated with the conservation gerrymandering method as it has historically been practiced. One limitation is that creating PAs surrounding rivers (which the 30x30 goal seeks to do) may not be effective. Biodiversity loss in these riparian environments often stems "from extra-local factors like modification of river flow due to dams, boat traffic and urbanization-induced pollution" that all occur upstream of the PA.[50] Additionally, deforestation outside of the PA is the only way to relocate individuals currently living within the PA.[51] Furthermore, when Indigenous land stewards are no longer caring for the land, invasive species can emerge absent "[l]ong-term ecological management and sustained funding . . . ."[52]

Another concern stems from how PAs are created. E.O. Wilson believed that one potential technique would be akin to gerrymandering. In his view, conservationists could "take a piece here and a sliver there, and then a little round area over here, and you put them together into a national reserve or

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44. ROBIN WALL KIMMERER, BRAIDING SWEETGRASS: INDIGENOUS WISDOM, SCIENTIFIC KNOWLEDGE, AND THE TEACHINGS OF PLANTS 152–53 (2013).

45. *Id.*

46. *Id.* at 155–56.

47. *Id.* at 156–57.

48. *Id.* at 158.

49. KIMMERER, *supra* note 44, at 159.

50. Asmita Kabra, *Ecological Critiques of Exclusionary Conservation*, 2 ECOLOGY, ECON., & SOC'Y –THE INSEE J. 9, 16 (2019).

51. *Id.* at 17.

52. *Id.*

protected area."[53] Often this is the technique used by the United States to preserve areas as National Parks. Historically, there is a bias toward protecting only those areas that are "nationally significant," which is often interpreted to mean rare landscapes or visually stunning scenic areas.[54] Figure 1 demonstrates some of the contorted shapes of National Parks in the United States.

Shenandoah National Park (Virginia) Badlands National Park (South Dakota) Zion National Park (Utah)

Figure 1: contorted outlines of various U.S. National Parks

The problem with this approach is that the contorted shapes with many edges exposes more of the perimeter of the PA to unprotected areas, impacting biodiversity.[55] The areas on the edge of the PA are "more vulnerable to current and future anthropogenic stressors," which can affect which species are present.[56] This impacts the entire PA because "stressors at the edges strongly condition interior environments."[57] Increasing urbanization and other land use changes in the areas surrounding PAs magnifies these impacts and further isolates the PAs from other habitats.[58] As PAs become more isolated, it becomes "harder for existing populations

53. Manke, *supra* note 4.

54. LAURA B. COMAY, CONG. RSCH. SERV., RS20158, NATIONAL PARK SYSTEM: ESTABLISHING NEW UNITS 2 (2022). Congress does have the authority to protect areas that are not just visually stunning, but also those that are culturally significant. *Id.* at 3. Critically, similar biases exist in the protection of cultural resources. For a cultural resource to be protected it must be nationally significant and "one of the most important examples of [that] type of resource[.]" *Id. See also* Paul R. Elsen et al., *Keeping Pace with Climate Change in Global Terrestrial Protected Areas*, 6 SCI. ADVANCES 1, 3 (2020) (noting a global bias toward protection of rare climates).

55. Santiago A. Schauman et al., *The Geometry of Global Protected Lands*, 7 NATURE SUSTAINABILITY 82, 82 (2024).

56. *Id.*

57. *Id.* at 84.

58. Juliet Lamb, *National Parks Are Like Islands for Wildlife*, JSTOR Daily (Apr. 14, 2016), https://daily.jstor.org/national-parks-are-like-islands-for-wildlife/.

to sustain themselves, or for new populations to establish themselves."[59] Isolation causes the extinction rate in many PAs to outpace the rate of new species arriving in the PA. This leads to an overall decrease in biodiversity, especially in small PAs.[60] The isolation of many PAs and their contorted shapes can therefore threaten the original goal of establishing PAs.[61]

But the problems with conservation gerrymandering extend far beyond its failure to foster biodiversity. Forced exclusion and human rights abuses against Indigenous peoples frequently accompany the creation of PAs. Government protection of Yosemite Valley in the United States—whose protection inspired PAs worldwide—exemplifies this pattern.[62] As the federal government exported its vision for protected, pristine landscapes all over the world, atrocities were being committed in its name. The following section surveys the history of human rights abuses against Indigenous peoples during PA formation, and contextualizes this violence in the broader history of settler colonial violence.

II. THE HUMAN RIGHTS TOLL OF CONSERVATION GERRYMANDERING

Settler colonialism is the process by which an outside group seeks to dominate an area that is currently inhabited by another. Often, the group already inhabiting the area "derive[s] economic vitality, cultural flourishing, and political self-determination from the relationships they have established with the plants, animals, physical entities, and ecosystem of those places."[63] Inherent in settler colonialism is the settlers' desire to destroy the Indigenous way of life and install their own.[64] For the settler, two of the most important steps in this process are creating their own ecology, and destroying Indigenous ecologies. This weakens Indigenous self-reliance and makes the settlers' domination easier.[65]

Examples of these two steps of the settler colonial process abound. One such example is the mass slaughter of the American bison, by which American colonists forced Native Americans off the Great Plains through control of food resources.[66] In an examples from the last 60 years, Israeli

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59. Lamb, *supra* note 58.
60. *Id.*
61. Schauman et al., *supra* note 55, at 84.
62. Lee, *supra* note 10.
63. Kyle Whyte, *Settler Colonialism, Ecology, and Environmental Injustice*, 9 ENV'T & SOC'Y 125, 134–35 (2018).
64. *Id.* at 135 ("[S]ettlers are literally seeking to erase Indigenous economies, cultures, and political organizations for the sake of establishing their own.").
65. *Id.*
66. J. Weston Phippen, *'Kill Every Buffalo You Can! Every Buffalo Dead is an Indian Gone'*, THE ATLANTIC (May 13, 2016), https://www.theatlantic.com/national/archive/2016/05/the-buffalo-killers/482349/.

authorities and settlers have uprooted 800,000 olive trees to weaken Palestinian economic self-sufficiency.[67] Actions such as rerouting rivers, deforestation, mining, introducing nonnative species, and draining wetlands have the same effect, whether those who directly engage in these actions intend them to weaken Indigenous peoples or not.[68] At the end of the day, these actions eradicate Indigenous ways of life to make room for a new settler ecology.

Perpetrators of settler colonial violence often seek to turn the land they steal from Indigenous peoples into an engine for economic growth. Such engines include agriculture, mining, logging, and other extractive practices. Unlike the United States and other settler colonialists, conservation gerrymanderers try to prevent these practices from ever occurring. Conservation gerrymanderers do not hope to occupy the land. Instead, they hope to prevent others from doing so. But conservation gerrymanderers seek to suppress Indigenous ecologies in favor of their own protectionist ecology, just as the United States suppressed Native American ecologies to install its own extractive ecology.

Conservation gerrymanderers justify their behavior with the belief that Indigenous peoples cannot be trusted to act in sustainable ways.[69] But settlers always invent "moralizing narratives" to justify their actions.[70] Conservation is the moralizing narrative of the conservation gerrymanderers who seek to control Indigenous lands today, just as cultural superiority was the moralizing narrative for the United States government when forcing Indigenous peoples onto reservations.

Since its inception, the conservation gerrymandering model's proponents have invoked this moralizing narrative to justify violating the human rights of Indigenous peoples all over the world. In the United States, creating

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67. Raja Shehadeh, *The Uprooting of Life in Gaza and the West Bank*, THE NEW YORKER (Oct. 26, 2023), https://www.newyorker.com/news/daily-comment/the-uprooting-of-life-in-gaza-and-the-west-bank; *See also*, Layla Hedroug, *Israel's Campaign Against Palestinian Olive Trees*, YALE REV. INT'L STUD. (Mar. 11, 2023), https://yris.yira.org/column/israels-campaign-against-on-palestinian-olive-trees/ ("The destruction and restriction of Palestinian olive trees acts as a method of economic control leveled by Israel.").

68. Whyte, *supra* note 63, at 135.

69. Wilshusen et al., *supra* note 11, at 22. Critically, even when Indigenous groups do not engage in conservation or sustainable practices (like fossil fuel extraction), that cannot serve as a justification to seize control of their lands, as Indigenous groups "have control over the decisions that shape their energy futures because of their status as sovereign nations." Daniel Raimi & Alana Davicino, *Securing Energy Sovereignty: A Review of Key Barriers and Opportunities for Energy-Producing Native Nations in the United States*, 107 ENERGY RSCH. & SOC. SCI. 1, 1 (2023). Numerous Indigenous groups in the United States have decided to engage in oil, coal, and natural gas production. *Id.* at 2. Conservationists must respect this decision, as "Indigenous sovereignty is interconnected with self-determination." June McCue, *New Modalities of Sovereignty: An Indigenous Perspective*, 2 INTERCULTURAL HUM. RTS. L. REV. 19, 25 (2007). Seizing their territories, no matter the purported justification, violates the sovereign rights of Indigenous groups.

70. Whyte, *supra* note 63, at 135.

national parks forced the removal of Indigenous inhabitants.[71] The government expelled thousands of Native Americans from the lands their ancestors stewarded for thousands of years, shaping the very landscape that white Americans now admire as virgin wilderness.[72] Indigenous peoples who sought to remain on their ancestral lands were often killed, including the slaughter of "three hundred Shoshones in one particularly lethal encounter."[73] American colonialists perpetrated all this violence and bloodshed so that privileged whites could experience the pristine beauty of the Western United States and conservationists could study and protect the biodiversity within the parks' borders.[74]

Australia, Canada, and New Zealand soon adopted this conservation model. These countries each formed national parks (following the removal of the Indigenous inhabitants of the area) in the latter quarter of the 20th century.[75] European nations colonizing Africa and Asia also created national parks in their colonies.[76] The Europeans forcibly removed Indigenous peoples from the land "so colonials could enjoy the aesthetics of wild nature, and in the case of Africa, selectively hunt the game for trophies."[77] The former Albert National Park (now the Virunga National Park) in the Belgian Congo is a striking example of this process.[78] King Albert I of Belgium established the park after he visited the Grand Canyon, Yellowstone, and Yosemite National Parks in 1919.[79] Like the American national parks, Belgian authorities violently removed thousands of Indigenous people from the land to complete King Albert's park.[80]

More recently, as the scope of the biodiversity crisis becomes clearer, some conservation gerrymanderers argue that the international community should adopt militarized strategies to protect the land.[81] Advocates of this approach call for "armed forms of conservation," adopting "counter-insurgency-like strategies," and employing military technologies to protect the biodiversity within PAs.[82] Indigenous peoples are often the targets of

71. DOWIE, *supra* note 12, at 11.
72. *Id.* ("[M]any of the parks we now revere were not only cleared of Indians but were also posted 'Whites Only.'").
73. *Id.*
74. *Id.* at 12.
75. *Id.* at 11.
76. *Id.*
77. DOWIE, *supra* note 12, at 12.
78. Lee, *supra* note 10.
79. *Id.*
80. *Id.*
81. Rosaleen Duffy et al., *Why We Must Question the Militarisation of Conservation*, 232 BIOLOGICAL CONSERVATION 66, 66 (2019).
82. *Id.*

conservation militarization.[83] Indigenous Baka peoples in the Democratic Republic of the Congo, for example, "have been beaten, imprisoned, and prevented from using their customary forest by eco-guards hired to protect wildlife." [84] The Tanzanian government, after years of attacking, incarcerating, and killing Indigenous Maasai peoples, forcibly removed 70,000 Maasai from the lands their ancestors had lived on in the name of environmental protection.[85]

Indigenous peoples worldwide also face a heightened risk of arrest for adhering to their traditional ways of life.[86] Canadian federal authorities have targeted and arrested First Nations fishermen for their fishing practices, despite those practices being protected by treaty.[87] Arrests are often based on trumped-up or altogether contrived charges. For example, the Honduran government arrested and held Berta Cárceres, an Indigenous environmental defender, on fabricated charges before she was murdered in 2016.[88] The Philippines government went so far as to declare the UN Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, and other Indigenous leaders to be terrorists.[89]

The impact on Indigenous communities worldwide is massive. In just 24 years across 15 countries, 250,000 people have been evicted from their land to make way for the formation of PAs.[90] Those establishing PAs burned homes and destroyed productive assets.[91] Since the inception of the conservation gerrymandering model, governments have established thousands of PAs on every continent.[92] In turn, these governments have evicted millions of people "from ancestral homelands in the interest of" a mythologized vision of nature.[93]

Pursuing the 30x30 goal, let alone E.O. Wilson's Half-Earth goal, could certainly result in millions, if not billions, of conservation refugees. The following section details an emerging conservation strategy that the international community should adopt. This strategy centers Indigenous peoples' sovereignty and utilizes the knowledge they possess to maximize the positive impacts of conservation.

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83. Sarah Sax, *UN Puts Spotlight on Attacks against Indigenous Land Defenders*, GRIST (Apr. 18, 2024), https://grist.org/global-indigenous-affairs-desk/un-puts-spotlight-on-attacks-against-indigenous-land-defenders/.

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.*

88. Sax, *supra* note 83.

89. *Id.*

90. TAULI-CORPUZ ET AL., *supra* note 36, at 6.

91. *Id.*

92. DOWIE, *supra* note 12, at 13.

93. *Id.*

III. TOWARD MORE EFFECTIVE, INDIGENOUS-CENTERED CONSERVATION

Canada is beginning to experiment with a new paradigm of conservation.[94] This new model, based upon creating Indigenous-protected and -conserved areas (IPCAs), centers Indigenous knowledge and practices that were historically disrespected and even criminalized.[95] IPCAs are currently located exclusively in British Columbia and the Northwest Territories of Canada. However, the Canadian government committed itself to the 30x30 goal, which would require doubling the areas currently protected in Canada, creating new opportunities for Indigenous peoples to be leaders in conservation efforts.[96] The Canadian government pledged "$100 million over five years [to fund] nature conservation projects led by Indigenous communities."[97] So far, the Canadian government has provided over 50 Indigenous communities funding through this program.[98] As of 2022, Indigenous communities in Canada were "in the process of creating IPCAs that would total nearly 200,000 square miles—larger than the entire state of California."[99]

The term IPCA is an umbrella term for a variety of protection methods. What IPCAs often share is Indigenous leadership, "a long-term commitment to conservation," and the "elevat[ion of] Indigenous rights and responsibilities."[100] The variability of protection practices stems primarily from the understanding that IPCAs are based on the self-determination of Indigenous communities.[101] Indigenous governments or nations determine the goals, borders, and methods of conservation within the IPCA and partner with outside governmental agencies or environmental nonprofits to carry out their plan.[102] Ultimately, Indigenous peoples managing a particular IPCA may make conservation decisions on the basis of numerous factors. Potential considerations include the terrain of the land being conserved, the historical practices of the Indigenous peoples within the IPCA, and the current needs of the Indigenous community.

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94. Nicolas Mansuy et al., *Indigenous Protected and Conserved Areas (IPCAs): Canada's New Path Forward for Biological and Cultural Conservation and Indigenous Well-Being*, 8 FACETS 1, 1 (2023).

95. *Id.* at 4.

96. *Id.* at 6–8.

97. *Id.* at 8.

98. *Id.*

99. Joseph Lee, *How Indigenous People Are Fighting to Stop 'The Biggest Land Grab in History'*, GRIST (Dec. 7, 2022), https://grist.org/global-indigenous-affairs-desk/how-indigenous-people-are-fighting-to-stop-the-biggest-land-grab-in-history/.

100. Parks Canada, *We Rise Together,* by The Indigenous Circle of Experts (2018), publications.gc.ca/pub?id=9.852966&sl=0 at 5 [hereinafter "Parks Canada"].

101. *Id.* at 36.

102. *Id.*

This flexibility enables Indigenous communities to carry out their traditional practices within the IPCA. In IPCAs, unlike in many PAs, Indigenous peoples have "the right to benefit from the bounty of the natural world" without fear of criminalization or harassment.[103] The only limitation on this is that the practices must be carried out sustainably, as those managing IPCAs are seen as the land stewards for future generations.[104] Of course, what this means in practice is simply codifying "the reciprocal responsibility to care for and respect the land and water" inherent within many Indigenous cultures.[105]

While IPCAs represent an emerging trend in conservation, early indicators suggest that they benefit both Indigenous communities and the environment.[106] Indigenous communities can use IPCAs to gain political clout and respect from outside groups.[107] Meanwhile, individuals within the community benefit from increased employment opportunities and greater well-being.[108] Finally, through IPCAs, Indigenous peoples have a new avenue to revitalize traditional cultures and practices.[109] Some of these practices were historically suppressed by the Canadian government, most prominently through the network of residential schools the government operated during the 20th century.[110]

Additionally, "IPCAs provide[] tangible benefits towards ecological conservation."[111] These initiatives promote the protection of various threatened species and their habitats and help to restore native plants.[112] The successes of utilizing traditional knowledge in IPCAs also helps facilitate greater respect for these practices from a western conservation science perspective.[113] As Indigenous peoples continue to create IPCAs, there will be even more opportunities for researchers to document their ecological benefits. In turn, these ecological benefits will foster more support for IPCAs.

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103. Parks Canada, *supra* note 100.

104. *Id.*

105. *Id.*

106. Tanya C. Tran, Natalie C. Ban, & Jonaki Bhattacharyya, *A Review of Successes, Challenges, and Lessons from Indigenous Protected and Conserved Areas,* 241 BIOLOGICAL CONSERVATION 1, 7-8 (2020).

107. *Id.*

108. *Id.* at 8.

109. *Id.*

110. *See generally* John Barber, *Canada's Indigenous Schools Policy Was 'Cultural Genocide', Says Report*, THE GUARDIAN (June 2, 2015), https://www.theguardian.com/world/2015/jun/02/canada-indigenous-schools-cultural-genocide-report (discussing the lengths taken by the Canadian government to suppress the nation's aboriginal peoples).

111. Tran et al., *supra* note 106, at 8.

112. *Id.*

113. *Id.* at 7.

CONCLUSION

Throughout conservation history in the United States and abroad, conservationists suppressed Indigenous practices and rights in favor of a mythologized vision of nature without humans. This conservatory impulse has been based upon racism,[114] and ironically, threatens to undermine the very goals that conservation gerrymanderers hope to accomplish. Thus, from a practical perspective, IPCAs offer the international and national conservation communities a better way to achieve their goals. But perhaps more importantly, IPCAs offer a path toward reconciliation between Indigenous peoples and the settlers who have sought to destroy their ways of life. In fact, the Truth and Reconciliation Commission investigating the Canadian government's historic violations of Indigenous rights helped drive the recent trend toward IPCA formation.[115]

It is important to keep in mind that widespread adoption of IPCAs would not be a silver bullet for solving the biodiversity crisis. Conservation's limitations extend beyond who is responsible for PA management. For example, governments must improve regulation of land development and urbanization surrounding IPCAs to prevent species isolation and other stressors on the habitat. Nevertheless, adopting IPCAs would still be a significant positive step. Doing so would help to deconstruct the myth of the pristine environment and the definition of wilderness as a place "where man himself is a visitor who does not remain."[116] Simultaneously, implementing IPCAs all over the world would put the resources in the hands of those who are best equipped to protect the planet's remaining biodiversity. As countries seek to live up to their pledge to preserve 30% of their resources by 2030, they should be prepared to support and listen to Indigenous leaders. Well-funded and politically supported IPCAs are the best way to do so.

114. DOWIE, *supra* note 12, at 6.
115. Mansuy et al., *supra* note 94, at 2.
116. 16 U.S.C. § 1131(c).