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Cover Image: "Goats abound in West Ireland wonder, Gleninchaquin Park, Co. Kerry, July 18, 2024" by Yanissa Rodriguez

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VERMONT JOURNAL OF ENVIRONMENTAL LAW SYMPOSIUM KEYNOTE ADDRESS ON EMOTIONALLY INTELLIGENT LAWYERING

Esperanza Franco

INTRODUCTION[1]

The journal chose Esperanza Franco as the keynote speaker for the 2025 Climate Justice LIVE symposium because of her unique ability to address a critical yet often overlooked aspect of environmental advocacy: the emotional resilience required for those leading the fight for environmental justice. In the environmental justice movement, burnout is a pervasive challenge. Advocates devoted to issues such as farmworker rights, Indigenous sovereignty, and preservation of the environment often face an uphill battle that can feel endless and emotionally draining. Esperanza's advocacy, specifically her book *Emotionally Intelligent Lawyers: How to Navigate the Psychological Implications of Becoming a Lawyer*, resonated deeply with the vision for this event, bringing together themes of justice, advocacy, and humanity.

Through her dedicated scholarship and experience as an immigration attorney, Esperanza has cultivated unparalleled expertise and invaluable tools for advocates to sustain their efforts without sacrificing their well-being. Her book provides practical strategies to navigate the psychological toll of advocacy, making it especially relevant to those working in grassroots environmental justice movements where emotional labor is high. Esperanza understands the intersectionality of these issues, and her ability to blend legal expertise with emotional resilience training made her uniquely qualified to inspire and empower our audience. Participants left the symposium not simply inspired but equipped with actionable insights to protect their mental health while continuing their critical work in environmental justice spheres.

Esperanza's message of balancing advocacy with self-care is timely and essential for sustaining long-term movements for environmental justice. Her insights will also fuel both the passion and the perseverance needed to drive change in climate justice advocacy.

1. Introduction provided by Vermont Journal of Environmental Law Symposium Editors Kathryn Keener and Isaiah Gonzales.

EMOTIONALLY INTELLIGENT LAWYERING

What I am about to tell you is a combination of the lessons I have learned since I graduated law school 10 years ago. They are alchemized from my own losses, pain, and disappointment; but also from the courage, resilience, and creativity that they brought to my life. As you may know by now, there is no light without darkness—it is what we make out of it that matters.

But before that, let me briefly tell you about my story. I grew up in the Canary Islands, Spain. When I was 13, my parents sent me to Arkansas to learn English, so I spent the whole 10th grade there. A year earlier, I had been drugged and raped at a party organized by my own sailing instructors. I was bullied continuously that year due to the rape, so my journey to Arkansas truly felt like a blessing. When I arrived there, I quickly realized that the school's corridor was separated between white and Black people. Most of my friends were African American, and my Spanish teacher felt it necessary to call my host family to "alert them." One day, I overheard one of the girls on my school bus say the N-word. The next day, she made more demeaning comments about African American people. So, on the third day, I got up and went to tell her to please stop saying those things. That was the first—and last—physical fight I have had in my life.

I almost got expelled from the school, until I explained to the administration the reason behind my outburst. When I went back home to the Canary Islands, I realized I wanted to be an advocate—not in Spain, but in the United States, fully aware of how deeply flawed the country was. I don't know if it was fate, but I knew in my heart that it was my destiny.

As an immigrant on a student visa, I fought every single day to be the best law student I could be. I overworked and over-studied every day of my almost six years in the United States. My personal relationships—with my family, my partner at the time, and my friends—gradually lost importance, as I was always studying or working. Somewhere along the way, I also lost myself. My second semester of law school, I went to the psychiatrist at the University of Arizona because I wanted to get an Adderall prescription in order to continue to score at the very top of the curve. In that session, I cried and finally realized that what I needed was a break from all the pressure I was under. For the next three months, I took Sertraline—an anti-depressant and OCD medication—to survive that final semester.[2] Once the semester

2. *See e.g.*, David Jaffe et al., *It is Okay to Not Be Okay: The 2021 Survey of Law Student Well-Being*, 60 U. LOUISVILLE L. REV. 1, 23–27 (2022) (discussing in its study that 68.7% of law students reported that they needed help for emotional or mental health problems in the last twelve months); *see also* ESPERANZA FRANCO, EMOTIONALLY INTELLIGENT LAWYERS, CH. 1: STUDIES ON LAW STUDENTS'

ended, I stopped the medication and decided to start researching law students' (and lawyers) mental health. There was something intrinsically wrong with the legal educational system and its design. I became incredibly disheartened by the stress, depression, and anxiety statistics that plague our profession. That summer, ironically, I interviewed with two big law firms in D.C., and left the interviews with an identity crisis and a fear that I would become part of those statistics.

When I graduated from law school, I started work as a detention attorney for asylum seekers in Arizona. A year later, the non-profit I was working for mishandled my own immigration case.[3]In a matter of two months, I had to leave my life and career in the United States behind, or become illegal and possibly be taken to a detention center with some of my own clients. I felt betrayed and alone in my pain. So, after almost six years in the United States, I lost everything I had worked so hard for.

When I got home to Spain, my father had been re-diagnosed with cancer. He died a year later. Had I not been forced to leave the United States, I would not have been able to spend the last year of his life with him. Once the grief started to soften, I got ahold of my law review note on the psychological impact of law school education and finally started to write my first book: *Emotionally Intelligent Lawyers*. Thanks to that book and every experience I lived, I am here with you today. So thank you for having me.

What I am about to tell you is a series of alchemized lessons from my own journey as a human being and attorney on this Earth. Please take what resonates and leave what does not.

A. About Finding Your Purpose in Law

Finding your purpose means finding what you love. It means finding what lights you up and what is intellectually fulfilling to you. It is what makes you feel "in the zone." Have you ever been in front of your computer and forgot that time was passing by? Explore that. The legal profession, family, friends, and society as a whole, will unconsciously tell you what is right for you and what you should do to be successful. Discard it and do not base your life on that because this is your life, not theirs.

You are the only person on this Earth who actually knows what is right for you; but you need to dig deep. You need to know yourself very, very well.

MENTAL HEALTH: A SEVENTY-YEAR PATTERN (2023) (discussing in depth the studies done on law students' mental health in the United States).

3. Jeff Gammage, *Penn Lawyer Who Defended Immigrants Could Face Her Own Deportation*, PHILADELPHIA INQUIRER, https://www.inquirer.com/philly/news/immigration-lawyer-deport-university-of-pennsylvania-20180819.html (Aug. 20, 2018).

Become aware of how external validation runs your choices. Identify the layers of conditioning and find out who you really are at your core—what makes you shine and feel lighter. Look for that feeling. And when you find it, resist and persist. Make mistakes, it is okay—they are just experiences that will make you wiser.

B. About Work and Empathic Burnout[4]

Most public interest lawyers carry the impossible weight of fixing everything that is wrong with our broken system.[5] How heavy and unreasonable is that burden? Beneath the lawyer suit, there is a human being who also needs to rest. Yes, we should do our best in every case, but we must put ourselves first.

You cannot pour from an empty cup. No matter what kind of legal work you end up doing, your well-being must come first. If you neglect yourself and your needs, burnout will take over, and the legal profession might lose a very important person: you. Remember this: the world—and the legal profession—needs you. We need your vision, your unique experiences, and your intelligence. Let that sink in.

C. About the Political Storms That Come and Go

Politically, we are currently in a phase of fear and uncertainty, but it will not last forever. Nothing ever does. Life is cyclical and change is the only constant we can truly be sure of. What is important now is to develop the inner strength that will allow you to navigate the storm with grace and intelligence. Set boundaries with what you let in: in your mind and in your environment.[6] This is not to say you should forget about everything and completely disconnect in the forest, but prioritize your mental peace, always. If something drains you, let it go. Do not spend too much time during your

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4. FRANCO, *supra* note 2, at 136–38 (discussing the gap between the machine-like lawyer and the human, emotional being); *see also*, *id.* at 181–82 (For example, those lawyers in the public sector or students in law school clinics who work with vulnerable clients are often at risk of experiencing empathic burnout—a term studied by researcher Tanya Singer and her team at the Max Planck Institute. By being in constant contact with the suffering of others, our brains might start to "feel like" those who are in pain. When we compare the neural activity of a person experiencing actual pain with that of a person merely observing that person in pain, the same brain regions (the anterior insula and the anterior medial cingulate cortex) are activated in both individuals.).

5. FRANCO, *supra* note 2, at 181 ("In addition to unrealistic standards of perfection that lawyers are at times held to, there is the added element of emotionally dealing with clients *and* their problems. In this regard, setting boundaries also becomes a valuable skill.").

6. *See id.* at 178 (discussing "boundaries: saying no & managing energy leaks" along with self-reflective exercises).

day in the negativity and depression of it all, because what we need is your strength and your joy—especially now. Resist with joy.

Fighting from a place of nurturing is much more effective than fighting from a place of resentment and hate. "Where attention goes, energy follows."[7] We are taught that we need to be aggressive lawyers in order to be successful, but the truth is, we can be successful by just being exactly who we are. We can win cases and challenge systems with the utmost intelligence—coupled with a dose of love and calmness—leaving the negative ones perplexed at our emotional mastery. Try it, it works.

D. About Energy Vampires: Some of Your Future Lawyer Colleagues

Misery likes company, so if I am unhappy and depressed, it will trigger me to see you happy. I challenge you to protect your energy, your heart, and your mind when you encounter these people and situations. Set boundaries. And remember one thing: you do not need to fit in—especially because the legal profession unfortunately continues to perpetuate a lawyer persona from the 19th century. So no need to fit in, honestly. This persona is a non-emotional, only rational, 24/7 machine who takes no breaks, never goes on vacation, who is always adversarial no matter what, and who steals his own happiness via obsessive competition.[8] We need lawyers from the 21st century, so please, be you. We need you exactly as you are. If all the lawyers around you are unhealthy, be the healthy one. Change the profession with your mere presence.

E. About the Lawyer Ego

I know you just spent three years of your life devoting yourself to this degree. I know how much time, sacrifice, and mental blood it took. But this degree does not define you. Here is the trap: "The more I do, the worthier I am," or "the more successful I am, the worthier I am," or "the busier I am, the better," or "the more productive I am, the better I feel," or "if I do not win this case, then I am a failure," or "if I am not being productive, then I am useless" or "I just need to do more." It goes on forever. This is your ego on an infinite loop of the following fallacy: my lawyer identity equals my worth, so without it, I am nothing.

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7. James Redfield, *Inspirational and Spiritual Quotes by James Redfield: Energy*, CELESTINE VISION, https://www.celestinevision.com/2016/06/james-redfield/quotes-by-james-redfield/ (last visited May 13, 2025).

8. FRANCO, *supra* note 2, at CH. 5: THE [19TH CENTURY] LAWYER IDENTITY.

This is probably the hardest lesson you will have to decondition from after law school. But once you do it, it is the most liberating thing you will ever experience; and you will practice from a place of pure purpose—the one you had when you applied to law school.[9]

You are not worthier because you are a lawyer. You were worthy before law school. Your worthiness is intrinsic in you. So, if one day you temporarily lose your legal career (like it happened to me), or you decide to switch career paths, so be it. Being a lawyer does not define you—you are much more than that. You are a human being—a very valuable one.

And yes, it feels great to say that you are an attorney (especially in the United States), but if you always depend on that title, you will become a slave to it. Free yourself from that. Moreover, if you do not end up working in big law or being a social justice attorney at a prestigious non-profit, that does not mean you failed. I mean think about it, how limited is that view of the world? There are so many career pathways that law school does not teach you. There is so much out there. Look for it—life is too short to be a sheep who does not question anything. And remember, success is a different concept for each person. The only definition of success that matters is your *own* definition. You have the power to design and refine your life, so take ownership of that.

F. About the Stress, Anxiety, and Depression that Comes with Being a Lawyer in this World

First and foremost, do not let the media and society force you to believe that all lawyers are unhappy, and that there is no hope. It is not true. You can reclaim a professional path that makes you happy; but you need to learn how to love and take care of yourself. Unlearn the perfectionism, the workaholism, and the ruthless competition that law school taught you. You do not need to carry that energy anymore. Leave it behind. More importantly, do not give in to the fallacy that there is no way out of stress. There is, if you develop self-awareness and self-love, which is extremely important, because our legal system will try to eat you alive. Not to be dramatic, but it is what it is; so if we are being honest, let us be.

Becoming emotionally intelligent does not mean there will not be any stress or anxiety in your legal career and life, but it will be easier to cope with.[10] You will react differently than those who have not done the inner work. Your surroundings will be healthier because that is what you will

9. *See generally* FRANCO, *supra* note 2, at 189–94 (discussing "Alignment: discerning what matters to you," along with self-reflective exercises to identify your own definition of success).

10. *See generally*, *id.* at 133–43 (covering Chapter 7, Redefining and Humanizing the Lawyer Identity).

attract and manifest. You will intelligently fight for a cause from a place of calmness rather than anxiety. Kindness makes you stronger, not weaker. Compassion makes you a better attorney. You do not need to be cruel in order to win a case. You can be a fierce advocate and remain kind. You can fiercely fight for your community and maintain your mental health. These are not mutually exclusive, but we have learned that they are. We have been taught that we need to abandon ourselves in order to care for others. That is not true. What is true, is that once we abandon ourselves and our well-being, we cannot take care of others. You are the most important person in your life. Without yourself, you have nothing.

In law school, we are trained to compete against our peers because of the curve.[11] The reality is, our profession requires teamwork, and more than that: peer support.[12] Now, more than ever, we need to unite. We need to support each other and we need to inspire each other—not from a place of "who is doing more" or "who is sacrificing more." That is a moral superiority trap that only adds to the feeling of restless competition. "I am better than you because I am doing public interest law and you are not." Do not fall into those ego traps. It only feeds the endless competition that was ingrained in us. Rebel against that, because we need to support each other from a place of love and brotherhood because if I, myself, heal, I am healing a part of you too. If I allow myself to be a healthier attorney, I am inspiring you to do the same. That is why we must empower each other. We must nurture each other.

CONCLUSION

Yes, the legal profession is one of the hardest professions in the world. And yet, you had the resilience to keep going, regardless of it all. So please give yourself credit for that. Undergoing law school is one of the most mentally harsh experiences a person can go through—I am surely not exaggerating. It can change the way you think about yourself and the world. But again, this title does not define you.

What defines you is the warrior spirit you carry inside in order to overcome this experience. It is the resilience you maintain when things get hard. It is the courage you have to be here, right now. It is the reason you are an advocate in the law.

If anything, I would love for you to remember one thing: the best lawyers are not the ones who have amassed the most titles, stickers, and accolades. The best lawyers are the ones who are truly kind and joyful inside. So please,

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11. *See* FRANCO, *supra* note 2, at 53 (covering Chapter 3, The 1L Hunger Games: The Curve as a Filter for Law Firms, Pathological Competition, and the Shift in the Student's Sense of Worth).

12. *See generally*, *id.* at 195–235 (covering Part IV: Reforming Legal Education).

as a warrior in law, I ask you to fight for that joy inside of you. It is your birthright.

Thank you very much for being here.

RE-INDIGENIZING FOOD SOVEREIGNTY IN THE NGORONGORO CONSERVATION AREA

*Fredrick Ole Ikayo**

A National Park must remain a primordial wilderness to be effective. No men, not even native ones, should live inside its borders.[1]

We conserve nature because we live in it, because it is our life.[2]

INTRODUCTION

The establishment of Tanzania's protected areas, some of which date back to colonial times, has raised ongoing debates about the implications and desirability of conservation laws. This article examines the conflict between wildlife conservation objectives and the protection of the livelihoods of Indigenous people, particularly those negatively impacted by these laws in Tanzania. It also explores the consequences of the country's extensive network of protected lands on the Maasai people.

About 43.7% of Tanzania's landmass is protected or conserved.[3] Although these protections have contributed to the preservation of various wildlife species, they have also imposed significant burdens on the Indigenous people who are displaced or whose traditional activities are restricted by the protection designation. Individuals or communities occupying land under traditional customs are considered to hold a "Right of Occupancy," though ultimate ownership remains vested in the President, who holds it in trust for the benefit of all citizens of Tanzania.[4] Under this legal framework, the Maasai people hold a "customary/deemed right of occupancy" to their land, which includes areas now designated as the Ngorongoro Conservation Area (NCA).[5] Despite the existence of this customary right of occupancy, the day-to-day management of their land is, to a great extent, heavily regulated by the Ngorongoro Conservation Area

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1. MARK DOWIE, CONSERVATION REFUGEES: THE HUNDRED-YEAR CONFLICT BETWEEN GLOBAL CONSERVATION AND NATIVE PEOPLE 23 (2009) (quoting Bernhard Grzimek, Frankfurt Zoo veterinarian).

2. *Id.* (quoting a Maasai elder).

3. *United Republic of Tanzania—Country Profile*, CONVENTION ON BIOLOGICAL DIVERSITY, https://www.cbd.int/countries/profile?country=tz (last visited Apr. 24, 2025).

4. The Land Act, 1999, Cap. 113, ss 24–52 (Tanz.).

5. *Id.*

Authority (NCAA).[6] The NCAA's regulations are focused on promoting tourism and conservation objectives in the NCA.[7] Tourism and conservation provide the Maasai people, at best, with limited economic benefits.[8] At worst, government agencies and conservation organizations, in pursuit of tourism and conservation goals, displace the Maasai and prevent them from accessing the resources essential for their livelihoods.[9]

This article argues that Tanzania violates the fundamental right to food of the Indigenous Maasai by prohibiting subsistence cultivation and denying access to resources in the NCA that are essential to Maasai livelihoods. This article explores how both conservation efforts and Indigenous livelihoods can be safeguarded by examining experiences from protected areas in the United States, jurisprudence from the Organization of American States, and cases from Sweden and Thailand.

This article proceeds as follows: Part I introduces the Maasai people and explores their connection to Tanzania's key natural areas. It also provides historical context on the environmental injustices they have endured, including their displacement from the Serengeti, and it examines the ongoing tensions between conservation efforts in the NCA and the Maasai's ability to sustain their livelihoods. Part II delves into the concept of "fortress conservation," both in general and as applied to the Maasai in Tanzania. Part III discusses the emergence of food sovereignty as an alternative to food security in the international context and examines how recognizing the Maasai people's right to food sovereignty can serve as a tool for securing resource access. Part IV analyzes contemporary challenges that threaten the Maasai's food sovereignty in the NCA. Part V reviews global approaches that acknowledge Indigenous resource access as a means of supporting livelihoods. Finally, Parts VI and VII explore potential remedies, propose recommendations for reform, and provide a concluding analysis.

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6. Juliana Nnoko-Mewanu & Oryem Nyeko, *It's Like Killing Our Culture: Human Rights Impacts of Relocating Tanzania's Maasai*, HUM. RTS. WATCH (July 31, 2024), https://www.hrw.org/report/2024/07/31/its-killing-culture/human-rights-impacts-relocating-tanzanias-maasai.

7. Robert Williams, *Kicking Native People Off Their Land Is a Horrible Way to Save the Planet*, N.Y. TIMES (Feb. 20, 2024), https://www.nytimes.com/2024/02/20/opinion/indigenous-peoples-biodiversity-climate.html.

8. Dev Kumar Sunuwar, *Maasai Fight for Survival: Land Grabs, Evictions, and the Struggle for Cultural Identity in Tanzania*, CULTURAL SURVIVAL (Mar. 6, 2025), https://www.culturalsurvival.org/news/maasai-fight-survival-land-grabs-evictions-and-struggle-cultural-identity-tanzania.

9. Christine Ro, *7 Myths Harming The Maasai People In Tanzania*, FORBES (Sep. 9, 2024), https://www.forbes.com/sites/christinero/2024/09/09/7-myths-harming-the-maasai-people-in-tanzania/.

I. THE MAASAI PEOPLE AND TANZANIA'S SIGNIFICANT NATURAL AREAS

Tanzania has one of the most spectacular natural environments in the world, containing a rich biodiversity. Tanzania has taken strong affirmative steps to protect its natural resources. About 43.7% of Tanzania's landmass is protected or conserved.[10] Indeed, Tanzania contains more than 800 protected areas,[11] seven of which are designated as World Heritage sites by the United Nations Educational, Scientific and Cultural Organization (UNESCO):

(1) NCA (Mixed Cultural and Natural Heritage),
(2) Serengeti National Park (Natural),
(3) Ruins of Kilwa and Ruins of Songo Mnara (Cultural),
(4) Selous Game Reserve (Natural),
(5) Kilimanjaro National Park (Natural),
(6) Stone Town of Zanzibar (Cultural),
(7) Kondoa Rock-Art Sites (Cultural).[12]

These conservation measures have contributed to an increase in tourism, with Tanzania becoming an increasingly popular tourist destination in recent years. In 2021, there were 922,692 tourist arrivals, and the tourism sector generated $1.4 billion USD in revenue.[13] By July 2023, tourist arrivals rose by 37.2%, reaching a record high of 1,658,043 visitors and generating $2.99 billion USD.[14] The Tanzanian government believes it can attract five million tourists by 2025, bringing in $6 billion USD in revenue.[15]

The Serengeti National Park (SNP) and NCA are two of the most famous tourist destinations in Tanzania. Before they were partitioned, they formed a united ecosystem. The Maasai people referred to the entire Serengeti-Ngorongoro ecosystem as "Ramat," which means caretaker of all (animals and people). [16] Today, the SNP remains one of the unaltered animal migrations locations in the world, where over one million wildebeest plus other animals partake in a 1,000 km (621 miles) annual circular trek in

10. *United Republic of Tanzania–Country Profile*, *supra* note 3.

11. INT'L UNION FOR CONSERVATION OF NATURE, STATE OF PROTECTED & CONSERVED AREAS IN EASTERN & SOUTHERN AFRICA 131–32 (Mark Hockings et al. eds., 2020).

12. *United Republic of Tanzania*, UNESCO WORLD HERITAGE CONVENTION, https://whc.unesco.org/en/statesparties/tz (last visited May 14, 2025).

13. *Tourism*, TANZANIAINVEST, https://www.tanzaniainvest.com/tourism (last visited April 6, 2024).

14. Victor Oluwole, *Tanzania's Tourism Industry Bounces Back With 37.2% Increase in Tourist Arrivals,* BUS. INSIDER AFRICA (Sept. 11, 2023, 2:44 PM) https://africa.businessinsider.com/local/markets/tanzanias-tourism-industry-bounces-back-with-372-increase-in-tourist-arrivals/z042j6h.

15. Williams, *supra* note 7.

16. Geoff Taylor & Lars Johansson*, Our Voices, Our Words and Our Pictures*, FAO, https://www.fao.org/4/x0271e/x0271e06.htm (last visited Apr. 6, 2025).

Tanzania and Kenya.[17] The entire Serengeti ecosystem includes "Maswa Game Reserve (2,200km^2) in the south, Grumeti and Ikorongo Game Reserves in the east, Maasai Mara National Reserve in Kenya (1,672km^2) to the north, and Loliondo Game Controlled Area in the west."[18] It supports an immense variety of wildlife, including two million wildebeests, 900,000 Thomson's gazelles, and 300,000 zebras as the dominant herds.[19] Other herbivores include 7,000 elands, 27,000 topis, 18,000 hartebeests, 70,000 buffalos, 4,000 giraffes, 15,000 warthogs, 3,000 waterbucks, 2,700 elephants, 500 hippopotamuses, 200 black rhinoceroses, 10 species of antelope, and 10 species of primate.[20] Major predators include 4,000 lions, 1,000 leopards, 225 cheetahs, 3,500 spotted hyenas, and 300 wild dogs.[21]

The NCA, which borders the SNP, spans 8,100km^2 brimming with rich wildlife and awe-inspiring landscapes. It is the world's largest caldera,[22] with a spectacular concentration of wildlife, including the big five (elephant, lion, leopard, buffalo, and rhino).[23] It was declared a world heritage site in 1979,[24] and it was first created as a conservation area in 1959 to provide for conservation, tourism, and the interests of the Indigenous Maasai.[25]

The SNP was once the homelands of the Maasai people, an Indigenous group of semi-nomadic pastoralists who depended on access to agricultural foods, exchange of livestock, and pastoral products for grain.[26] Throughout the area's history, the Maasai people implemented a healthy landscape-based food system. The hooves of their cattle mix the soil and help regenerate new grassland that is essential for native wildebeest to thrive.[27] Additionally, the deposition of livestock dung and urine in times of mobility enhances soil fertility and aids in the growth of certain plant species.[28]

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17. *Serengeti National Park*, UNESCO, https://whc.unesco.org/en/list/156/ (last visited Apr. 25, 2025).
18. *Id.*
19. *Id.*
20. *Id.*
21. *Id*.
22. *Ngorongoro Conservation Area*, UNESCO, https://whc.unesco.org/en/list/39 (last visited Apr. 6, 2025).
23. *Ngorongoro Conservation Area*, NGORONGORO CONSERVATION AREA AUTHORITY, https://www.ncaa.go.tz/ (last visited Apr. 25, 2025).
24. *Ngorongoro Conservation Area*, UNESCO, https://whc.unesco.org/en/list/39 (last visited Apr. 6, 2025).
25. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, ss 4–20 (Tanz.).
26. KAJ ÅRHEM, PASTORAL MAN IN THE GARDEN OF EDEN: THE MAASAI OF THE NGORONGORO CONSERVATION AREA, TANZANIA 15, 17 (Univ. of Uppsala, Dept. of Cultural Anthropology 1985), http://www.diva-portal.se/smash/get/diva2:277704/FULLTEXT01.pdf.
27. Emma Hutchinson, *The Maasai, Wildbeest, and a Warming Serengeti*, EARTH ISLAND J. (Jan. 10, 2017), https://www.earthisland.org/journal/index.php/articles/entry/maasai_wildebeest_and_warming_serengeti/.
28. *Enhancing biodiversity through livestock keeping,* PASTRES, https://pastres.files.wordpress.com/2022/09/en-infosheet-3of6.pdf.

The Maasai use land as common resource, and their main livelihood depends on livestock-keeping (cattle economy) to provide for their basic needs: food, clothing, and shelter.[29] The primary, traditional diet of the Maasai includes milk and dairy products, lean beef, cattle fat, and blood.[30] Crop cultivation also constitutes a crucial part of the Maasai people's diet, especially at times of severe food shortages. To provide themselves with these basic needs, the Maasai people practice seasonal migration of their livestock as an adaptive strategy in search of pasture, water, and saltlicks.[31] This process, known as "transhumance," requires mobility because it uses the seasonal movement of livestock to suitable grazing grounds to allow the land to regenerate.[32] Notably, the transhumance practice, based on a communal land management system, allows for a sustainable use of resources under normal conditions; for example, where there are reserve pastures and adequate rainfall.[33]

The formal protection of wildlife in the SNP dates to 1940 when the British colonial government enacted a Game Ordinance.[34] While the ordinance imposed restrictions on human settlement, it granted exemptions for existing grazing and water rights, allowing certain residents to remain.[35] The Maasai were not the only inhabitants; groups such as the Ndorobo and Sukuma also lived in the park, engaging in hunting and cultivation.[36] This conservation effort aimed to safeguard the Serengeti's unique ecosystems and wildlife, which faced growing threats from human activities, particularly the rise of trophy hunting and exploration by white hunters.[37] The trophy hunting culture, which celebrated the indiscriminate killing of animals, had a devastating effect on wildlife populations.[38] In response, the colonial

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29. Nat'l Geographic Soc'y, *The Cattle Economy of the Maasai*, NAT'L GEOGRAPHIC, https://education.nationalgeographic.org/resource/cattle-economy-maasai (last updated Oct. 19, 2023).

30. *Id.*

31. *Pastoralism of the Maasai*, U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE, https://www4.unfccc.int/sites/NWPStaging/Pages/item.aspx?ListItemId=23410&ListUrl (last visited Apr. 25, 2025).

32. Teagan Wolter, *Transhumance*, BRITTANICA, https://www.britannica.com/topic/transhumance, (Apr. 11, 2025).

33. *Maasai Land and Livestock Management: Sustainable Practices and Challenges Faced by the Maasai in Modern Times*, 100 HUMANITARIANS INT'L, https://100humanitarians.org/maasai-land (last visited May 14, 2025).

34. Ylenia Gostoli, *Maasai Plight in Tanzania Shows 'Colonial' Roots of Conservation*, TRTWORLD (2022), https://www.trtworld.com/magazine/maasai-plight-in-tanzania-shows-colonial-roots-of-conservation-58472.

35. RODERICK NEUMANN, *The Production of Nature: Colonial Recasting of the African Landscape in the Serengeti National Park,* in POLITICAL ECOLOGY: AN INTEGRATIVE APPROACH TO GEOGRAPHY AND ENVIRONMENT-DEVELOPMENT STUDIES 246 (Karl S. Zimmerer & Thomas J. Bassett, eds., 2003).

36. *Id.* at 249.

37. *History of Serengeti National Park*, SERENGETI, https://serengetipark.org/serengeti-national-park-history/ (last visited Apr. 6, 2025).

38. *Id.*

administration implemented game reserves and introduced early conservation laws, such as the Game Preservation Ordinance of 1921, to regulate hunting and protect endangered species from overexploitation.[39]

When Bernhard Grzimek, veterinary surgeon and Adolph Hitler's director of the Frankfurt Zoo, first saw the Serengeti in 1954,[40] he declared the Serengeti a "primordial wilderness" and said that no one, "not even natives," should live within its borders.[41] Grzimek was of the view that the pastoral Indigenous Maasai, who had co-existed and lived in harmony with nature, would eventually destroy the ecosystem. Grzimek wrote, "We Europeans must teach our black brothers to value their own possession . . . because we do not want them to repeat our mistakes and our sins."[42] But what Grzimek failed to consider was that the Indigenous Maasai had lived sustainably and were original stewards of the land—thriving on the same transhumance practices since time immemorial.

To colonial preservationists, the Maasai people were regarded as part of the colonial landscape, to be preserved "as part of our fauna."[43] When these European stereotypes were not met, efforts were made to enforce conformity. In the same year, the colonial administration imposed a prohibition on agriculture, prompting the Maasai and local farmers to form an alliance to defend their subsistence livelihoods against restrictive conservation policies.[44] For the Maasai people, agriculture became a form of risk insurance, offering a safety net for their vulnerable pastoral economy.[45] However, colonial agricultural prohibitions and land restrictions profoundly impacted the Maasai residents of the Serengeti, disrupting their traditional practices, limiting their ability to supplement their food supply, and causing environmental challenges due to the reduced availability of grazing land.[46]

By 1957, a proposal was put forth by a British-led "Committee of Enquiry" to partition the SNP into two, so as to preserve the area's valuable biodiversity.[47] The first area would become the SNP, where habitation and related human activities would be prohibited, including those of the Indigenous Maasai, who inhabited the area of the SNP long before the

39. *History of Serengeti National Park*, *supra* note 37.
40. DOWIE, *supra* note 1, at 24.
41. *Id.*
42. BERNHARD GRZIMEK & MICHAEL GRZIMEK, SERENGETI SHALL NOT DIE 136–37 (1969).
43. *Serengeti National Park Board of Management meeting minutes*, TNA Secretariat File 40851 (July 7, 1953) (Barclay Leechman, Chairman of the Serengeti National Park Board of Management).
44. ÅRHEM, *supra* note 26, at 70.
45. *Id.*
46. ANURADHA MITTAL & ELIZABETH FRASER, LOSING THE SERENGETI: THE MAASAI LAND THAT WAS TO RUN FOREVER 7 (Heather Blackie ed., The Oakland Inst. 2018).
47. *Id.* at 22.

establishment of the park.[48] The second area would be the NCA with three management objectives: conserving natural resources, protecting the interests of Indigenous pastoralists (Maasai), and promoting tourism.[49]

The British colonial administration successfully persuaded the Maasai people to vacate the SNP.[50] They promised, among other things, to provide the Maasai with better water resources, access to grazing areas, and opportunities for crop cultivation in the NCA, all of which are very essential for the Maasai's cultural survival and livelihoods.[51] The Indigenous Maasai people ultimately agreed to vacate the newly formed park based on these promises.[52] However, those promises were repeatedly broken, starting immediately after Tanzania's independence in 1961.[53]

Upon arrival to the NCA, the Maasai who had been evicted from the SNP merged with the existing Maasai community that had already occupied the NCA before its creation. Under Tanzania's land laws, the Maasai people possess a deemed right of occupancy in the NCA, established through historical and continual use over an extended period.[54] There is no legal provision explicitly revoking these rights. However, the NCAA holds extensive statutory powers over the management of the area, including the authority to regulate the Maasai people's daily interactions with the land and its resources.[55]

Bernhard Grzimek's campaign to displace the Maasai people continued in the NCA through the Frankfurt Zoological Society, which had sponsored Grzimek's forays to the Serengeti.[56] Some post-independence administrations, stemming from Tanzania's colonial history, perpetuated this practice through continuing colonial-era education and ideological frameworks, legal systems, and converting large areas of land into protected zones across the country to enhance tourism revenues.[57] To accomplish this goal, government agencies and campaigns systematically excluded local communities while promoting the vested interests of powerful European elites.[58]

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48. Peter J. Rogers, *International Conservation Governance and the Early History of the Ngorongoro Conservation Area, Tanzania*, 4 GLOB. ENV'T 78, 88 (2009).

49. UNESCO, *supra* note 22.

50. DOWIE, *supra* note 1, at 26.

51. *Id.*

52. *Id.*

53. *Id.* at 29–30.

54. ISSA SHIVJI & WILBERT KAPINGA, MAASAI RIGHTS IN NGORONGORO, TANZANIA 40 (Margaret Cornell et al., eds., 1998).

55. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, ss 4–20 (Tanz.).

56. DOWIE, *supra* note 1, at 29–30.

57. Abdallah R. Mkumbukwa, *The Evolution of Wildlife Conservation Policies in Tanzania During The Colonial and Post-Independence Periods*, 25 DEV. OF S. AFRICA 589, 593–94 (2008).

58. *Id.*

For generations, the Maasai of the NCA lived in harmony with the land, practicing a delicate balance between pastoralism and small-scale cultivation. Agriculture was once permitted in select areas—Enduleni, Kakesio, and Empakaai—allowing the Maasai to supplement their diet with maize, beans, and potatoes, particularly during times of drought.[59] However, the growing influence of conservationist lobbying groups cast their traditional practices under scrutiny, and by 1975, cultivation was banned entirely.[60]

The Maasai had long asserted that they were not purely pastoralists. While cattle remained central to their way of life, subsistence farming had always been a necessary safeguard against unpredictable droughts and disease outbreaks.[61] Yet, conservation authorities argued that Maasai farming contributed to soil erosion.[62] Ironically, the very policies meant to protect the environment led to overgrazing and land degradation as the Maasai were pushed into smaller areas.[63] Conservation efforts, rather than preserving a balanced ecosystem, forced the Maasai into increasingly unsustainable conditions.

A key justification for the cultivation ban was the fear that farming would expand uncontrollably. Government officials claimed that preventing extensive agriculture was only possible by prohibiting it altogether.[64] But in reality, the Maasai had never engaged in extensive farming. Their small plots—typically no more than two acres—stood in stark contrast to the larger fields cultivated by non-Indigenous residents of Ngorongoro, including hospital workers, teachers, shopkeepers, and government officials.[65] These outsiders, whose farmlands were often twice the size of Maasai plots, were mistakenly associated with the Maasai, ultimately resulting in a complete ban on subsistence cultivation.

At the heart of these policies lay a persistent misconception: the belief that the Maasai were, and had always been, purely pastoralists.[66] Yet, historical records suggest otherwise. As early as the 1890s, the Maasai had integrated cultivation into their way of life, relying on small harvests when cattle alone could not sustain them.[67] Far from being a modern adaptation, farming had been a deeply ingrained part of their survival strategy.

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59. ÅRHEM, *supra* note 26, at 35–36.
60. SHIVJI & KAPINGA, *supra* note 54, at 41.
61. *Id.*
62. *Id.* at 39.
63. *Id.*
64. Randall Boone et al., *Cultivation and Conservation in Ngorongoro Conservation Area, Tanzania*, 34 HUM. ECOLOGY 1, 809–28 (2006).
65. SHIVJI & KAPINGA, *supra* note 54, at 40.
66. *Id.*
67. *Id.*

Over the years, restrictions on the Maasai's traditional transhumance practices—moving livestock in search of pasture—have intensified. Conservation laws and tourism-driven policies have systematically reduced their grazing lands and displaced them from their ancestral territories.[68] The internationally-recognized conservation and tourism status of their homeland has come at a direct cost to the Maasai, contributing to widespread food insecurity.[69] Many East African governments, including Tanzania, hold the view that ranches with rotational grazing, regulated stocking levels, high-performance cattle breeds, and improved veterinary care produce more beef of superior quality compared to pastoralist systems.[70] However, this viewpoint overlooks a substantial body of research showing that pastoralism makes significant economic contributions to national and regional economies and can be far more productive per hectare than commercial ranching in comparable environments. Climate change has only exacerbated these hardships, making it increasingly difficult to endure prolonged droughts.[71] Despite this, pastoralism presents a promising solution.

Research shows that pastoralist landscapes can maintain a neutral or even positive carbon balance. Grazing livestock stimulates plant growth, which helps store carbon in the soil, and mobile herding systems contribute to carbon cycling through the natural distribution of manure and urine.[72] The United Nations Development Programme (UNDP) has also emphasized the importance of Maasai Indigenous knowledge in enhancing climate resilience, noting that the Maasai play a "vital role in preventing land degradation and conserving ecosystems" through practices rooted in harmony with nature.[73] However, ongoing droughts across the pasturelands of Kenya and Tanzania pose a serious threat to their way of life.[74]

The prohibition on subsistence farming in the NCA remains a deeply contentious issue under Tanzanian law. Opponents of cultivation argue that

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68. Dev Kumar Sunuwar, *Maasai Fight for Survival: Land Grabs, Evictions, and the Struggle for Cultural Identity in Tanzania*, CULTURAL SURVIVAL (Mar. 6, 2025), https://www.culturalsurvival.org/news/maasai-fight-survival-land-grabs-evictions-and-struggle-cultural-identity-tanzania.

69. Ngorongoro Conservation Area, UNESCO WORLD HERITAGE CONVENTION, https://whc.unesco.org/en/list/39/ (last visited Apr. 19, 2025).

70. Joseph Ole Simel, *Pastoralism And The Challenges Of Climate Change*, in INDIGENOUS AFFAIRS (2009) https://iwgia.org/images/publications/IA_3-09.pdf.

71. CECILIA M. LEWERI ET AL., RAINFALL VARIABILITY AND SOCIO-ECONOMIC CONSTRAINTS ON LIVESTOCK PRODUCTION IN THE NGORONGORO CONSERVATION AREA, TANZANIA pt. 5 (Discover Applied Sci., 2021).

72. *The Benefits of Pastoralism for Biodiversity and Climate*, PASTRES PROGRAMME (2022), https://pastres.org/wp-content/uploads/2022/09/en-infosheet-1of6.pdf.

73. *Maasai Communities Harness the Resilience of Native Plants to Restore Grasslands in Tanzania*, U.N. DEV. PROGRAMME (Sept. 23, 2024), https://climatepromise.undp.org/news-and-stories/maasai-communities-harness-resilience-native-plants-restore-grasslands-tanzania.

74. *Id.*

permitting farming would lead to widespread agricultural expansion; that the Maasai have only recently begun farming; and that those who wish to cultivate should leave the NCA.[75] However, these arguments fail to acknowledge the Maasai people's right to determine their own food systems and traditional livelihoods. To this day, no alternative solutions have been provided, and food insecurity among the Maasai people has worsened.

Against this backdrop of dispossession and broken promises, the right to food sovereignty must be re-centered. The Maasai people deserve to self-determine their own food sources, preserve their cultural food traditions, and sustain their way of life in the land they have called home for centuries.

II. FORTRESS CONSERVATION AND ITS DEFICIENCIES

> The conquest of the earth, which mostly means the taking it away from those who have a different complexion or slightly flatter noses than ourselves, is not a pretty thing when you look into it too much. What redeems it is the idea only. An idea at the back of it; not a sentimental pretence but an idea; and an unselfish belief in the idea—something you can set up, and bow down before, and offer a sacrifice to.[76]

In the 20th century, conservationists and environmentalists sought to protect wildlife and biodiversity by establishing protected areas free from human disturbance.[77] This strategy, now widely known as the "fortress conservation model," has been implemented across the globe.[78] Supporters of this approach argue that conservation should take precedence in certain ecologically significant areas, particularly where species or ecosystems are fragile or rare.[79] They further contend that restricting economically productive activities—such as logging, grazing, and cultivation—within these areas is essential to preserving biodiversity.[80]

However, the fortress conservation model has faced widespread criticism for its role in displacing and marginalizing Indigenous communities in creating protected areas. By restricting access to lands and resources that

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75. SHIVJI & KAPINGA, *supra* note 54.

76. Joseph Conrad, *The Heart of Darkness*, 165 BLACKWOOD'S EDINBURGH MAG. 193, 196 (1899).

77. Karl Jacoby et al., *Fortress Conservation*, OUTSIDE/IN (Nov. 5, 2020) https://outsideinradio.org/shows/fortressconservation.

78. *Id*.

79. Peter Clark, *Fortress Conservation and Community-Based Conservation: both have advantages and disadvantages*, NAT'L PARKS OF PARA. (Dec. 23, 2021) https://parquesnacionalesdelparaguay.blogspot.com/2021/12/fortress-conservation-and-community.html.

80. *Id.*

local populations have traditionally depended on,[81] this approach fosters deep distrust and socioeconomic hardship. It is rooted in the assumption that human communities and conservation are inherently in conflict, often leading to policies that exclude local voices and limit meaningful community participation. As a result, the model not only disrupts traditional livelihoods, but it also undermines the potential for collaborative conservation efforts that recognize and integrate Indigenous knowledge and stewardship.

In the case of the Maasai people in the Ngorongoro Conservation Area (NCA), the fortress conservation model continues to reinforce and perpetuate racist and colonial attitudes, prioritizing discriminatory viewpoints over sound resource-management principles.[82] A stark example of this is the suppression of traditional Maasai fire-management practices, which historically played a vital role in maintaining pasturelands. Fire was strategically used to control disease-bearing ticks, rejuvenate grasslands, and create forest glades with high-quality forage.[83] Infested pastures would be temporarily abandoned and burned, effectively eliminating disease threats before livestock returned.[84] However, conservation policies have disregarded these time-tested Indigenous practices, undermining both ecological balance and pastoral livelihoods.

Beyond restricting traditional land management, the fortress model also dismisses the stewardship values of the Maasai and their potential contributions to biodiversity conservation. Instead of fostering cooperation, it remains regulation-heavy and penalty-rich.[85] The Ngorongoro Conservation Area Authority (NCAA) exercises broad control over entry into the NCA, dictates grazing access, and frequently imposes hefty fines on those it deems violators.[86] Moreover, the fortress model has led to the continued displacement of the Maasai from their ancestral lands without meaningful consultation, participation, or adequate compensation.[87] These exclusionary policies have fueled resentment and resistance, ultimately undermining conservation objectives rather than promoting sustainable coexistence.

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81. Clark, *supra* note 79.

82. DOWIE, *supra* note 1, at 30 (2009). Bernhard Grzimek's fortress conservation campaign continued in the NCA through the Frankfurt Zoological Society, which had sponsored Grzimek's forays to the Serengeti.

83. RODERICK NEUMANN, *The Production of Nature: Colonial Recasting of the African Landscape in the Serengeti National Park,* in POLITICAL ECOLOGY: AN INTEGRATIVE APPROACH TO GEOGRAPHY AND ENVIRONMENT-DEVELOPMENT STUDIES 248–49 (Karl S. Zimmerer & Thomas J. Bassett, eds., 2003).

84. *Id*.

85. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, ss 35–39 (Tanz.).

86. *Id.*

87. Anuradha Mittal, *Urgent Alert: Tanzania Government on a Rampage Against Indigenous People*, OAKLAND INST. (Jan. 25, 2024, 11:00 PM PST), https://www.oaklandinstitute.org/urgent-alert-tanzanian-government-rampage-against-indigenous-people.

The marginalization of the Maasai people and the erosion of their food sovereignty in the name of conservation stand in stark contrast to the growing global recognition of Indigenous rights in environmental protection. Conservation organizations worldwide increasingly acknowledge that the survival of Indigenous people and the preservation of nature are inherently interconnected and cannot be meaningfully separated.[88] This recognition must extend to the NCA, where conservation strategies should not come at the cost of Indigenous livelihoods. Moving forward, NCA management must ensure the meaningful inclusion of the Maasai in decision-making processes and guarantee their access to critical resources such as pasture, water, and salt `licks—resources essential for sustaining their culturally significant food systems and way of life.

III. THE MAASAI PEOPLES' RIGHT TO FOOD SOVEREIGNTY

A. The Essential Nature of Food Sovereignty

In the NCA, and indeed across the world, Indigenous people face higher levels of food insecurity. According to one report, "the surveyed communities (in Nainokanoka ward within the NCA) experience anxiety and uncertainty about food supply (77.3% of the households), insufficient quality in terms of variety and preferences (74.1%), and insufficient food intake (55.9%)."[89] More than half of the households are food insecure.[90]

Food security has become a concept widely used by governments and implemented in agricultural policies. According to the Food and Agriculture Organization, food security is achieved when everyone consistently has both physical and financial access to adequate, safe, and nutritious food that meets their dietary needs and preferences, enabling them to maintain a healthy and active lifestyle.[91] This definition reflects the multidimensional nature of food security: the availability of food, access to food, utilization, and stability.[92] Though noble in its intent to end hunger and food shortage, the means used in the production of food appear to be less significant to the concept. A lack of self-determination is linked to food insecurity. A more holistic effort to address hunger, especially for Indigenous people, would not just be about the

88. Janis B. Alcorn, *Indigenous People and Conservation*, 7 CONSERVATION BIO. 424, 425 (1993).

89. J. Safari et al., *Food Insecurity in Pastoral Communities of Ngorongoro Conservation Area*, 11 AGRIC. & FOOD SEC. 36 (2022).

90. *Id.*

91. *Fact Sheet No. 34: The Right to Adequate Food*, U.N. OFF. OF THE HIGH COMM'R FOR HUM. RTS. (2010), https://www.ohchr.org/sites/default/files/Documents/Publications/FactSheet34en.pdf (last visited Apr. 19, 2025).

92. *Food Security*, FOOD & AGRIC. ORG. OF THE U.N. (2006), https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf.

lack of access to food. It should also encompass the political economy of environmental change and the importance of cultural and spiritual dimensions of Indigenous and ecologically-grounded foodways.[93]

Food sovereignty, on the other hand, as a critical alternative to the concept of food security, is broadly defined as the right of local people to define their own food systems, food cultures, production modes, and markets.[94] The two terms are related but differ in their approaches and results: food security focuses on the supply of food to communities, whereas food sovereignty takes into account the inherent power in food systems.[95] Food sovereignty recognizes both the people and the power inherent in food systems and aims to link production to consumption.[96]

First proposed in 1996 by "La Via Campesina" in its manifesto, *Food Sovereignty: A Manifesto for the Future of Our Planet*,[97] "food sovereignty" aimed to go beyond food security to address the challenges that confront oppressed people in Latin America and the world. As defined by Masioli and Nicholson, food sovereignty is:

> [T]he right of peoples to decide and produce their own food. It is a political right to organize ourselves, to decide what to plant, to have control of seeds. Food sovereignty is a very broad concept that includes the right of access to seeds, the right to produce, to trade, to consume one's own foods . . . it is a concept that is linked to the autonomy and sovereignty of peoples.[98]

The concept of food sovereignty has since evolved into a global social movement, influencing national policies and even constitutional frameworks. Countries such as Ecuador,[99] Bolivia,[100] Venezuela,[101] and Nepal[102] have

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93. Lucy Jarosz, *Considering Sovereignty, Care Ethics and Policy in Food Politics*, 4 DIALOGUES IN HUM. GEOGRAPHY 229, 330–31 (2014).

94. Karlah Rae Rudolph & Stephane McLachlan, *Seeking Indigenous Food Sovereignty: Origins of Responses to the Food Crisis in Northern Manitoba, Canada*, 18 LOC. ENV'T: INT'L J. OF JUST. & SUSTAINABILITY 1079, 1080–81 (2013).

95. *Id.*

96. Hannah Wittman et al., *The Origins & Potential of Food Sovereignty*, FOOD SOVEREIGNTY: RECONNECTING FOOD, NATURE AND COMTY., Jan. 2010, at 1, 2.

97. *Food Sovereignty: A Manifesto for the Future of Our Planet*, LA VIA CAMPESINA (Oct. 13, 2021), https://viacampesina.org/en/food-sovereignty-a-manifesto-for-the-future-of-our-planet-la-via-campesina/.

98. Tabitha Martens et al., *Understanding Food Sovereignty Through an Indigenous Research Paradigm*, 5 J. OF INDIGENOUS SOC. DEV. 18, 20 (2016).

99. CONSTITUCION REPUBLICA DE LA ECUADOR CONSTITUCION DE 2008 Oct. 20, 2008, tit. VI, ch. III, art. 281–82 (Ecuador).

100. CONSTITUCION POLITICA DEL ESTADO 2009 Feb. 7, 2009, tit. VII ch., I art. 255 (Bol.).

101. CONSTITUCION DE LA REPUBLICA BOLIVARIANA DE VENEZUELA 1999, Dec. 20, 1999, tit. VI, ch. I, art. 305 (Venez.).

102. CONSTITUTION OF NEPAL 2015, art. 36 (3).

enshrined food sovereignty in their constitutions as a means of ensuring food needs for their populations. Meanwhile, nations like Mali and Senegal have adopted food sovereignty policies,[103] with grassroots movements playing a crucial role in shaping and implementing these initiatives at both national and international levels.[104] In line with this, the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas was adopted by the United Nations General Assembly in 2018.[105] Article 15.2 recognizes this right as both an individual and collective one, enabling each peasant or rural worker to fully exercise it in a manner that is intrinsically connected to their human dignity.[106] This right can also be asserted collectively by specific social groups or communities, which is especially important when addressing the right to adequate food and nutrition.[107]

For Indigenous communities, food sovereignty holds particular significance because historical food policies have often been tied to discrimination and cultural erasure. The loss of bison in the Canadian prairies, for instance, not only disrupted the livelihoods of First Nations, but it also eroded their cultural and traditional identity, altering the balance of power in favor of the Canadian state.[108] Similarly, in the NCA, the prohibition of cultivation stripped the Maasai of their ability to grow food as a supplement during times of scarcity.[109] Restrictions on land access have further disrupted the Maasai's transhumance practices, eroding Indigenous foodways and increasing dependence on government aid.[110] This shift has exacerbated food insecurity and public health crises, both physical and emotional.[111] Reclaiming the power inherent in food systems is therefore essential for Indigenous self-determination and cultural survival.

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103. Tina D. Beuchelt & Detlef Virchow, *Food Sovereignty or the Human Right to Adequate Food: Which Concept Serves Better as International Development Policy for Global Hunger and Poverty Reduction?*, 29 AGRIC. & HUM. VALUES 259, 263 (2012).

104. *See* Priscilla Claeys, *From Food Sovereignty to Peasants' Rights: An Overview of La Via Campesina's Rights-Based Claims over the Last 20 Years*, *in* FOOD SOVEREIGNTY: A CRITICAL DIALOGUE, Conference Paper No. 24, at 4 (Sept. 2013).

105. G.A. Res. 73/165, at 1 (Dec. 17, 2018).

106. *Id.* at 11.

107. *Id.*

108. *See* JAMES DASCHUK, CLEARING THE PLAINS: DISEASE, POLITICS OF STARVATION, AND THE LOSS OF ABORIGINAL LIFE 96–114 (Univ. of Regina Press, 2013) (2013) (discussing the destruction of bison populations in Canada and the ensuing starvation of First Nations peoples, forcing them to sign treaties with the Canadian state to survive).

109. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, s 25 (Tanz.).

110. Christine Ro, *7 Myths Harming the Maasai People in Tanzania*, FORBES (Sept. 9, 2024, 7:49 AM), https://www.forbes.com/sites/christinero/2024/09/09/7-myths-harming-the-maasai-people-in-tanzania/.

111. John G. Safari et al., *Food Insecurity in Pastoral Communities of Ngorongoro Conservation Area, Tanzania*, 11 AGRIC. & FOOD SEC. ART. 36 (2022), https://agricultureandfoodsecurity.biomedcentral.com/articles/10.1186/s40066-022-00374-5.

Indigenous food sovereignty is more than just a concept—it is a movement that seeks to restore the deep spiritual and cultural connections between Indigenous people and their traditional food systems. It challenges the existing power structures that have historically displaced Indigenous communities from their lands and disrupted their ways of producing and consuming food. At its core, Indigenous food sovereignty acknowledges that food is not merely a commodity but a sacred gift that sustains both body and spirit.

Recognizing the importance of these issues, the Indigenous Food Systems Network has established a set of guiding principles aimed at restoring and protecting Indigenous food systems.[112] The first principle declares that food is sacred and must be treated with respect,[113] ensuring that traditional practices are honored and upheld. Second, participation in land-based food activities is also essential[114]—reconnecting with traditional harvesting, farming, and hunting practices fosters self-sufficiency and cultural resilience. Third, self-determination is a cornerstone of Indigenous food sovereignty,[115] affirming that Indigenous communities must have the authority to govern their own food systems without external interference. Lastly, legislative and policy reforms are necessary to secure lasting protections for Indigenous foodways,[116] ensuring that future generations can continue to cultivate and consume food in a way that aligns with their cultural traditions.

The significance of food sovereignty extends beyond just access to food—it is deeply connected to the ability of Indigenous people to control and improve access to resources essential for survival. While the Tanzanian Constitution does not explicitly enshrine food sovereignty as a right, legal arguments can be made that it is embedded within existing provisions. For example, Article 14 guarantees the right to life, which can be interpreted to include the right to secure basic necessities.[117] This provision can serve as a legal foundation for the Maasai people to demand access to essential resources such as grazing land, water, and seasonal migratory routes for their

112. INDIGENOUS FOOD SYSTEM NETWORK, https://www.indigenousfoodsystems.org/ (last visited Apr. 24, 2025). The Indigenous Food Systems Network (IFSN) is an initiative developed by the Working Group on Indigenous Food Sovereignty (WGIFS) to facilitate networking and information sharing among individuals and groups engaged in Indigenous food-related actions, research, and policy reform. Its mission is to support the revitalization and preservation of Indigenous land and food systems by fostering relationships and understanding among diverse stakeholders, including traditional harvesters, farmers, community members, academics, and civil society organizations.

113. *Id.*

114. *Id.*

115. *Id.*

116. *Id.*

117. The Constitution of the United Republic of Tanzania, Art. 14.

livestock. It also supports their right to engage in supplemental cultivation during periods of food scarcity.

Similarly, food sovereignty aligns with the right to own property under Article 24, which should extend to subsistence cultivation, even when land is used as a common resource under customary rights of occupancy.[118] However, Tanzanian courts have often invoked technical legal reasoning to reject Indigenous peoples' claims to collective land rights.[119] The country's legal framework has historically prioritized individual rights over collective claims, creating significant barriers for Indigenous groups seeking to assert their rights to land and livelihoods.[120] Substantive laws have primarily emphasized individual rights, often neglecting claims rooted in a livelihoods-based protection framework grounded in collective rights.[121]

This legal orientation has particularly disadvantaged communities like the Maasai, who rely on communal land tenure for grazing, resource access, and cultural preservation. The Tanzanian Constitution does not explicitly recognize collective rights concerning land, culture, or self-determination, further weakening legal protections for Indigenous groups. While the Village Land Act of 1999 acknowledges customary land tenure systems, it does not provide robust protections for collective ownership, leaving communities vulnerable to land dispossession and tenure insecurity.[122]

Beyond domestic law, international human rights instruments also provide legal grounds for Indigenous food sovereignty. Tanzania, as a state party to the African Charter on Human and Peoples' Rights, falls under the jurisdiction of the African Court on Human and Peoples' Rights regarding disputes over its interpretation.[123]

In the landmark case of *SERAC v. Nigeria*, the African Commission affirmed the right to food as a fundamental aspect of human dignity,[124] intrinsically linked to other fundamental rights such as health, education, and work.[125] The ruling established that governments must not only ensure food

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118. The Constitution of the United Republic of Tanzania, Art. 14.

119. Chris Maina Peter, *Human Rights of Indigenous Minorities in Tanzania and the Courts of Law*, 14 INT'L J. ON MINORITY & GRP. RTS. 1, 19–38 (2007).

120. Edward Loure & Edward Lekaita, *Securing Collective Land Tenure for Hunter-Gatherers in Tanzania*, NAMATI (Feb. 12, 2016), https://namati.org/news-stories/ucrt-case-study/.

121. Peter, *supra* note 119, at 18.

122. The Village Land Act No. 5 of 1999, Cap. 114, ss 7–59 (Tanz.).

123. *State Parties to the African Charter*, AFR. COM. ON HUM. AND PEOPLES' RTS., https://achpr.au.int/en/states (last visited Apr. 20, 2025).

124. Social and Economic Rights Action Center and Center for Economic and Social Rights v. Nigeria, Communication 155/96, African Commission on Human and People's Rights [Afr. Comm'n H.P.R.], ¶ 65 (Oct. 27, 2001), https://leap.unep.org/sites/default/files/court-case/achpr30_155_96_eng.pdf.

125. *Id.*

security but also refrain from actions that destroy or limit access to food sources.[126]

Similarly, in the case of *Batwa of Kahuzi-Biega National Park v. Democratic Republic of Congo* (DRC), the African Commission on Human and Peoples' Rights ruled that the DRC government had violated the Batwa's land and other rights by establishing the Kahuzi-Biega National Park.[127] The decision rejected the fortress conservation model as ineffective for biodiversity protection, emphasizing that Indigenous people are the best stewards of nature.[128] The Commission found the DRC in violation of 11 articles of the African Charter, including the Batwa's rights to life, property, natural resources, development, health, religion, and culture.[129] It called on the government to legally recognize and protect Batwa lands and resources, ensuring their access and use in accordance with their traditions.[130]

Applying these principles to Tanzania, the government should take concrete steps to guarantee the Maasai permanent and unrestricted access to grazing land, water, and other essential resources. Additionally, the ban on subsistence cultivation in the NCA should be repealed to uphold Maasai food sovereignty and fundamental rights.

Further guidance can be drawn from the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which offers strong moral and legal considerations for Tanzanian courts and NCA authorities. UNDRIP affirms that states must (1) consult and cooperate in good faith with Indigenous people to obtain their free, prior, and informed consent;[131] (2) ensure that Indigenous people secure their own means of subsistence;[132] and (3) that "Indigenous people have the right to own, use, develop and control the lands, territories and resources they possess by reason of traditional ownership or other traditional occupation or use."[133]

To fulfill these obligations, NCA authorities must engage in meaningful and good faith consultation with the Maasai people, ensuring their full

126. Social and Economic Rights Action Center and Center for Economic and Social Rights v. Nigeria, Communication 155/96, African Commission on Human and People's Rights [Afr. Comm'n H.P.R.], ¶ 65 (Oct. 27, 2001), https://leap.unep.org/sites/default/files/court-case/achpr30_155_96_eng.pdf.

127. Minority Rights Group International and Environmental Resources Naturelles et Developpement (on behalf of the Batwa of Kahuzi-Biega National Park, DRC) v. Democratic Republic of Congo (DRC), Communication 588/15, African Commission on Human and People's Rights [Afr. Comm'n H.P.R.], ¶ 227-28 (May 13, 2022), https://minorityrights.org/app/uploads/2024/07/communcation-588-002-decision--english-version.pdf.

128. *Id.* at ¶ 230.

129. *Id.* at ¶ 227.

130. *Id.* at ¶ 233.

131. G.A. Res. 61/295, annex, United Nations Declaration on the Rights of Indigenous Peoples, Article 19 (Sept. 13, 2007).

132. *Id.* at Article 20.

133. *Id.* at Article 26(2).

participation in decisions that affect their livelihoods. Consultation is a matter of justice and human rights. The Maasai people have an ancestral claim in the NCA and must be treated as active stakeholders in its governance. Their exclusion from decision-making has resulted in policies that have disrupted their traditional practices, restricted their access to critical resources, and even led to forced evictions. By engaging in meaningful community participation, NCA authorities can uphold the fundamental rights of the Maasai and prevent the injustices that arise from unilateral decision-making.

Furthermore, effective conservation cannot be achieved through coercion or exclusion. Attempts to remove or limit the presence of Indigenous communities often lead to resistance, conflict, and even greater environmental harm. Collaborative conservation models, where Indigenous scientific knowledge and modern science work together, have proven successful in various parts of the world.[134] The NCA should be no exception. Consultation with the Maasai is not only a legal and ethical obligation but also a pragmatic approach to sustainable conservation. Recognizing the Maasai as equal partners rather than obstacles will lead to policies that respect human rights, integrate traditional scientific knowledge, and promote a more inclusive and effective conservation strategy. If the NCA is to be a model for conservation, it must also be a model for justice, equity, and collaboration.

B. Contemporary Issues that Threaten and Impede Indigenous Food Sovereignty in the Ngorongoro Conservation Area

Under the Ngorongoro Conservation Area Authority Act (NCAAA), the Ngorongoro Conservation Area Authority (NCAA), a body corporate[135] with perpetual succession, is tasked with three management objectives: conserving land,[136] promoting tourism,[137] and safeguarding and promoting the interests of the Maasai people.[138] Despite the clear mandate to safeguard and promote the interest of the Indigenous Maasai, conservation and tourism revenues have been the dominant force in shaping laws to constrain

134. See, e.g., *Co-Management of National Parks with Traditional Owners*, GOV'T OF S. AUSTL. https://www.environment.sa.gov.au/topics/park-management/co-management-of-parks (last visited Apr. 20, 2025).

135. The NCAAA creates a board that consists of a chair, who shall be appointed by the President; a conservator, who shall be secretary of the board; and no less than six, but no more than eleven, members appointed by the minister to performing functions regarding the national interest. However, the NCAAA does not recognize or mandate the appointment of Maasai leaders as board members. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, s 5 (Tanz.).

136. *Id.* at s 6(a).

137. *Id.* s 6 (b).

138. *Id.* s 6 (c).

livelihoods in the NCA. For example, in the 2022 to 2023 fiscal year, the NCA saw an influx of 752,232 TZS (Tanzanian shillings), up from 191,614 TZS in 2020 to 2021.[139] By September 2023, tourism revenues in the NCA reached 176 billion TZS (approximately $70 million USD).[140] Additionally, in 2019, the tourism sector contributed 10.3% to Tanzania's gross domestic product,[141] generating over $2.6 billion in revenue.[142]

As a highly regulated area, the expansion of conservation areas and the enforcement of grazing restrictions have severely limited the Maasai people's access to essential resources, making it increasingly difficult for the Maasai people to sustain their traditional adaptive strategies.[143] Grazing livestock in critical areas, such as the Ngorongoro Crater and other ecologically sensitive zones, is strictly prohibited.[144] Seasonal grazing, which was once allowed, is now subject to growing restrictions, further reducing the available pastureland for cattle.[145]

Since 2009, the Maasai people have been completely banned from cultivating land within the NCA, despite their historical reliance on small-scale farming for subsistence.[146] This ban has exacerbated food insecurity, increasing hunger and vulnerability.[147] Furthermore, forced evictions and relocations—justified by the purported benefits of environmental conservation and tourism development—have displaced some Maasai communities or limited their access to land.[148]

These restrictions, particularly the prohibition of livestock from grazing in many areas of Ngorongoro, have inflicted profound hardship on Maasai

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139. Giza Mdoe, *Ngorongoro Crater: A Driving Force in Tanzania's Tourism Recovery*, THE EXCHANGE, https://theexchange.africa/countries/tanzania-ngorongoro-crater/ (last visited Apr. 24, 2025).

140. Zephania Ubwani, *Ngorongoro's Tourism Earnings Soar to Record Sh176 Billion in One Year*, THE CITIZEN (Sept. 28, 2023), https://www.thecitizen.co.tz/tanzania/news/business/ngorongoro-s-tourism-earnings-soar-to-record-sh176-billion-in-one-year-4382922.

141. World Travel & Tourism Council, Tanzania 2020 Annual Research: *Key Highlights*, WORLD TRAVEL & TOURISM COUNCIL, https://wttc.org/research/economic-impact/moduleid/704/ (last visited Apr. 24, 2025).

142. *Tourism*, TANZANIAINVEST, https://www.tanzaniainvest.com/tourism (last visited Apr. 24, 2025).

143. ANDY CURRIER AND ANURADHA MITTAL, THE LOOMING THREAT OF EVICTION: THE CONTINUED DISPLACEMENT OF THE MAASAI UNDER THE GUISE OF CONSERVATION IN NGORONGORO CONSERVATION AREA 10 (The Oakland Inst., 2021).

144. *Id.* at 5.

145. *Id.* at 10.

146. *Biodiversity: Ngorongoro Conservation Area*, UNITED REPUBLIC OF TANZ. BIODIVERSITY, https://tz.chm-cbd.net/en/protected-areas/ngorongoro-conservation-area (last visited Apr. 24, 2025).

147. John G. Safari et al., *Food Insecurity in Pastoral Communities of Ngorongoro Conservation Area, Tanzania*, 11 AGRIC. & FOOD SEC. ART. 36 (2022), https://agricultureandfoodsecurity.biomedcentral.com/articles/10.1186/s40066-022-00374-5.

148. *Tanzania Tour Risks Whitewashing Maasai Forced Evictions*, HUM. RTS. WATCH, https://www.hrw.org/news/2023/12/01/tanzania-tour-risks-whitewashing-maasai-forced-evictions (last visited Apr. 20, 2025).

families, leaving them traumatized, demoralized, and struggling to sustain their way of life.[149] As an NCA Maasai resident explains:

> The government prohibited livestock from accessing pastures in many places in Ngorongoro. Livestock without food, water and saltlicks are like sacks of skeletons. They cannot produce milk. If slaughtered, they are unpalatable. Selling them is not an option since they would not fetch good prices. So many people have lost their livestock over the decades.[150]

Another detrimental restriction imposed by the NCAAA is the ban on subsistence cultivation within the NCA.[151] This prohibition has made it increasingly difficult for the Maasai to diversify their food production, supplement their diets, and use cultivation as a safety net during extreme droughts or food shortages.[152] The resulting hunger, malnutrition, and even death have led many to question the deliberate denial of resources critical to their survival. As recounted by a Nainokanoka resident: "If we can break the ground to lower a body, why can't we break it for cultivation?"[153]

The Maasai people's situation is further complicated by the climate in the NCA. The NCA's annual precipitation receives less than 500mm on the dry western plains to as much as 1,700mm on the forested eastern slopes, with precipitation increasing at higher altitudes.[154] Between 1967 and 2018,[155] rainfall patterns in the region declined, and variability in rainfall has led to higher rates of livestock mortality, threatening food security for Maasai households.[156] To adapt to these climatic changes, the Maasai have adopted various strategies, including diversifying their livelihoods. These adaptations

149. NAVAYA JAMES NDASKOI, REPORT OF THE FACT-FINDING MISSION CONDUCTED IN NGORONGORO CONSERVATION AREA 13–14 (Apr. 3, 2021).

150. *Id.* at 8.

151. Ngorongoro Conservation Area Authority Act, 1959, Cap. 284, s 25 (Tanz.).

152. Chris Lang, *Fortress Conservation Threatens Maasai Pastoralists in the Ngorongoro Conservation Area: "The Government Is Systematically Starving Us."*, REDD (June 18, 2021) https://redd-monitor.org/2021/06/18/fortress-conservation-threatens-maasai-pastoralists-in-the-ngorongoro-conservation-area-the-government-is-systematically-starving-us/.

153. For more on the restrictions and subsequent hunger facing the Maasai living in the NCA, see MITTAL & FRASER, *supra* note 46, at 28.

154. *Ngorongoro Conservation Area*, WORLD HERITAGE DATASHEET (May 2011), http://world-heritage-datasheets.unep-wcmc.org/datasheet/output/site/ngorongoro-conservation-area/.

155. CECILIA M. LEWERI ET AL., RAINFALL VARIABILITY AND SOCIO-ECONOMIC CONSTRAINTS ON LIVESTOCK PRODUCTION IN THE NGORONGORO CONSERVATION AREA, TANZANIA pt. 3.1 (Discover Applied Sci., 2021).

156. *Id.*

involve migrating for wage labor, selling milk, and participating in small-scale trade.[157]

Severe climatic events like drought have a profound impact on water and pasture availability, leading to significant socio-economic consequences.[158] For example, the 2017 drought in the NCA caused the loss of 77,389 heads of cattle, 72,881 heads of goats, and 78,490 heads of sheep,[159] which accounted for approximately 70% loss compared to the livestock numbers in 2016.[160] While the total livestock in the Ngorongoro District has remained around 430,000 livestock unit (LU), the per capita share has dropped significantly—from over 20 LU in the 1960s to just over 2 LU in 2016—well below the 4 LU per person required to meet basic needs such as housing, food, clothing, education, and healthcare.[161] Projections indicate a further decline to 1.2 LU by 2037 and just 0.3 LU by the end of the century.[162] For this reason, subsistence cultivation becomes crucial for those whose livestock holdings fall below the threshold,[163] as it helps provide sufficient food, particularly during periods of drought.

To secure a just and sustainable future for the Maasai, policies must balance conservation efforts with the rights and livelihoods of Indigenous communities. Genuine and meaningful engagement, along with policy reforms that recognize their traditional land use and adaptive strategies, is crucial for their continued survival within the NCA. Overcoming these challenges requires a more inclusive approach—one that respects the Maasai's cultural heritage while supporting their coexistence with conservation and tourism efforts.

V. CONTEMPORARY EXAMPLES OF INDIGENIZING RESOURCE MANAGEMENT IN SELECTED JURISDICTIONS

Historically, the creation of protected areas and national parks largely disregarded the presence and rights of Indigenous communities inhabiting

157. J. Terrence McCabe et al., *Adopting Cultivation to Remain Pastoralists: The Diversification of Maasai Livelihoods in Northern Tanzania*, 38 HUM. ECOLOGY 312, 314 (2010).

158. Bekele Megersa et al., *Impacts of Climate Change and Variability on Cattle Production in Southern Ethiopia: Perceptions and Empirical Evidence*, 130 AGRIC. SYS. 23, 24 (2014).

159. CECILIA M. LEWERI ET AL., RAINFALL VARIABILITY AND SOCIO-ECONOMIC CONSTRAINTS ON LIVESTOCK PRODUCTION IN THE NGORONGORO CONSERVATION AREA, TANZANIA pt. 4.2 (Discover Applied Sci., 2021).

160. TANZ. WILDLIFE RSCH. INST., STATUS AND DISTRIBUTION OF WILDLIFE, LIVESTOCK AND BOMAS IN AND AROUND SERENGETI ECOSYSTEM, TANZANIA 15 (2016).

161. SEF SLOOTWEG, *Climate Change and Population Growth in Pastoral Communities of Ngorongoro District, Tanzania*, in HANDBOOK OF CLIMATE CHANGE RESILIENCE 1, 17 (Walter Leal Filho ed., 2018).

162. *Id*.

163. David Nkedianye et al., *Livestock-Wealth Inequalities and Uptake of Crop Cultivation Among the Maasai of Kenya and Tanzania*, 14 WORLD DEV. PERSP. 1, 2 (2019).

their lands. Indigenous people were excluded from the management of parks, denied access to resources, and restricted from practicing their traditions and way of life within these areas. However, exclusionary conservation models are increasingly being replaced by approaches that recognize the rights of Indigenous people and local communities.[164] This shift is further reinforced by emerging jurisprudence from regional human rights systems, such as the Organization of American States, which uphold Indigenous land rights.

More inclusive management strategies—such as co-management and co-stewardship—are being implemented in protected areas across various regions. These approaches emphasize consultation and collaboration with Indigenous communities in decision-making and planning. Applying such models to the governance of the NCA could help shape more equitable and sustainable conservation policies that respect Indigenous rights while achieving conservation goals.

A. Bears Ears National Monument and the Bears Ears Inter-Tribal Commission

Under the Obama Administration, President Obama signed a proclamation that established the 1.35-million-acre Bears Ears National Monument.[165] The protection of the area was motivated by environmental and cultural preservation rather than wildlife. Most importantly, the Bears Ears Proclamations established a commission responsible for the management of the National Monument.[166] The commission is comprised of the Secretary of Interior, the Secretary of Agriculture, and one representative from each of the five tribes [167] making up the so-called Inter-Tribal Coalition.[168] The provision provides that the Secretaries of Interior and Agriculture: "shall meaningfully engage the commission" and "shall carefully and fully consider integrating the traditional and historical knowledge and special expertise of the Commission . . . ."[169] A written

164. Neil Dawson, *Journeys to More Equitable and Effective Conservation: The Central Role of Indigenous Peoples and Local Communities*, IUCN (Aug. 22, 2023) https://www.iucn.org/news/202308/journeys-more-equitable-and-effective-conservation-central-role-indigenous-peoples-and.

165. Establishment of the Bears Ears National Monument, 82 Fed. Reg. 1139, 1143 (Dec. 28, 2016).

166. *The Bears Ears Commission*, BEARS EARS INTER-TRIBAL COAL., https://www.bearsearscoalition.org/the-bears-ears-commission/ (last visited Apr. 20, 2025).

167. The Tribes include Hopi Nation, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe of the Uintah Ouray, and Zuni Tribe. Establishment of the Bears Ears National Monument, 82 Fed. Reg. 1139, 1143 (Dec. 28, 2016).

168. See *Who We Are,* BEARS EARS INTER-TRIBAL COAL., https://www.bearsearscoalition.org/about-the-coalition/ (last visited May 14, 2025) (explaining that the Bears Ears Inter-Tribal Coalition was founded by the leaders of the Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Pueblo of Zuni, and Ute Indian Tribe).

169. Establishment of the Bears Ears National Monument, 82 Fed. Reg. at 1144.

explanation should be provided if the Secretary chooses not adopt the tribal recommendation.[170] This collaborative model, though not yet fully implemented, offers a path forward in direct tribal management in land planning and cultural resource preservation on public lands.[171]

B. Alaska Native Co-Management of Marine Mammals

Federal and state authorities in Alaska aim to ensure a sustainable take of marine mammals for food and handicrafts by Alaskan natives[172] through self-regulation.[173] Since 2000, Executive Order 13175 has provided a framework for meaningful consultation and collaboration between Federal and Tribal Governments in the development of federal policies, legislation, regulations, and programs that may affect Tribal Governments and their members.[174]

Additionally, Section 119 of the Marine Mammal Protection Act allows the National Marine Fisheries Service or the U.S. Fish and Wildlife Service to establish agreements with Alaska Native Organizations.[175] These agreements support the development of marine mammal co-management structures and processes with Federal and State agencies; monitor the harvest of marine mammals for subsistence use; participation in marine mammal research; and the collection and analysis of data in marine mammal populations.[176] The agreements also "encourage the exchange of information regarding conservation, management, and utilization of marine mammals in" the waters of the United States in Alaska.[177] To the extent permitted by law, decisions in the co-management of marine mammals are based on the best available scientific information, "as well as traditional and contemporary Alaska Native knowledge and wisdom."[178]

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170. Establishment of the Bears Ears National Monument, 82 Fed. Reg. at 1144.

171. Daniel Cordalis & Amy Cordalis, *Civilizing Public Land Management in the Colorado River Basin*, *in* VISION & PLACE 242, 244 (Jason Robinson et al. eds. 2020)

172. "As a general rule, an . . . Alaskan Native person is someone who has blood degree from and is recognized as such by a federally recognized tribe or village (as an enrolled tribal member) and/or the United States. . . . Other factors include: a person's knowledge of his or her tribe's culture, history, language, religion, familial kinships, and how strongly a person identifies himself or herself as . . . [an] Alaskan Native." Indian Affs., *Who is an American Indian or Alaska Native?*, U.S. DEP'T OF THE INTERIOR (Aug. 19, 2017, 2:54 PM), https://www.bia.gov/faqs/who-american-indian-or-alaska-native.

173. *Consultations: Tribal Engagements & Consultations*, NOAA FISHERIES, https://www.fisheries.noaa.gov/topic/consultations/tribal-engagements-and-consultations (last visited Apr. 20, 2025).

174. Exec. Order No. 13175, 65 Fed. Reg. 67,249 (Nov. 6, 2000); *Id.*

175. 16 U.S.C. § 1388 (1972).

176. *Co-Management of Marine Mammals in Alaska*, NOAA FISHERIES https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/co-management-marine-mammals-alaska (last visited May 14, 2025).

177. *Id.*

178. *Id.*

C. Tribal Co-Management and Co-Stewardship of Federal Lands and Waters

The Biden Administration took significant "steps to strengthen the nation-to-nation relationship with Tribal Nations" by employing new procedures to "increase Tribal co-stewardship of lands and waters, incorporate Indigenous Knowledge into the Department's work, and preserve and protect sacred sites around the country."[179] Joint Secretary's Order 3403 (S.O.3403),[180] signed by Secretary of the Interior Deborah Haaland and Secretary of Agriculture Tom Vilsack, made a commitment to Tribal and federal co-stewardship of federal lands, waters, and wildlife through collaborative and cooperative agreements.[181] As of 2023, three Departments have signed almost 200 new co-stewardship agreements with Tribes, Alaska Native Corporations, and consortiums.[182]

D. Organization of American States

1. Mary and Carrie Dann v. United States[183]

Carrie Dann and her sister Mary led a decades-long resistance against the U.S. federal government's grazing permit system, which restricted their access to traditional Western Shoshone lands.[184] They argued that the system violated their treaty rights and Indigenous sovereignty, as it prevented them from grazing livestock without permits.[185] Their struggle highlighted broader injustices, including the U.S. government's denial of Western Shoshone land rights while enabling corporate exploitation through mining, nuclear waste disposal, and other harmful activities.[186] Despite their efforts, the U.S. Supreme Court ruled against them, declaring their land rights "extinguished" under domestic law.[187] Refusing to accept this outcome, Carrie Dann took

179. *Biden-Harris Administration Takes Steps to Increase Co-Stewardship Opportunities, Incorporate Indigenous Knowledge, Protect Sacred Sites*, U.S. DEPT. OF INTERIOR (Dec. 6, 2023) https://www.doi.gov/pressreleases/biden-harris-administration-takes-steps-increase-co-stewardship-opportunities.

180. U.S. DEP'T OF AGRIC., U.S. DEP'T OF INTERIOR, U.S. DEP'T OF COMMERCE, S.O. NO. 3403, AMEND. NO. 1, JOINT SECRETARIAL ORDER ON FULFILLING THE TRUST RESPONSIBILITY TO INDIAN TRIBES IN THE STEWARDSHIP OF FEDERAL LANDS AND WATERS (2022).

181. *Id*.

182. *Biden-Harris Administration Takes Steps to Increase Co-Stewardship Opportunities, Incorporate Indigenous Knowledge, Protect Sacred Sites*, *supra* note 179.

183. Mary and Carrie Dann v. United States, Case 11.140, Inter-Am. Comm'n H.R., Report No. 75/02, doc. 5 (2002).

184. *Western Shoshone*, JAMES E. ROGERS COLL. OF L., https://law.arizona.edu/western-shoshone (last visited April 20, 2025).

185. *Id.*

186. *Id.*

187. *Id.*

the case to the Inter-American Commission on Human Rights, which condemned the U.S. for violating their rights and criticized the lack of due process and just compensation in the government's land seizure practices.[188]

2. Saramaka People v. Suriname

Saramaka People v. Suriname involved a long-standing dispute over land rights for the Saramaka, a group descended from African slaves who gained freedom and settled in Suriname in the 1700s.[189] While not officially recognized as Indigenous, the Saramaka people maintain a deep cultural, spiritual, and economic connection to their land, which they use for fishing, hunting, and craftsmanship.[190]

In 1986, Suriname's constitution declared that all land without formal titles, including that of the Saramaka, was state-owned.[191] In the 1990s, the Surinamese government authorized mining and logging activities within the Saramaka's ancestral lands without consulting them or obtaining their consent.[192] This prompted the Saramaka people to file a complaint with the Inter-American Commission on Human Rights in 2000, asserting that they had a right to their land for cultural and subsistence purposes, even if they did not have formal land titles.[193]

By 2006, the case had moved to the Inter-American Court of Human Rights.[194] The Court ruled that, despite the Saramaka's non-Indigenous status, their relationship to the land bore strong similarities to that of Indigenous communities and thus warranted similar protections.[195] The Court stated that their long-standing occupation and use of the land was sufficient to establish ownership, even without formal title.[196]

The Court concluded that Suriname had violated several provisions of the American Convention on Human Rights, particularly the rights to property and judicial protection (Article 21 and 25).[197] The ruling required Suriname to officially demarcate and grant collective title to the Saramaka's land in accordance with their customary laws, while ensuring they were fully

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188. *Western Shoshone*, JAMES E. ROGERS COLL. OF L., https://law.arizona.edu/western-shoshone (last visited April 20, 2025).

189. *Case of the Saramake People v. Suriname*, ESCR-NET (April 2, 2014) https://www.escr-net.org/caselaw/2014/case-saramaka-people-v-suriname/.

190. *Id.*

191. *Id.*

192. *Id.*

193. *Id.*

194. *Id.*

195. *Case of the Saramake People v. Suriname*, ESCR-NET (April 2, 2014) https://www.escr-net.org/caselaw/2014/case-saramaka-people-v-suriname/.

196. *Id.*

197. Organization of American States, American Convention on Human Rights, Nov. 22, 1969, O.A.S.T.S. No. 36, 1144 U.N.T.S. 123; *Id.*

consulted before any land-related decisions were made.[198] Suriname was also instructed to halt any activities, such as mining or logging, that could affect the land and to review any existing concessions granted within Saramaka territory.[199]

Moreover, the Court ordered Suriname to adopt laws that would ensure better protection of the Saramaka's property rights, create mechanisms for meaningful consultation, and offer legal remedies for any violations.[200] The government was also directed to compensate the Saramaka people and to make the judgment publicly available in a way that could be understood by the community.[201]

E. Laponia World Heritage in Sweden

The Laponian Area, recognized as a World Heritage Site in 1996, is celebrated for both its exceptional natural beauty and its cultural significance to the Indigenous Sami people. This vast area encompasses pristine landscapes, including forests, lakes, and rivers, and is one of the best-preserved examples of a transhumance grazing system.[202] For centuries, large reindeer herds have been central to the Sami way of life, alongside practices such as fishing and hunting.[203]

After 15 years of unsuccessful negotiations, the Sami community's persistent advocacy led to the establishment of Laponiatjuottjudus in 2012, a management organization aimed at ensuring the Sami people's involvement in managing their ancestral lands.[204] Central to Sami's demands was the right to self-determination, with a call for direct control over land management.[205] The Sami refused to participate in management discussions until the Swedish government addressed issues of proper representation and power distribution.[206]

The statutes of Laponiatjuottjudus and its management plan now reflect a comprehensive approach that integrates cultural and natural conservation. The organization, which is primarily composed of Sami representatives,

198. *Case of the Saramake People v. Suriname*, ESCR-NET (April 2, 2014) https://www.escr-net.org/caselaw/2014/case-saramaka-people-v-suriname/.

199. *Id.*

200. *Id.*

201. *Id.*

202. *Laponian Area*, UNESCO WORLD HERITAGE CONVENTION, https://whc.unesco.org/en/list/774/ (last visited Apr. 25, 2025).

203. Elsa Reimerson, *Traditional Knowledge and the Management of the Laponia World Heritage Site*, CURRENT CONSERVATION (Mar. 2, 2013), https://www.currentconservation.org/traditional-knowledge-and-the-management-of-the-laponia-world-heritage-site-2/.

204. *Id*.

205. *Id.*

206. *Id*.

operates on a consensus-based decision-making process.[207] This structure ensures that Indigenous governance and perspectives are central to the protection and preservation of the Laponian Area.[208]

F. Canada

In *Haida Nation v. British Columbia (Minister of Forests)*,[209] the government of British Columbia (the Crown) issued a Tree Farm License (TFL) to a forestry company, permitting them to harvest trees on land that the Haida Nation claimed as their own.[210] Later, the TFL was transferred to Weyerhaeuser, another forestry company, giving it exclusive rights to harvest timber on nearly a quarter of the Haida Nation's claimed territory.[211] Despite objections from the Haida Nation regarding the environmental impacts, the rate of logging, and the methods used, no changes were made. In response, the Haida Nation filed a lawsuit, arguing that the government had issued and transferred the TFL without their consent and in defiance of their objections.[212]

The Supreme Court of Canada ruled that the Crown has an obligation to consult with Indigenous people when making decisions that may affect their rights or land, even if those rights have not yet been legally recognized.[213] In this case, the Court found that the Haida Nation had a strong case for their claims to the land and their Aboriginal right to harvest red cedar, and that these claims were relevant to the land in question. The Court held that the duty to consult the Haida Nation was triggered when the TFL was replaced, as the province was aware that this decision could impact the Haida's potential rights.[214]

The Court emphasized that TFL decisions play a central role in the strategic planning of natural resources and have significant implications for Aboriginal rights. Therefore, the Crown is required to engage in meaningful consultation with Indigenous communities at the stage of granting or renewing TFLs.[215] Given the strength of the Haida Nation's claims and the serious impact of such strategic decisions on their interests, the Crown's duty

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207. Reimerson, *supra* note 203.

208. U.N EDUC. SCI. & CULTURAL ORG. & LAPONIA UPPTOGS PÅ VÄRLDSARVSLISTAN 1996, TJUOTTJUDUSPLÁNA MANAGEMENT PLAN (2014), https://laponia.nu/wp-content/uploads/2014/08/Laponia-forvaltningsplan-eng-web-150327_2.pdf.

209. Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511 (Can.).

210. *Id.* at 512.

211. *Id.*

212. *Id.* at 513.

213. *Id.* at 514.

214. *Id.*

215. Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511 (Can.).

may require substantial accommodation to protect Indigenous rights, even while their title claims remain unresolved.[216]

The Court further explained that the duty to consult and accommodate Indigenous people stems from the principle of the honor of the Crown.[217] This principle obligates the Crown to engage with Indigenous people in good faith, even before formal claims are resolved.[218] Although unproven Aboriginal rights do not create a fiduciary duty, the Crown must not disregard Indigenous interests when those interests are actively being pursued in legal processes or treaty negotiations.[219] The Court's decision reinforces that the duty to consult and accommodate is part of a broader framework for fair dealing and reconciliation, which starts with the assertion of Crown sovereignty but extends to protecting Indigenous rights throughout the legal process. This duty arises when the Crown has knowledge of a potential Aboriginal right or title and considers actions that could harm those rights.[220] The Court affirmed that requiring consultation and accommodation before final claims resolution is essential to respect Indigenous interests and ensure a just reconciliation process.[221]

G. The Teen Tok Village, Thailand

The Teen Tok village, located in Kanchanaburi Province, Thailand,[222] has been home to its residents for approximately 250–300 years.[223] The villagers primarily rely on subsistence farming, with rain-fed rice cultivation forming the foundation of their diet. In addition to rice, around 80% of the community grows maize as their main cash crop, along with other vegetables and fruits for sale.[224]

In 1961, Thailand passed the National Park Act,[225] aiming to conserve the country's forests in their natural state.[226] This led to the creation of Sri Nakarin National Park and the Charlem Rattanakosin Forest Reserve in 1980

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216. Haida Nation v. British Columbia (Minister of Forests), [2004] 3 S.C.R. 511 (Can.).

217. *Id.* at 513.

218. *Id.*

219. *Id.* at 523.

220. *Id.* at 529.

221. *Id.* at 530–31.

222. Rawee Thaworn et al., *Can Biodiversity Conservation Go Hand in Hand with Local Livelihoods? A Case of Conflict Resolution in Thailand*, 61 UNASYLVA 28, 30 (2010).

223. *Id.*

224. *Id.*

225. *See generally* National Parks Act, B.E. 2562 (2019) (Thai.) (codifying the National Parks Act in Thailand).

226. Ahmad Dhiaulhaq et al., *Transformative Mediation, A Tool for Maximising the Positives Out of Forest Conflict: A Case Study from Kanchanaburi, Thailand*, *in* FOREST UNDER PRESSURE 285, 286 (Pia Katila et al. eds., Int'l Union of Forest Rsch. Orgs. 2014).

and 1981, respectively.[227] However, these protected areas were established without consulting the local communities, including the villagers of Teen Tok, who had lived in the region for generations.[228] As a result, their traditional methods of maintaining their livelihoods—such as farming, hunting, and rice cultivation—were abruptly prohibited, causing significant tension and hardship.[229]

The conflicts that arose were primarily due to two factors: the government's imposition of protected status over the villagers' ancestral lands without recognizing their customary rights, and the lack of consultation with the community during the decision-making process. Additionally, the park's management plan failed to consider the villagers' essential livelihood needs, further exacerbating the situation.[230]

By the late 1980s and early 1990s, the conflict escalated, leading to arrests, land confiscations, and increasing disputes as villagers fought to reclaim their land.[231] In 1999, although some restrictions on subsistence farming were relaxed, tensions remained high.[232] A temporary agreement was reached, permitting the villagers to engage in swidden farming (slash and burn agriculture) for a five-year period, but a permanent solution still remained elusive.[233]

A shift came in 1997 with the adoption of a new Thai Constitution,[234] which required consultation with local communities before establishing protected areas and recognized their right to participate in sustainable resource management.[235] Following this constitutional change, a 1998 cabinet resolution acknowledged the presence of local communities in protected areas but imposed limitations on settlement expansion.[236]

In 2001, the Thai government launched the Community Participation in National Park Management pilot project, targeting Charlem Rattanakosin National Park and six other protected areas.[237] However, this initiative faltered due to insufficient community involvement, lack of support for demarcating park boundaries, and resistance to the regulations imposed.[238]

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227. Dhiaulhaq et al., *supra* note 226, at 287.
228. *Id.*
229. *Id.*
230. Thaworn et al., *supra* note 222, at 30.
231. *Id.* at 31.
232. *Id.*
233. *Id.*
234. *See generally* Radthathammanoon (B.E. 2534)–1997 (Thai.) (codifying the Thailand Constitution).
235. *Id.*
236. Dhiaulhaq et al., *supra* note 226, at 287.
237. *Id.*
238. *Id.*

The turning point occurred in 2004, when the Sueb Nakhasathien Foundation and the Danish International Development Agency introduced the Joint Management of Protected Areas Initiative.[239] This collaborative project involved the villagers, the Department of National Parks, Wildlife and Plant Conservation, and the Ministry of Natural Resources and Environment.[240] By 2006, a successful collaboration resulted in the demarcation of village-use zones within the two protected areas.[241]

Under the newly established regulations, villagers were permitted to sustainably harvest forest products such as medicinal plants, leaves, mushrooms, and fruits.[242] National park authorities were also required to notify the village committee before conducting boundary inspections related to swidden farming, with these inspections being carried out jointly by forestry officials and community representatives.[243]

To support conservation efforts, the community developed its own sanctions for those violating the management regulations, including social boycotts of events like weddings and funerals.[244] This approach helped expand the Teen Tok village's Forest Conservation Network, which now includes five neighboring villages. Together, these communities formed the Forest Protection Volunteer Network, with over 150 volunteers working alongside national park officers to protect the forest, monitor its health, and prevent fires.[245]

These cases highlight that conservation and sustainable resource use are not mutually exclusive. Engaging Indigenous communities as active partners in the management of protected areas—through genuine consultation and collaboration—leads to more inclusive and effective conservation efforts. Furthermore, when domestic avenues for justice are exhausted, international human rights mechanisms can serve as important channels for redress in matters concerning Indigenous rights. The next section explores how these approaches can be adapted and implemented in Tanzania.

VI. PROPOSED SOLUTIONS AND RECOMMENDATIONS

This article highlights how Tanzania's fortress conservation approach, which excludes the Indigenous Maasai people, has resulted in continued displacement and adverse impacts. The NCAA continues to prioritize preservation for conservation and tourism at the expense of the Maasai

239. Thaworn et al., *supra* note 222, at 31.
240. *Id.*
241. *Id.* at 31–32.
242. *Id.* at 32.
243. *Id.*
244. *Id.*
245. Thaworn et al., *supra* note 222, at 32.

people's rights to land and resources. As a result, the current regulatory framework violates the Maasai people's food sovereignty, a right protected under both Tanzanian and international law. To address these challenges, a co-management framework should be implemented in the NCA, ensuring collaborative decision-making between the NCAA and Maasai representatives. This model would ensure that conservation policies balance environmental protection with the Maasai's livelihoods, including the reinstatement of designated areas for subsistence cultivation to enhance food security during droughts. Additionally, a formal consultation mechanism would provide the Maasai people with a voice in land-use planning, resource distribution, and tourism revenue-sharing. Inspired by Laponiatjuottjudus governance in Sweden's Laponian Area,[246] such a framework would integrate Indigenous scientific knowledge with conservation science, creating a more inclusive and sustainable system for managing the NCA.

The human rights struggle of the Maasai people in Ngorongoro also closely reflects that of Carrie and Mary Dann. Both cases underscore how Indigenous communities confront state-imposed systems that threaten their land, identity, and self-determination. As U.S. grazing permits restricted the Danns' access, Tanzanian conservation policies similarly constrain the Maasai's ability to graze livestock, cultivate crops, and culturally self-determine. In both contexts, the land has been exploited—through mining and waste disposal in the U.S., and through tourism and conservation in Tanzania—while Indigenous rights are marginalized. When U.S. courts failed the Danns, they turned to the Organization of American States, a path the Maasai have similarly pursued through the East African Regional Court (East African Court of Justice), though with limited success.[247]

Given Tanzania's colonial history and the judiciary's reluctance to uphold Indigenous collective rights, domestic courts are unlikely to recognize legal claims rooted in food sovereignty or livelihood protection. Therefore, a legislative remedy is the more viable path forward. The British colonizers, the Tanzanian government, and other responsible entities owe a long-overdue moral debt to the Maasai people. This obligation should be addressed through reparations, including financial compensation, fair employment opportunities, capacity-building programs, and substantial investments in critical social services such as education and healthcare. Only through such structural reforms and reparative justice can the Maasai people's rights and livelihoods be genuinely safeguarded while fostering a more equitable conservation model.

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246. Reimerson, *supra* note 203.

247. Reuters, *Regional court dismisses Maasai eviction case against Tanzania government*, REUTERS (Oct. 1, 2022, 1:50 AM), https://www.reuters.com/world/africa/regional-court-dismisses-maasai-eviction-case-against-tanzania-government-2022-09-30/.

To address the harm inflicted on the Indigenous Maasai people by the Tanzanian government, seven key remedies are necessary:

(1) Recognition of collective land rights: Ensuring broader recognition of collective land rights is crucial for the meaningful restitution and protection of Maasai livelihoods. This includes integrating Maasai livelihoods into the management objectives of the NCA, such as securing access to migratory routes for pasture, water, saltlicks, and amending the Ngorongoro Conservation Area Authority Act to permit subsistence cultivation.
(2) Land tenure reform: Constitutional and legislative reforms must explicitly strengthen collective land rights, provide legal safeguards that resolve land conflicts, and uphold the Maasai's rights within the NCA. Such reforms would offer greater security and protection against forced evictions and land dispossession.
(3) Genuine participation in decision-making: The Maasai must be meaningfully involved at all levels of decision-making, with their free, prior, and informed consent required before implementing any restrictions, zoning laws, or changes in land use. Their voices must be central to shaping policies that affect their land and livelihoods.
(4) Support for Indigenous scientific knowledge and conservation initiatives: Strengthening community-based organizations and Indigenous scientific knowledge will empower the Maasai to develop their own conservation initiatives. This approach fosters collaboration, capacity building, and sustainable resource management. This ensures that conservation efforts respect and integrate traditional practices.
(5) Reparations: The Maasai community has endured significant socio-economic harm due to forced displacement, loss of traditional livelihoods, and exclusion from decision-making processes. To address these injustices, meaningful reparations should be comprehensive and multifaceted, including financial compensation, land restitution, employment opportunities, sustained investment in social services, and assurances of non-repetition. Compensation must adequately reflect the loss of land, livestock, and economic opportunities that have historically sustained their way of life, ensuring that past harms are redressed, and future livelihoods are secured.
(6) Fair and meaningful benefit-sharing of tourism revenues: A just and equitable benefit-sharing model should allocate a significant portion of tourism revenue directly to Maasai-led initiatives, including but not limited to education, healthcare, and sustainable livelihood programs. Furthermore, Maasai individuals should have priority

access to employment opportunities in conservation, park management, and tourism sectors. Ultimately, benefit-sharing should not be limited to symbolic compensation, but should function as a sustainable mechanism for economic empowerment and self-determination, aligning conservation goals with the rights and well-being of Indigenous communities.

(7) The Government of Tanzania should recognize that monetary compensation alone is not always an appropriate or sufficient remedy for property loss, especially in cases involving Indigenous people whose cultural identity, livelihoods, and spiritual well-being are deeply rooted in their lands and natural resources. For Indigenous communities, land is not merely a commodity, but a foundation of their existence.

(8) Governments, international bodies, and other relevant stakeholders should take concrete and proactive measures to protect and promote the cultural rights of the Maasai people, in alignment with international human rights frameworks, including the U.N. Declaration on the Rights of Indigenous Peoples (UNDRIP) and other relevant instruments. Indigenous people must not be subjected to assimilation or cultural suppression that threatens their unique identity. Rather, any efforts to integrate Indigenous communities into national social and political frameworks must ensure the protection of their right to maintain and practice their distinct cultural traditions and ways of life.

(9) Establishment of an Independent Accountability Body: A neutral and independent body should be created to oversee and implement accountability mechanisms for violations of Maasai livelihoods resulting from conservation and tourism policies in the NCA. This body would ensure that any infringements on Indigenous rights are addressed through transparent and just processes.

Through these remedies, the Tanzanian government can begin to foster an environment where Maasai people in the NCA are empowered to thrive while simultaneously contributing to the conservation and sustainable management of their lands.

CONCLUSION

Environmental justice necessitates that courts recognize the collective rights of the Massai people, which are uniquely essential not only to their right to food but also to the preservation of their cultural identity and contributions to conservation. While limiting local access to vital resources

may yield short-term conservation gains, such restrictions risk undermining long-term sustainability in the NCA if they exclude the active and meaningful participation of the Maasai people in its management. A just and effective conservation approach must also involve capacity-building and integrating Maasai traditional scientific knowledge into management practices. Promoting self-determination, co-management, and co-stewardship with the Maasai community is not only a matter of rights but a necessary strategy for ensuring the NCA's enduring ecological and cultural integrity.

WHAT LIES BENEATH: IS AMERICA'S MOST COMMON METHOD FOR DISPOSING OF OILFIELD WASTEWATER LEGAL?

*Justin Nobel & Megan M. Hunter**

INTRODUCTION[1]

It is well understood that the oil and gas industry enjoys a host of exemptions from the United States' environmental laws.[2] Indeed, nearly every one of our bedrock environmental statutes or their implementing regulations have nestled inside them some exemption for the oil and gas industry. These exemptions are so well-known that they are in some cases known by name: the Safe Drinking Water Act's (SDWA's) Halliburton Loophole and the Resource Conservation and Recovery Act's (RCRA's) Bentsen Amendment.[3]

This article is about an even more insidious exemption. This exemption is nameless and appears nowhere in statute, regulation, or even formal agency guidance. Rather, it is an unwritten practice of the United States Environmental Protection Agency (EPA). The article calls this exemption the "Class II Loophole." Put simply, the Class II Loophole is the practice of turning a blind eye to the fact that the liquid brew that emerges as a waste product from fracking (often called simply "produced water," "brine," or "salt water") plainly meets the SDWA's definition of "radioactive waste" and must be regulated accordingly.

This article tells the history of the Class II Loophole, describe its effects, and makes the case for closing it. It argues that closing the Class II Loophole requires no new regulation, no act of Congress, merely the enforcement of existing SDWA regulations. Section I provides a primer on radioactivity. Section II explains the SDWA's Underground Injection Control Program (UIC), including its role in regulating radioactive wastes. Section III details the radioactive constituents of oil and gas wastes. Section IV describes the rise of Class II disposal wells as a predominant method of oil and gas waste disposal. Section V presents current environmental and public health harms associated with Class II injection well disposal. Section VI documents EPA's understanding of how the SDWA applies to radioactive wastes and oil field wastes, and the oil and gas industry's own understanding of how the SDWA applies to its wastes. Section VII then makes the case for the immediate regulation of produced water as "radioactive waste" under the SDWA.

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* Megan Hunter is an environmental litigator who has been working on oil and gas field waste issues in the Marcellus and Utica shale plays for nearly a decade. Justin Nobel is an award-winning investigative science journalist whose seven years of research and reporting on this topic recently resulted in the book, "Petroleum-238: Big Oil's Dangerous Secret and the Grassroots Fight to Stop It." The stories and legal analysis presented herein capture work developed individually in our respective roles and brought together collaboratively in this work.

1. All legal opinions expressed herein are solely the view of the authors and are not expressed on behalf of, nor can they be attributed to, any organization.

2. Adam Kron, *EPA's Role in Implementing and Maintaining the Oil and Gas Industry's Environmental Exemptions: A Study in Three Statutes*, 16 VT. J. ENV'T L. 586, 587 (2015).

3. *Id.* at 588.

This article makes the case for applying regulations already on the books in order to protect our drinking water and people's health, and tells an important story. It is a story about the underground Earth, what lies deep beneath our feet yet is connected to our world and its water in myriad ways; a story about how it came to be that the United States annually injects approximately a trillion gallons of oilfield wastewater via a disposal technique that, as this article demonstrates, lacks scientific merit;[4] a story about little-known legal risks and liabilities to a waste disposal practice that has become stunningly commonplace, yet most Americans have no idea it even exists. Most importantly, this is a story about a diverse group of people in rural and rust-belt America standing up to protect their communities. Many of them have been oppressed and contaminated across generations by aggressive extractive industries and repeatedly let down by paltry regulations. Some are workers in the oil and gas industry, tending the wells or driving trucks of waste. Quite a few of these people tend not to call themselves environmentalists, even though they may live a life more deeply immersed in their local environment than most environmentalists. Among many others, this is a story about Felicia Mettler, a former Ohio elementary school archery instructor who co-founded an advocacy group called "Torch CAN DO" to hold accountable an injection well in her rural southeast Ohio community. Her daughters, Autumn and Alexus, who she pulled into the fight, participated in a series of artful protests at the site. They dressed as monsters for a Halloween "Frackenstine Rally" and, inspired by Alice in Wonderland, dressed as fairies and hosted a toxic tea party.[5]

One morning in Ms. Owen's class, in Coolville, Ohio, a nervous eight-year-old Alexus Mettler stood up before her fellow third-graders, strode to the front of the classroom, and made a speech about injection wells, where fracking wastewater is injected deep underground. "I said basically it was radioactive and nobody knew about it and I told people my mom was trying to stop it and nobody was believing her," says Lexie, as she likes to be called.[6] "I remember the class kind of quiet, then I heard a couple people laughing."[7]

But there is really no reason to laugh. The string Lexie was pulling on is a string that could unravel the entire oil and gas industry, and to understand how and why, we must go back to the beginning, or at least the beginning of the modern story of radioactivity.

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4. ALL CONSULTING, U.S. PRODUCED WATER VOLUMES AND MANAGEMENT PRACTICES IN 2021 8 (2022).

5. JUSTIN NOBEL, PETROLEUM-238: BIG OIL'S DANGEROUS SECRET AND THE GRASSROOTS FIGHT TO STOP IT 215 (Karen LeBlanc ed., 2024).

6. Interview by Justin Nobel with Felica Mettler and Alexis Mettler (Oct. 2024) (on file with author).

7. Correspondence with Felica Mettler and Alexis Mettler (Oct. 2024) (on file with author).

I. RADIOACTIVITY—THE SCIENCE AND HISTORY

Marie and Pierre Curie discovered radium, but it was Dr. Harrison Martland, a Newark, New Jersey medical examiner, who made the radioactive element famous.[8] During the mid-1920s, Martland began to notice unusual bone and blood cancers in a curious set of female patients, along with a lethal condition that came to be called radium jaw, in which the bones of the mouth rot and crumble to pieces.[9] Martland, who helped found the field of occupational health medicine, was able to crack the code on an extraordinary industrial secret, and it involved timepieces.[10] When radium was put in paint, the radiation released as it decayed excited zinc sulfide molecules.[11] The women who piqued Martland's concern worked in factories, applying this paint to the dials of clocks and watches, which caused them to glow in the dark.[12] Martland theorized that in regularly running their brushes between their lips to keep the tips firm, these women had accidentally ingested significant amounts of radium, and a portion had gone to their bones.[13] Radium is in the same column of the Periodic Table as calcium, and chemically-speaking, the elements resemble and act like one another.[14] Martland believed it was radium that caused the cancers and jaw-rot that killed these women—the infamous radium girls.[15]

Many notable scientists of the day denied radium posed radiological risks.[16] Among them was James Ewing, a pioneering American cancer researcher who had appeared on the cover of Time Magazine in 1931 as "Cancer Man Ewing."[17] Ewing helped found both the American Society for the Control of Cancer, which became the American Cancer Society, and a

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8. *Marie Curie: Her Story in Brief*, THE AM. INST. OF PHYSICS (2000), https://history.aip.org/exhibits/curie/brief/index.html.; *Harrison S. Martland's Research Proved that Ra-226 Caused Death of the Radium Dial Painters*, RUTGERS N.J. MED. SCH., https://njms.rutgers.edu/departments/division_radiation/history_pub.php (last visited Apr. 19, 2025).

9 . Harrison Martland, *The Occurrence of Malignancy in Radioactive Persons: A General Review of Data Gathered in the Study of the Radium Dial Painters, With Special Reference to the Occurrence of Osteogenic Sarcoma and the Inter-Relationship of Certain Blood Diseases*, 15 AM. J. CANCER 2435, 2440–41 (1931).

10. RUTGERS N.J. MED. SCH., *supra* note 8.

11. NOBEL, *supra* note 5.

12. *See generally* KATE MOORE, THE RADIUM GIRLS: THE DARK STORY OF AMERICA'S SHINING WOMEN (Sourcebooks 2017) (telling the story of the women who worked in factories that used radium).

13. Martland, *supra* note 9, at 2436.

14. Mary Beth Genter, *Magnesium, Calcium, Strontium, Barium, and Radium*, *in* 1 PATTY'S TOXICOLOGY 145, 148, 159 (Eula Bingham & Barbara Cohrssen eds., 6th ed. 2012).

15. Martland, *supra* note 9, at 2436.

16. Matthew Tontonoz, *What Ever Happened to Coley's Toxins?*, CANCER RSCH. INST. (Apr. 2, 2015), https://www.cancerresearch.org/blog/april-2015/what-ever-happened-to-coleys-toxins; *see* Arty R. Zantinga & Max J. Coppes, *James Ewing (1866–1943): "The Chief"*, 21 MED. & PEDIATRIC ONCOLOGY 505, 508 (1993) (noting Ewing's belief that radiation is a cure for cancer, not a cause).

17. *Professor James Ewing: Jan. 12, 1931*, TIME MAG., https://content.time.com/time/covers/0,16641,19310112,00.html (last visited Apr. 19, 2025).

clinical cancer research unit at Memorial Hospital in New York, now Memorial Sloan Kettering Cancer Center.[18] Ewing served as an expert witness for the U.S. Radium Corporation, from which the women were trying to secure damages for their tragic condition.[19] He doubted radium had seriously harmed them, and in court quibbled at the medical expenses they were racking up, which U.S. Radium had to pay for.[20] Nevertheless, Martland supported his theory with dazzling science. He performed autopsies on half a dozen radium girls and discovered their bones were filled with radium.[21] "For instance in the year 3491 A.D.," Martland wrote in his seminal 1931 paper in *The American Journal of Cancer*, "the skeleton will still be giving off 185,000 alpha particles per second."[22] Using a device called an electroscope, which indicates electrical charge, he also measured the women's exhaled breath, demonstrating that it was radioactive.[23] As the women's radium-filled bones were continuously producing the radioactive gas radon, the direct daughter product of radium, some would inevitably escape the body through the mouth, essentially transforming the women into human radioactive chimneys.[24]

From his research with the radium girls, Martland came away with several important revelations: radiation can cause cancer, we live on a radioactive planet so some cancer may be expected, and increasing our exposure to radioactivity by even minute amounts may increase the amount of cancer.[25] "The radium cases should be looked upon as an unfortunate but valuable experiment," he warned in his 1931 paper, "in which, through ignorance and lack of proper governmental supervision, human beings have been allowed to swallow, over long periods of time, radio-active substances."[26]

In a way, Martland's alarm bell has been heard. The medical community knows about radium, and EPA has strict standards, regarding, for example, the permissible level of radium in drinking water, 5 picocuries per liter (pCi/L).[27] The Nuclear Regulatory Commission created a multitude of tables

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18. *History of Medicine: Time Magazine's "Cancer Man,"* COLUM. SURGERY, https://columbiasurgery.org/news/2015/07/23/history-medicine-time-magazines-cancer-man (last visited Apr. 19, 2025); *Professor James Ewing: Jan. 12, 1931*, TIME MAG., https://content.time.com/time/covers/0,16641,19310112,00.html (last visited Apr. 19, 2025).

19. MOORE, *supra* note 12 at 157, 241.

20. *Id.*

21. Martland, *supra* note 9, at 2435-516.

22. *Id*. at 2510.

23. *Id*. at 2438, 2453, 2470.

24. *Id*. at 2453, 2470.

25. *Id*. at 2513–14.

26. *Id*. at 2436.

27. 40 C.F.R. § 141.66(b) (2024). The curie is a unit used to measure the rate of radioactive decay and named for Pierre and Marie Curie, who received the Nobel Prize for their groundbreaking work on

covering hundreds of different radioactive elements and their various isotopes setting limits protecting human health.[28] Numerous federal and state agencies incorporate these limits into their own regulations for radioactivity, including EPA's regulations implementing the SDWA.[29]

People connected to the oil and gas industry will often point out that even bananas are naturally radioactive, but the statement is designed to mislead, and helps cloak the dangers posed by oilfield radioactivity.[30] "A banana's radioactivity comes from a radioactive isotope of potassium which has a half-life of over a billion years and in decay gives off a beta particle to become nonradioactive elements."[31] The radioactive isotopes brought to the surface in oil and gas production decay to other radioactive isotopes, and these too will decay. With each decay, radiation is blasted off.[32]

> Sludge sitting in the bottom of a brine truck or tank, or scale stuck to the inside of an oilfield pipe gives off radiation in the form of gamma rays, beta particles, and alpha particles. Gamma rays can travel several hundred feet through the air, go right through a human body, and even go through concrete and steel. Beta are minuscule particles and can go several feet through the air and penetrate human flesh. But of greatest concern are alpha particles, which are many thousands of times heavier than a beta particle and travel at a speed of 12,430 miles per second. The outer layers of human skin or a piece of paper are dead and act as shielding, absorbing an alpha particle's incredible energy. But the soft lining of an organ, the marrow of a bone, or the delicate tissue of the lung is very much alive. An alpha particle fired off here will smash about the cellular space, colliding with tens of thousands of different things. Any hit to the nucleus can break strands of DNA, usually killing the cell, or worse, leaving it genetically mutated, damage that can lead to cancer.[33]

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radioactivity. Daniel J. Bell, *Curie (unit)*, RADIOPAEDIA, https://radiopaedia.org/articles/curie-unit (May 5, 2021). A picocurie is one trillionth of a curie. *Picocurie*, MERRIAM-WEBSTER, https://www.merriam-webster.com/medical/picocurie (last visited May 7, 2025).

28. 10 C.F.R. § 20 (2024).

29. *See, e.g.*, 40 C.F.R. § 146.3 (defining "radioactive waste" as "any waste which contains radioactive material in concentrations which exceed those listen in 10 CFR part 20, appendix B, table II column 2"). Radium-226 and radium-228, individually and combined, appear in the table with a limit of 60 picocuries per liter. 10 C.F.R. pt. 20, app. B tbl. 2, col. 2.

30. NOBEL, *supra* note 5, at 57.

31. *Id.*

32. Telephone Interview with Dr. Marco Kaltofen, Nuclear Forensic Scientist (May 2, 2020) (on file with author).

33. NOBEL, *supra* note 5, at 57–58.

Oilfield waste happens to contain a number of radioactive isotopes that emit alpha particles as they decay, including radium-226, radon-222, and five different isotopes of polonium.[34] Working in a contaminated workspace littered with piles of sludge or open pits of brine provides several pathways for workers to inhale or inadvertently ingest these elements. Even wearing some protective gear, workers cleaning out a tank can get their underclothes, faces, boots, and bodies splattered in sludge, including their hands. Because workers are uninformed, easily preventable actions can still lead to exposures, such as drinking a soda, smoking a cigarette, or not washing their hands before eating lunch.[35]

Whether or not elevated levels of radium in drinking water can over time cause human health harms and cancers is a complicated question. In 2019, investigative reporters at the Pittsburgh Post-Gazette revealed that in the community of Cecil, five cases of Ewing sarcoma had been diagnosed since 2008. Cecil is in Washington County, in the heart of southwestern Pennsylvania's Marcellus shale boom.[36] Across this four-county region, from 2008 through 2018, 27 cases of Ewing sarcoma were reported.[37]

Six cases of Ewing's were diagnosed within the Canon-McMillan School District alone, and several kids had attended the local high school together, known as Canon-Mac, in Canonsburg, Pennsylvania.[38] Luke Blanock was diagnosed with Ewing's in 2013, married his high school sweetheart in February 2016, and passed away that August.[39] In 2018, Canon-Mac graduate Mitchell Barton, who played baseball with Luke Blanock, was also diagnosed with Ewing's.[40] The Post-Gazette article described ten other cases of unusual cancer that were afflicting or killing the children and students of Cecil and Canon-Mac.[41] The cases included: one astrocytoma (brain and spinal cord); two osteosarcomas (bone); one liposarcoma (joint); one rhabdomyosarcoma (muscle); one Wilms tumor (kidney); one liver cancer; and two cases of leukemia (blood).[42]

David Spigelmyer, the 2019 president of the Marcellus Shale Coalition trade group that represents fracking interests in Pennsylvania, told the Post-

34. Telephone Interview with Dr. Marco Kaltofen, Nuclear Forensic Scientist (May 2, 2020) (on file with author).

35. *Id.*

36. NOBEL, *supra* note 5, at 292.

37. David Templeton & Don Hopey, *CDC, State Officials Investigating Multiple Cases of Rare Cancer in Southwestern Pa.*, PITTSBURGH POST-GAZETTE (Mar. 28, 2019, 7:54 AM), https://www.post-gazette.com/news/health/2019/03/28/Ewing-sarcoma-Washington-Westmoreland-cancer-Canon-McMillan-school-cecil-pennsylvania/stories/201903280010.

38. *Id.*

39. *Id.*

40. *Id.*

41. *Id.*

42. *Id.*

Gazette that attempts to link the incidence of Ewing sarcoma to the industry were without scientific or medical support.[43] His group cited a review of medical data by the American Cancer Society that found "no known lifestyle-related or environmental causes of Ewing tumors."[44]

Indeed, the medical profession supports this conclusion. "Doctors have not identified any risk factors that make one child more susceptible than another," says the American Academy of Orthopaedic Surgeons.[45] "Parents should know that there is nothing they could have done differently to prevent their child's tumor," says the Academy, and the disease "does not develop as a result of any dietary, social, or behavioral habits."[46] There are about 75 million children and adolescents in the United States and, according to Johns Hopkins University School of Medicine, about 225 of them are diagnosed with Ewing sarcoma each year. "The exact cause of Ewing sarcoma," says Johns Hopkins, "is not fully understood."[47]

Still, there is important research largely ignored among researchers, attorneys, regulators, and the oil and gas industry. During the 1990s, the Canadian epidemiologist Dr. Murray Finkelstein authored a pair of studies on naturally occurring radium contamination in drinking water and the presence of Ewing sarcoma and osteosarcoma among Ontario youths.[48] He wanted to know if there was an association between the amount of radium in home drinking water and the risk of death from these bone cancers.[49]

While studying Ewing sarcoma, Dr. Finkelstein was working as an epidemiologist for the province of Ontario and had access to reliable data. He obtained a computer tape containing the death certificates for Ontario residents between 1950 and 1983 and identified people 25 years or younger who had died of bone cancer during this time.[50] Dr. Finkelstein then linked these people to their birth certificates and found the patients' addresses at

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43. Templeton & Hopey, *supra* note 37.

44. *Id.*; David Templeton & Don Hopey, *Human Toll: Are the 27 Cases of Ewing Sarcoma Near Pittsburgh a Cluster?*, PITTSBURGH POST-GAZETTE (May 14, 2019), https://newsinteractive.post-gazette.com/ewing-sarcoma-cancer-cluster-pittsburgh-washington-westmoreland/.

45. *Diseases & Conditions: Ewing's Sarcoma*, AM. ACAD. OF ORTHOPAEDIC SURGEONS, https://orthoinfo.aaos.org/en/diseases--conditions/ewings-sarcoma (April 2019).

46. *Id.*

47. *Ewing Sarcoma in Adults*, JOHNS HOPKINS MED., https://www.hopkinsmedicine.org/health/conditions-and-diseases/sarcoma/ewing-sarcoma-in-adults (last visited Apr. 5, 2025).

48. Murray Finkelstein, *Radium in Drinking Water and the Risk of Death from Bone Cancer among Ontario Youths*, 151 CAN. MED. ASSOC. J. 565 (1994); Murray Finkelstein & Nancy Kreiger, *Radium in Drinking Water and Risk of Bone Cancer in Ontario Youths: A Second Study and Combined Analysis*, 53 OCCUPATIONAL ENV'T MED. 305 (1996).

49. Murray Finkelstein, *Radium in Drinking Water and the Risk of Death from Bone Cancer Among Ontario Youths*, 151 CAN. MED. ASSOC. J. 565, 565 (1994).

50. *Id.* at 566.

their times of death, and their mothers' addresses at their times of birth.[51] This meant water samples could be collected from the same drinking water source presumably used by the patient throughout their youth, and that water could then be sampled for radium.[52]

Finkelstein's paper reported the stunning result that even minute increases of radium in drinking water can lead to an increase in death from bone cancers, including Ewing sarcoma.[53] There is a "statistically significant" relationship between levels of radium in drinking water and Ewing sarcoma, he wrote.[54] Finkelstein co-authored a follow-up paper in 1996 which found an association between risk of osteosarcoma, the more common form of bone cancer, and birthplace exposure to radium in drinking water.[55] This paper did not find the same association for Ewing's, but it did not negate his prior results.[56]

II. THE SAFE DRINKING WATER ACT AND RADIOACTIVITY

Congress enacted the SDWA in 1974.[57] It included two main parts. The first focused on regulating public drinking water systems, including setting national drinking water standards and requirements for public drinking water suppliers.[58] The second—the UIC program—was designed to protect actual and potential sources of drinking water by protecting groundwater resources from contamination caused by underground injection of fluids or waste.[59]

In 1980, pursuant to the SDWA, EPA adopted regulations delineating five major Classes of injection wells and the types of waste they can receive.[60] EPA based these delineations on the wells' potential to endanger drinking water sources depending on their depth, injectate, and geologic setting.[61] Class I wells are for the injection of hazardous, non-hazardous, and radioactive wastes into deep rock formations.[62] Class II wells are for the

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51. Murray Finkelstein, *Radium in Drinking Water and the Risk of Death from Bone Cancer Among Ontario Youths*, 151 CAN. MED. ASSOC. J. 565, 566-67 (1994).

52. *Id*. at 567.

53. *Id.* at 565.

54. *Id*. at 565.

55. Murray Finkelstein & Nancy Kreiger, *Radium in drinking water and risk of bone cancer in Ontario youths: a second study and combined analysis*, 53 OCCUPATIONAL & ENV'T MED. 305, 307 (1996).

56. *Id*. at 307.

57. 42 U.S.C. § 300g *et seq.*; Sierra Club v. Chesapeake Operating, LLC, 248 F. Supp. 3d 1194, 1199–200 (W.D. Okla. 2017).

58. 42 U.S.C. § 300g *et seq.*; *Sierra Club*, 248 F. Supp. 3d at 1199–200.

59. 42 U.S.C. § 300g, *et seq.*; Miami-Dade Cnty. v. EPA, 529 F.3d 1049, 1052 (11th Cir. 2008).

60. 40 C.F.R. § 146.5 (2024). In 2010, EPA also added a sixth category, Class VI, for the injection of carbon dioxide into deep subsurface rock formation for long-term storage. *Id*. § 144.6(f).

61. ENV'T PROT. AGENCY, INTRODUCTION TO THE UNDERGROUND INJECTION CONTROL PROGRAM, 8, 12 (2003).

62. 40 CFR § 144.6(a).

injection of fluids associated with oil and gas production.[63] Class III wells are used to inject fluids for mineral extraction.[64] Class IV wells are shallow wells used for injection of hazardous and radioactive wastes.[65] Class V wells are for non-hazardous fluids.[66]

Radioactive waste is only permitted in Class I wells.[67] Aside from Class IV wells, a more recent class of wells designed for long-term storage of carbon dioxide, Class I wells are the most technically sophisticated well class, requiring the greatest regulatory attention.[68] The purpose of Class I wells is to inject waste deep into isolated rock formations separated from the lowest underground source of drinking water by layers of impermeable clay and rock.[69] All Class I wells have continuous monitoring for internal mechanical integrity and must submit quarterly reports to EPA or the delegated state director for those states with enforcement primacy.[70] Class I wells also require an ambient monitoring plan to help detect any migration before it reaches underground sources of drinking water wells.[71] EPA's website claims that the agency is not aware of any current radioactive waste injections into Class I wells.[72]

Class IV wells are a category designed strictly for use in enforcement.[73] Construction or injection into Class IV wells has been banned since 1984.[74] These wells present the greatest risks to drinking water sources.[75]

Class V wells serve as a catch-all category for all wells that are not one of the other classes of wells.[76] At the time of EPA's original UIC regulations, some Class V wells were used for the disposal of radioactive waste.[77] In 1999, addressing the need for more rigorous standards, EPA promulgated a

63. 40 CFR § 144.6(b).
64. *Id*. § 144.6(c).
65. *Id*. § 144.6(d).
66. *Id*. § 144.6(e).
67. *See* 40 C.F.R. § 146.5(a)(3) (2024) (defining Class I wells as, among other things, "[r]adioactive waste disposal wells. . . ."); *see also* 40 C.F.R. § 146.5(d) (2024) (defining Class IV wells as, among other things, wells used to dispose of radioactive waste); 40 C.F.R. §§ 144.13(a)(1)–(2) (prohibiting constructing or operating any Class IV well).
68. ENV'T PROT. AGENCY., *supra* note 61, at 41; *see* 40 C.F.R. § 146.81(a)–(d) (2024) (detailing the standards and criteria applicable to Class VI wells).
69. 40 C.F.R. § 146.5(a).
70. *Id.* § 146.13(b)–(c) (2024).
71. *Id.* § 146.13(d).
72. *Class I Industrial and Municipal Waste Disposal Wells*, ENV'T PROT. AGENCY, https://www.epa.gov/uic/class-i-industrial-and-municipal-waste-disposal-wells (last updated Mar. 12, 2025).
73. 40 CFR § 146.5(d); 40 C.F.R. § 144.13; ENV'T PROT. AGENCY, *supra* note 61, at 51.
74. 40 C.F.R. § 144.13.
75. ENV'T PROT. AGENCY, *supra* note 61, at 51.
76. 40 C.F.R. § 146.5(e).
77. *Id.* § 146.5(e)(11).

rule clarifying that radioactive waste could not be injected into Class V wells, and only Class I wells could receive this waste.[78]

Class II wells are for fluids "[w]hich are brought to the surface in connection with conventional oil or natural gas production."[79] Class II wells are sub-categorized as: II-D wells for the commercial disposal of brine into injection zones other than the production formation; II-R wells where brine is re-injected into the production formation for "enhanced recovery" of oil and gas; and II-H wells where hydrocarbons are injected for storage and reuse.[80] Class II wells do not require continuous monitoring or ambient monitoring and only require annual reporting.[81] Unlike Class I wells, Class II wells do not feature complete cementing of the protective long-string casing, and surface casing may not extend to below the lowest underground source of drinking water.[82] Thus, Class II construction standards are less protective of nearby drinking water sources than those for Class I wells.

III. RADIOACTIVITY IN OIL AND GAS WASTE

Brine, also called "produced water" because it is the fluid that surfaces with the production of oil and gas, is where many of the oil and gas industry's radioactive troubles begin.[83] Brine can be loaded with toxic levels of salt, elevated levels of heavy metals like lead and arsenic—and the radioactive metal radium. Radium is moderately soluble and thus flows to the surface with brine.[84] America's oil and gas industry generates more than three billion gallons of brine a day, or a trillion gallons a year.[85] If this brine was put into oil barrels, and these barrels were stacked atop one another, the barrels would

78. *See* EPA, State Implementation Guide, Revisions to the Underground Injection Control Regulations for Class V Wells (2000), available at https://www.epa.gov/sites/default/files/2015-08/documents/class5_state_imp_guid.pdf (last visited Feb. 6, 2005) (explaining that EPA found the full set of Class I regulations for permitting, construction, operation, monitoring, reporting, mechanical integrity testing, area of review, and plugging and abandonment to be applicable to wells injecting radioactive waste, and accordingly EPA had reclassified radioactive waste disposal wells injecting below underground sources of drinking water as Class I wells.).

79. 40 C.F.R. § 146.5(b)(1).

80. ENV'T PROT. AGENCY, *supra* note 61, at 45.

81. *Id.* at 46.

82. *Id.* at 47; *see also* 40 C.F.R. §§ 146.21–.24 (setting forth criteria and standards for Class II wells).

83. Peter Gray, *NORM Contamination in the Petroleum Industry*, 45 J. PETROLEUM TECH. 12, 12 (1993). Brine is known by many names and is sometimes even deceptively referred to as "saltwater," or simply "water." None of these colloquialisms change the chemical makeup of the toxic liquid described throughout this article.

84. *TENORM: Oil and Gas Production Wastes*, ENV'T PROT. AGENCY, https://www.epa.gov/radiation/tenorm-oil-and-gas-production-wastes (last updated Feb. 13, 2025).

85. ALL CONSULTING, *supra* note 4.

reach the moon and back almost 28 times,[86] a monumental waste stream that must be disposed of. The industry wants to keep and use the oil, gas, and natural gas liquids—fuels like butane, propane, and ethane—a plastics feedstock. The industry does not want this liquid waste (i.e. brine, a.k.a. produced water), and operators have never had a good solution for what to do with it all.[87]

The radioactive element radium is one of the most concerning contaminants in brine. UIC regulations in the SDWA define a liquid as "radioactive waste" at radium levels of 60 pCi/L.[88] In the oilfield setting, radium values are commonly presented as the addition of two of the radioactive element's isotopes, radium-226 and radium-228.[89] Pennsylvania Department of Environmental Protection data reveals radium levels in brine of the Marcellus formation far exceeds the UIC limit—averaging 9,330 pCi/L, and reaching as high as 28,500 pCi/L.[90] Existing data for oil and gas-bearing geologic formations across the nation reveals radium in brine is consistently over the threshold that would define it as radioactive waste under the SDWA.[91] What has America done with all of this waste, a good portion of which would be radioactive waste under the SDWA? We have swept it under the carpet.[92]

Figure 1. Maximum radium levels, and average radium levels (when available), in oilfield brine for oil and gas formations across the United States as recorded in various academic, government, and industry papers.

Name of Formation or Oilfield	Maximum Radium Level (Ra-226+Ra-228) / Avg	Source
Unnamed Michigan formation	29,000 pCi/L	K.P. SMITH ET AL., RADIOLOGICAL DOSE ASSESSMENT RELATED TO

86. Analyzing the number of barrels per year, converted to miles using the barrel's height, the distance covered equates to 28.6 trips to the moon and back, as the average distance to the moon is 238,855 miles. *How Far Away Is the Moon?*, ROYAL MUSEUMS GREENWICH, https://www.rmg.co.uk/stories/topics/how-far-away-moon# (last visited Apr. 6, 2025).

87. NOBEL, *supra* note 5, at 208.

88. *See* 40 C.F.R. § 146.3 (2024) (defining "radioactive waste" as "any waste which contains radioactive material in concentrations which exceed those listen in 10 CFR part 20, appendix B, table II column 2"). Radium-226 and radium-228, individually and combined, appear in the table with a limit of 60 picocuries per liter. 10 C.F.R. pt. 20, app. B tbl. 2, col. 2 (2024).

89. PERMAFIX, TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS 72 (TENORM) STUDY REPORT, (2016).

90. *Id.*

91. NOBEL, *supra* note 5, at 57, 190–91, 307–08, 310.

92. ALL CONSULTING, *supra* note 4 (i.e., it is injected).

		MANAGEMENT OF NATURALLY OCCURRING RADIOACTIVE MATERIALS GENERATED BY THE PETROLEUM INDUSTRY 14 (Sept. 1996).
Marcellus formation, Pennsylvania	28,500 pCi/L / 9,330 pCi/L	PERMAFIX, PENN. DEP'T OF ENV'T PROT., TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS (TENORM) STUDY REPORT 14 (2016).
Venango formation, Pennsylvania	25,408 pCi/L	*U.S. Geological Survey National Produced Waters Geochemical Database*, DEP'T OF THE INTERIOR, (Dec. 27, 2023), https://www.usgs.gov/tools/us-geological-survey-national-produced-waters-geochemical-database-viewer.[93]

93. Data on interactive map: Click "Launch Viewer" at left; at right under Formation, click off "All" so there are no formations listed; then type "Venango" into search and click box so only Venango formation emerges in viewer; zoom in so data points from Venango formation in western PA come clearly into view; at bottom of screen see chart and entry points under headings Y-axis and X-axis; adjust variables to display data points on graph thus: on Y-axis scroll down to Ra226 (radium-226), on X-axis scroll down to Ra228 (radium-228); hold cursor over that value and see the X-axis, or Ra228, is 24,000 pCi/L, and the Y-axis, or Ra226, is 1408 pCi/L, so total Ra226 + Ra228 readings are 25,408 pCi/L/.

Antrim formation, Michigan	22,358 pCi/L / 5,416 pCi/L	Wenjia Fan, Kim F. Hayes & Brian R. Ellis, *Estimating Radium Activity in Shale Gas Produced Brine*, 52 ENV'T SCI. & TECH. 10839 (2018) (Supporting Information on file with author).
Texas Panhandle	10,640 pCi/L	R. STEPHEN FISHER, NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM) IN PRODUCED WATER AND SCALE FROM TEXAS OIL, GAS, AND GEOTHERMAL WELLS 26 (1995).
Clinton formation, Ohio	9,602 pCi/L	Memorandum, Ohio Dep't of Nat. Res., Div. of Oil & Gas, Radium Testing Results for Conventional Brine (2018) (on file with author).
Bakken formation, North Dakota	6,490 pCi/L / 3,632 pCi/L	E-mail from Jay C. Almlie, Principal Eng'r, Energy & Enf't Rsch. Ctr., Univ. N.D., to Justin Nobel, author (Nov. 27, 2019, 9:52 AM) (on file with author).
Helderberg Ls formation, New York	3,900 pCi/L	*U.S. Geological Survey National Produced Waters Geochemical Database*, DEP'T OF THE INTERIOR, (Dec.

		27, 2023), https://www.usgs.gov/tools/us-geological-survey-national-produced-waters-geochemical-database-viewer.[94]
Gulf Coast, US	2,801 pCi/L	Earl S. Snavely, Jr., *Radionuclides in Produced Water*, AMERICAN PETROLEUM INSTITUTE 79 (Aug. 16, 1989) (on file with author).
San Joaquin Basin, California	2,111 pCi/L	TASHA STOIBER & BILL WALKER, ENV'T WORKING GRP., TOXIC STEW: WHAT'S IN FRACKING WASTEWATER 9 (2015).
Paluxy formation, Mississippi	2,099 pCi/L	*U.S. Geological Survey National Produced Waters Geochemical Database*, DEP'T OF THE INTERIOR, (Dec. 27, 2023), https://www.usgs.gov/tools/us-geological-survey-national-produced-waters-

94. Data on interactive map: Click "Launch Viewer" at left; at right under Formation, click off "All" so there are No formations listed; then type into search "Helderberg" and click box so only Helderberg formation emerges in viewer; zoom in so data points from Helderberg formation in western NY, come clearly into view; at bottom of screen, see chart and entry points under headings Y-axis and X-axis; adjust variables to display data points on graph thus: on Y-axis scroll down to Ra226 (radium-226) and on X-axis scroll down to Ra228 (radium-228). Note that few sample of wells in the Helderberg formation with radium data will appear on the graph, and note the data point all the way to the left, with very high Ra226 values. Hold cursor over that value and see the X-axis, or Ra228, is 100 pCi/L, and the Y-axis, or Ra226, is 3800 pCi/L, so total Ra226 + Ra228 readings are 3,900 pCi/L/.

		geochemical-database-viewer.[95]
Cherokee Platform, Oklahoma	2,020 pCi/L	B.F. Armbrust & P.K. Kuroda, *On the Isotopic Constitution of Radium (Ra-224/Ra-226 and Ra-228/Ra-226) in Petroleum Brines*, 37 TRANSACTIONS AM. GEOPHYSICAL UNION 37 (1956).
Permian Basin in Texas and New Mexico	1,247 pCi/L	Punam Thakur, Anderson L. Ward & Tanner M. Schaub, *Occurrence and Behavior of Uranium and Thorium Series Radionuclides in the Permian Shale Hydraulic Fracturing Wastes*, 29 ENV'T SCI. & POLLUTION RSCH. 43058, 43063 (2022).
Denver-Julesburg Basin, Colorado	598 pCi/L	COLO. DEP'T OF PUB. HEALTH AND ENV'T, TENORM REPORT FOR THE STATE OF COLORADO 389 (2019).
Fayetteville Shale, Arkansas	294 pCi/L	*U.S. Geological Survey National Produced Waters Geochemical Database*, DEP'T OF

95. Data on interactive map: Click "Launch Viewer" at left; at right, under Formation, click off "All" so there are No formations listed; type into the search "Paluxy" and click box so only Paluxy formation emerges in viewer; zoom in so data points from the Paluxy formation, in Mississippi, come clearly into view; at bottom of screen, see chart and entry points under headings Y-axis and X-axis; adjust variables to display data points on graph thus: on Y-axis scroll down to Ra226 (radium-226) and on X-axis scroll down to Ra228 (radium-228). Note that few samples of wells in Paluxy formation with radium data will appear on the graph and note the sample on the far-right side of the graph; the X-axis or Ra228 is 1054.6, and the Y-axis or Ra226 is 1044.26.

		THE INTERIOR, (Dec. 27, 2023), https://www.usgs.gov/tools/us-geological-survey-national-produced-waters-geochemical-database-viewer.[96]

IV. THE HISTORY OF OIL AND GAS WASTE DISPOSAL AND THE RISE OF UNDERGROUND INJECTION

America's first commercial oil well was drilled in 1859 in Titusville, Pennsylvania, and the disposal of produced water from oil and gas production has posed a problem ever since.[97] For over 100 years, the industry's copious stream of oilfield brine was simply discharged into unlined pits, ditches, swamps, streams, bays, and bayous—practices that caused considerable contamination to farmland, estuaries, and water supplies.[98] The exceptional salt levels in oilfield brine alone make land stained with brine unproductive for agriculture. This is a significant problem in oil and gas states like North Dakota, which is 90% farmland, yet millions of gallons of oilfield brine are spilled annually.[99] More recently, the industry has come to rely on a different disposal technique—injection wells.[100] Here, oilfield brine and other toxic liquids brought to the surface in the oilfield are injected deep into the earth. EPA, whose regulations govern the practice, supports it with the belief that this waste will remain locked "almost indefinitely" within a specific deeply-buried geologic layer.[101] "Injection wells are often located many miles from the oil and gas wells that produce the waste and can be located out of the oilfield entirely."[102]

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96. Data on interactive map: Click "Launch Viewer" at left; at right under Formation, click off "All" so there are No formations listed; type into search "Paluxy" and click box so only Paluxy formation emerges in viewer; zoom in so data points from Paluxy formation, in Mississippi, come clearly into view; at bottom of screen see chart and entry points under headings Y-axis and X-axis; adjust variables to display data points on graph thus: on Y-axis scroll down to Ra226 (radium-226) and on X-axis scroll down to Ra228 (radium-228). Note that few samples of wells in Paluxy formation with radium data will appear on the graph, and note the sample on the far right side of the graph, the X-axis or Ra228 is 1054.6 and the Y-axis or Ra226 is 1044.26.

97. NOBEL, *supra* note 5, at 106.

98. ENV'T PROT. AGENCY, *supra* note 61, at 5.

99. Deborah Sontag & Robert Gebeloff, *The Downside of the Boom*, N.Y. TIMES (Nov. 22, 2014), https://www.nytimes.com/interactive/2014/11/23/us/north-dakota-oil-boom-downside.html.

100. ENV'T PROT. AGENCY, *supra* note 61, at 8.

101. *Id.* at 30.

102. NOBEL, *supra* note 5, at 45.

To understand injection wells' rise in popularity, go back to June 22, 1969, when sparks from a diesel locomotive passing over the Norfolk & Western Railroad Trestle on the south side of Cleveland ignited a slick of oil and debris on the surface of the Cuyahoga River.[103] The fire, according to an assessment made the following day by Cleveland's Department of Public Safety, "flared up and mushroomed instantaneously."[104] It was the 13th fire on the Cuyahoga, and this time a photo was captured and published in Time Magazine.[105] The image would come to symbolize the transformation of the nation's rivers by American industry into free-flowing sewers of toxic waste. In December 1970 EPA was formed, and in 1972 Congress signed the Clean Water Act, which aimed to eliminate "the discharge of pollutants into the navigable waters."[106] But where would it all go? America's new home for liquid industrial waste would be underground.

In 1950, there were four recorded injection wells in the United States.[107] In 1967 there were 110.[108] When Congress passed its UIC program to govern the practice in 1974, there were already 322 wells drilled, with 290 operating.[109] Today, just counting injection wells that deal with the oil and gas industry's waste, EPA figures indicate there are 181,431[110] (or roughly 11 injection wells for every U.S. Starbucks).[111] If you drove from New York City to Los Angeles at 65 miles per hour and lined the highway with them, an oil and gas wastewater injection well would emerge every nine-tenths of a second. An EPA website states: "Injection proved to be a safe and inexpensive option for the disposal of unwanted and often hazardous industrial byproducts."[112] Today, approximately 96% of America's reported oilfield wastewater will be disposed at Class II injection wells,[113] where high pressure pumps inject the waste deep underground.

Despite EPA formally regulating underground injection through its UIC program for more than 40 years, the program continues to fall short of addressing the tremendous risks of injecting waste underground. Moreover, these risks have long been on the radar of U.S. federal agencies.

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103. NOBEL, *supra* note 5, at 219.

104. *Cuyahoga River Fire,* OHIO HIST. CENT. (2021) https://web.archive.org/web/20190906165648/https://ohiohistorycentral.org/w/Cuyahoga_River_Fire.

105. *Id.*

106. Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 (2002).

107. ENV'T PROT. AGENCY, *supra* note 61, at 5.

108. *Id.*

109. *Id.*

110. *Underground Injection Control Program,* ENV'T PROT. AGENCY (2020), https://www.epa.gov/sites/default/files/2020-04/documents/uic_fact_sheet.pdf.

111. *Starbucks Statistics: How Many Starbucks Are There in the United States?*, CAFELY, https://cafely.com/blogs/research/starbucks-statistics? (last visited Apr. 4, 2025).

112. *General Information about Injection Wells*, ENV'T PROT. AGENCY, https://www.epa.gov/uic/general-information-about-injection-wells (last visited Apr. 20, 2025).

113. ALL CONSULTING, *supra* note 4, at 2, 4.

A 1929 report on Disposal of Oil-Field Brines reads: "there is always the danger of subsequent contamination."[114] The report, authored by Ludwig Schmidt, a petroleum engineer, and John Devine, an organic chemist, both with the U.S. Bureau of Mines Petroleum Experiment Station in Bartlesville, Oklahoma, states that, "[i]f this method is used care must be taken that the brines are delivered to a reservoir formation from which migration can not take place with detrimental effect to sources of fresh-water supply."[115]

In the 1980s, EPA's Environmental Research Lab in Ada, Oklahoma extensively researched injection wells. A report produced by this lab states that, "[u]nfortunately, hazardous wastes are complex mixtures of materials" which makes it "difficult to predict exactly the action or fate of wastes after their injection."[116] A problem, researchers note, is when one hazardous waste stream is "combined with other mixed waste streams, the potential number of interactions increase factorially."[117] Because "subsurface environments often take many years to reach chemical and biological equilibrium, predicting exactly what will happen *a priori* may be nearly impossible."[118]

EPA's observation that predicting the fate of wastes injected underground "may be nearly impossible" becomes particularly important and concerning. In the age of modern fracking, as oilfield wastewater disposed of at injection wells includes not just brine, but flowback. Flowback is an industry term referring to the toxic—and sometimes entirely unknown—chemicals that surge back to the surface in the fracking process.[119] Former Marcellus brine hauler Richard Cummins stated that "brine haulers don't just haul brine, we haul whatever the [f***] they want off that pad and will fit in my truck."[120] This means that brine haulers take all sorts of fluids to Class II wells for injection, including, among other things, fluids from compressor stations and condensate.[121] This waste evades regulation as "hazardous waste" under RCRA as a result of the famed Bentsen Amendment.[122] However, it is widely acknowledged by EPA that some portion of this waste exhibits "hazardous waste characteristics."[123]

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114. *Disposal of Oil Field Brines*, 28 OIL & GAS J., at 110 (1929).

115. *Id.*

116. ARDEN STRYCKER & A. GENE COLLINS, EPA, PROJECT SUMMARY, STATE-OF-THE-ART REPORT: INJECTION OF HAZARDOUS WASTES INTO DEEP WELLS 1, 2 (1987).

117. *Id.* at 2.

118. *Id.*

119. NOBEL, *supra* note 5, at 308.

120. Interview with Richard Cummins, Brine Hauler, Marcellus (Feb. 10, 2021).

121. *Id.* at 65–66.

122. *Id.* at 46.

123. *See, e.g.*, Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes, 53 Fed. Reg. 25446, 25446 (July 6, 1988) ("It is clear that some portions of both the large-volume and associated waste would have to be treated as hazardous if the Subtitle C exemption were lifted. EPA estimates that approximately 10 to 70 percent of large-volume

How are all of these different chemicals and compounds mixing in the high-heat, high-pressure, and largely-unknown chemical environment of the subterranean? No one really knew then[124] and, at least as far as research for this article has shown, no one really knows now.[125]

A report prepared by EPA and the Department of Energy published in 1987 presented four main ways that hazardous waste injected down wells might contaminate groundwater.[126] First, an accidental spill at the surface. Second, old oil and gas wells that were never plugged or plugged incompetently provide "an escape route whereby the waste can enter an overlying potable ground water aquifer."[127] Third, waste is injected at such great pressure that it fractures the rocks deep in the earth, "whereby a communication channel allows the injected waste to migrate to a fresh water aquifer."[128] Fourth, the piping and cement that forms the injection well itself corrodes apart, enabling "the waste to escape and migrate" back up to an aquifer.[129]

These early papers appear to fracture the notion that injection wells are a safe storage locker for complex industrial waste streams—or any waste streams at all. In October 1970, David Dominick, Commissioner of the Federal Water Quality Administration, warned that injection was a short-term fix to be used with caution and "only until better methods of disposal are developed."[130] When EPA laid out its proposed policy on injection wells in 1974 the agency echoed Dominick's concern. The agency stated in an internal statement on the subject that EPA's "policy considers waste disposal by [deep] well injection to be a temporary means of disposal."[131] The statement continues: "Should a more environmentally acceptable means of disposal become available, change to such technology would be required."[132] Again, presently the U.S. has 181,431 Class II injection wells, yet EPA never trusted that they would work, or last.

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wastes and 40 to 60 percent of associated wastes could potentially exhibit RCRA hazardous waste characteristics under EPA's regulatory tests.").

124. *See* STRYCKER & COLLINS, *supra* note 116, at 4 (demonstrating lack of understanding on how chemicals and compounds in waste might react in unknown subterranean environments).

125. NOBEL, *supra* note 5, at 79.

126. A. GENE COLLINS & M.E. CROCKER, NAT'L INST. FOR PETROLEUM & ENERGY RSCH., PROTOCOL FOR LABORATORY RESEARCH ON DEGRADATION, INTERACTION, AND FATE OF WASTES DISPOSED BY DEEP WELL-INJECTION 1 (1987).

127. *Id.*

128. *Id.*

129. *Id.*

130. Earle A. Herbert, *The Regulation of Deep-Well Injection: A Changing Environment Beneath the Surface*, 14 PACE ENV'T L. REV. 169, 171–72 (1996) (quoting STANLEY M. GREENFIELD, UNDERGROUND WASTE MANAGEMENT AND ENVIRONMENTAL IMPLICATIONS: EPA—THE ENVIRONMENTAL WATCHMAN, 14, 15 (T.D. Cook ed., 1972)).

131. *Id.* at 189.

132. *Id.*

In fact, top EPA officials in the early 1970s, as injection wells began to proliferate across the nation, were skeptical of the process, believing injection to be a technology of avoiding problems, not solving them. "We really do not know what happens to the wastes down there," stated EPA Assistant Administrator Stanley Greenfield in 1971, "we just hope."[133]

Greenfield spoke these words at a symposium on "Underground Waste Management and Environmental Implications," held in 1971 in Houston, Texas. The symposium was hosted by the U.S. Geological Survey together with the American Association of Petroleum Geologists. Some attendees expressed optimism about the practice. Vincent McKelvey, Director of the U.S. Geological Survey and the symposium's keynote speaker, was among the optimists. He believed society should assign value to the "natural pore space" in underground rock layers.[134] "On the whole," said McKelvey, "we are looking at an underutilized resource with a great potential for contribution to national needs."[135] But largely, the symposium's speakers expressed concern and laid out an eerily accurate prediction of the issues to come.[136]

"It is clear," said Theodore Cook, who was with the American Association of Petroleum Geologists, "that this method is not the final answer to society's waste problems."[137] Utah geologist Henri Swolfs explained that injecting chemical-filled waste deep into the earth could affect the strength of rocks and alter their frictional characteristics.[138] "The result could be earthquakes," he said, creating fractures that channel waste out of the injection zone.[139] Tsuneo Tamura, with the Department of Energy, said the disposal of radioactive liquid wastes posed "a particularly vexing problem," even in low concentrations.[140] "My message to you is not a cheerful one," Frank Trelease, a Wyoming law professor, told symposium attendees.[141] "It is simply this: if you goop up someone's water supply with your gunk; if you render unusable a valuable resource a neighboring landowner might have

133. STANLEY M. GREENFIELD, *EPA—The Environmental Watchman*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 14, 17 (T.D. Cook ed., 1972).

134. V. E. MCKELVEY, *Underground Space—An Appraised Resource*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 1, 1–2(T.D. Cook ed., 1972).

135. *Id.* at 4.

136. *See generally*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS (T.D. Cook ed., 1972).

137. T. D. COOK, *Foreword*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS VII (T.D. Cook ed., 1972).

138. HENRI S. SWOLFS, *Chemical Effects of Pore Fluids on Rock Properties*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 224 (T.D. Cook ed., 1972).

139. *Id.*

140. TSUNEO TAMURA, *Sorption Phenomena Significant in Radioactive-Waste Disposal*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 318 (T.D. Cook ed., 1972).

141. FRANK J. TRELEASE, *Liability for Harm from Underground Waste Disposal*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 369 (T.D. Cook ed., 1972).

recovered; or if you 'grease' the rocks, cause an earthquake, and shake down his house—the law will make you pay."[142]

Another attendee at that 1971 symposium, U.S. Geological Survey research hydrologist John Ferris, dismantled the central thesis of injection wells: that waste could be held in virtual perpetuity in a specific geologic layer deep in the earth because the layers above and below acted as a cork to seal it off. "The term 'impermeable' is never an absolute,"[143] said Ferris, because "all rocks are permeable to some degree."[144] So, the idea that any rock layer could act as a cork to seal off waste was simply wrong. "Waste will always and inevitably escape the injection zone," said Ferris, and "engulf everything in its inexorable migration toward the discharge boundaries of the flow system."[145]

V. PREDICTED HARMS NOW A REALITY: PRESENT DAY IMPACTS OF UNDERGROUND INJECTION OF OIL AND GAS WASTE

Federal agencies' well-documented concerns regarding underground injection are now playing out across the nation, with documented instances in Ohio and Texas.[146] Fracking wastewater shot down injection wells is traveling miles through the earth and spouting back to the surface at conventional oil and gas wells.[147] As the hydrologist John Ferris recognized in 1971, these conduits are exactly where to expect waste leaking deep underground to breach the surface.[148]

A. A Brief Story of Two Bobs: Conventional Oil and Gas Operators Adversely Impacted by Class II Injection Wells

About five years ago, a pair of independent oil and gas operators from rural Ohio named Bob noticed some of their gas wells were over-pressured,

142. FRANK J. TRELEASE, *Liability for Harm from Underground Waste Disposal*, in UNDERGROUND WASTE MANAGEMENT & ENVIRONMENTAL IMPLICATIONS 369 (T.D. Cook ed., 1972).

143. JOHN G. FERRIS, *Response of Hydrologic Systems to Waste Storage*, *in* UNDERGROUND WASTE MANAGEMENT AND ENVIRONMENTAL IMPLICATIONS 126, 128 (T.D. Cook ed., 1972).

144. *Id.* at 132.

145. Kiley Bense, *Peering Inside the Pandora's Box of Oil and Gas Waste*, INSIDE CLIMATE NEWS (July 9, 2024), https://insideclimatenews.org/news/09072024/oil-gas-waste-investigation-book/.

146. ROLAND BLAUER & NAING AYE, WASHINGTON COUNTY PRODUCED WATER INVESTIGATION 4 (2020); Vamshi Karanam et al., *Investigation of Oil Well Blowouts Triggered by Wastewater Injection in the Permian Basin, USA*, 51 GEOPHYSICAL RSCH. LETTERS 1, 1 (2024).

147. Naing Aye & Roland Blauer, *Washington County Produced Water Investigation Prepared for Ohio Department of Natural Resources Division of Oil & Gas Management by Resource Services International (RSI)*, OHIO DEPT. OF NAT. RES. (June 2020), https://ohiodnr.gov/discover-and-learn/safety-conservation/about-odnr/oil-gas/oil-gas-resources/washington-county-investigation.

148. FERRIS, *supra* note 143, 126.

and one was spewing an extremely salty liquid more than 50 feet in the air.[149] They suspected leaking fracking waste from nearby injection wells had found its way into their gas wells.[150] Being tax-paying citizens of this country, the Bobs expected the government would be concerned and help them with their problem.[151] The Bobs went to the Ohio Department of Natural Resources, the Ohio Environmental Protection Agency, and EPA. And, the Bobs say, no one took them seriously—until they called Felicia Mettler, the former Ohio elementary school archery instructor and Torch CAN DO co-founder.[152]

In June 2021, one of this article's authors met at a roadside rest stop opposite an injection well with Felicia and the Bobs. Two important points were discussed. One: people in rural, conservative areas may—despite climate change and other harms—be pro-oil and gas, but they are concerned and critical of having fracking wastewater injected deep beneath their communities.[153] Two: they are well aware of bedrock legal documents that support their outrage.[154]

Because the Bobs' gas wells have become overrun with oil and gas wastewater, these wells are no longer usable, and the men have lost an important source of income.[155] "Initially we thought we could talk to the state, tell them what was happening, and they would be reasonable and compensate us," Bob 2 explained at the meeting.[156] "But they didn't want to hear it."[157]

"I paid a million dollars or more in taxes over the years, and that festers me," Bob 1 said, "because I pay taxes to be protected. What they done is criminal."[158]

The enemy to the Bobs is not necessarily the people who drilled the wells producing the waste, but the injection well operators and regulators. "Our biggest problem," said Bob 2, "is I don't think the state of Ohio has permission to give them rights to pump brine under my property."[159]

Bob 1 mentioned that he has been reflecting about the 14th Amendment since his ordeal began.[160] He recited:

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149. Interview with Bob Lane & Felicia Mettler, Oil & Gas Operators (June 20, 2021) (on file with author).
150. *Id.*
151. *Id*.
152. *Id*.
153. NOBEL, *supra* note 5, at 174.
154. *Id.* at 179.
155. Lane, *supra* note 149.
156. *Id*.
157. *Id*.
158. *Id*.
159. *Id*.
160. *Id*.

> No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.[161]

Bob 1 continued his reflection. "Right in that Constitution it says if you impinge upon a man's property you owe him due compensation, and we here are the one's suffering and it has ruined our property. So, if we can't rely on that Constitution, then I don't know what we can rely on."[162]

Bob 1 certainly has a philosophical point, but does he have a legal one? Can people whose property or business interests suffer contamination from fracking wastewater leaking out of injection wells hold the oil and gas operators that initially produced the waste liable? Can the communities and the general public whose local water sources and environment may be contaminated by this waste hold oil and gas operators accountable? Numerous lawsuits address these questions.[163] However, this article focuses on other more overlooked questions regarding Class II injection wells. Can you really inject radioactive waste into Class II injection wells—wells never intended to receive radioactive materials—simply because that radioactive waste was at some point associated with oil and gas production? Can communities use existing SDWA regulations to better protect their groundwater resources from contamination by oil and gas waste?

VI. WHAT THE SAFE DRINKING WATER ACT HAS TO SAY ABOUT RADIOACTIVITY, OIL AND GAS WASTE, AND UNDERGROUND INJECTION

EPA's rules implementing the SDWA's UIC program state: "Radioactive Waste means any waste which contains radioactive material in concentrations which exceed those listed in 10 CFR part 20, appendix B, table II, column 2."[164] The Nuclear Regulatory Commission created these tables based on levels intended to protect public health, covering hundreds of different radioactive elements and their various isotopes.[165] The values listed for both radium-226 and radium-228 are 60 pCi/L.[166] Thus, under federal

161. Lane, *supra* note 149 (quoting U.S. CONST. amend. XIV, § 1).

162. *Id*.

163. *See, e.g.*, Complaint at ¶¶ 23–144, Standard Oil Co. V. Redbird Dev., LLC, No. 24CI0186 (Athens C.P. Ohio July 22, 2024) (claiming the contamination from fracking wastewater resulted in common law tortious conduct); Complaint, Anderson v. Redbird Dev., LLC, No. 24CI0183 (Athens C.P. Ohio July 22, 2024).

164. 40 C.F.R § 146.3.

165. 10 C.F.R. § 20 (2025).

166. 40 C.F.R § 146.3.

regulations, any liquid containing radium-226 or radium-228 above 60 pCi/L meets the SDWA's definition of "radioactive waste."[167]

In early 2020, the authors of this article ran this assertion by EPA for confirmation, and in an email message sent on January 13, 2020, EPA stated: "As indicated in the Federal regulations, liquid waste containing radium-226 above 60 pCi/L or radium-228 above 60 pCi/L is defined as radioactive."[168]

EPA's position on what constitutes "radioactive waste" under SDWA regulations is clarified in the 2005 document, "A Regulators' Guide to the Management of Radioactive Residuals from Drinking Water Treatment Technologies." EPA states: "Under the UIC regulations, 'radioactive' refers to any waste containing radioactive concentrations that exceed those listed in 10 CFR 20, Appendix B, Table 2, Column 2. These concentrations are 60 pCi/L for radium-226, 60 pCi/L for radium-228." [169] And according to the Unity Rule, as well as defined in this 2005 EPA report, if the levels of two radionuclides present together add up to more than 60 pCi/L, then this waste is also considered "radioactive."[170]

As mentioned above, according to the Pennsylvania Department of Environmental Protection, radium levels in oilfield brine in the Marcellus formation average 9,330 pCi/L and can be as high as 28,500 pCi/L.[171] Clearly, Marcellus oilfield brine meets EPA's definition of "radioactive waste." But the Marcellus is the nation's most radioactive oil and gas formation.[172] Still, as shown in Figure 1, data for every oil field studied shows radium levels exceeding 60 pCi/L.[173]

In 2014, the Energy and Environmental Research Center at the University of North Dakota found the average radium levels in the brine of North Dakota's Bakken oilfield to be 3,618 pCi/L and as high as 6,760 pCi/L.[174] A 2018 paper published by researchers in University of Michigan's Department of Civil and Environmental Engineering found average radium levels in brine of Michigan's Antrim formation to be 5,416 pCi/L, and as high as 22,358 pCi/L.[175] And on it goes. The Ohio Department of Natural Resources in 2019 detected radium in brine of Ohio's Clinton formation, a

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167. ENV'T PROT. AGENCY, OFF. OF WATER, A REGULATORS' GUIDE TO THE MANAGEMENT OF RADIOACTIVE RESIDUALS FROM DRINKING WATER TREATMENT TECHNOLOGIES 19 (2005).

168. E-mails from Angela Hackel, EPA Spokesperson, to Megan. M. Hunter, author (Jan. 13, 2020–Feb. 6, 2020) (on file with author).

169. ENV'T PROT. AGENCY, OFF. OF WATER, *supra* note 167.

170. *Id.*

171. PERMAFIX, *supra* note 89, at 72.

172. NOBEL, *supra* note 5.

173. *See supra* Figure 1.

174. E-mail from Jay C. Almlie, Principal Eng'r, Energy & Env't Rsch. Ctr., Univ. N.D., to Justin Nobel, author (Nov. 27, 2019, 9:52 AM) (on file with author).

175. Wenjia Fan, Kim F. Hayes & Brian R. Ellis, *Estimating Radium Activity in Shale Gas Produced Brine*, 52 ENV'T SCI. & TECH. 10839, 10845 (2018) (Supporting Information on file with author).

conventional gas formation, as high as 9,602 pCi/L.[176] Radium in oilfield brine of Gulf Coast formations has been found as high as 2,801 pCi/L,[177] California's San Joaquin Basin as high as 2,111 pCi/L,[178] and Colorado's Denver-Julesberg Basin as high as 598 pCi/L.[179] An exhaustive literature search demonstrates that the levels for combined radium-226 and radium-228 in oilfield brine in formations across the United States are regularly greater than 60 pCi/L—often astonishingly greater. Therefore, these values would be defined by SDWA regulations as "radioactive waste."[180]

The vital question now emerges in full. If much of America's oilfield brine has more than enough radium to meet the SDWA's definition of radioactive waste, how is radioactive waste being regularly put in a truck and taken to be injected down Class II injection wells, when radioactive waste can only be injected down Class I injection wells?

The authors of this article put this question to EPA, and the agency replied—without providing any legal support—that while 60 was indeed the limit, injection wells "may receive radioactive wastes under certain conditions."[181] Given that no statute or regulation allows for wells other than Class I wells to receive "radioactive wastes under certain conditions," the authors asked EPA just what the certain conditions it referred to would be.[182] Again, citing no statute or regulation, EPA responded that there were "site-specific" conditions when an "injection well would receive a permit for radioactive waste."[183] Given that there is no statutory or regulatory process for granting wells other than Class I wells permits or permission to receive radioactive waste, the authors asked just how often these site-specific permits for radioactive waste EPA granted for Class II oilfield waste injection wells.[184] EPA is yet to reply to this question.

The oil and gas industry, however, has long known what type of injection well its waste, given its radioactivity profile, would need to go down under SDWA regulations. The next section explains some of what is publicly documented about that knowledge and history.

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176. Memorandum, Ohio Dep't of Nat. Res., Div. of Oil & Gas, Radium Testing Results for Conventional Brine (2018) (on file with author).

177. Earl S. Snavely, Jr., *Radionuclides in Produced Water*, AM. PETROLEUM INST. 79 (Aug. 16, 1989) (on file with author).

178. TASHA STOIBER & BILL WALKER, ENV'T WORKING GRP., TOXIC STEW: WHAT'S IN FRACKING WASTEWATER 8 (2015).

179. COLO. DEP'T OF PUB. HEALTH AND ENV'T, TENORM REPORT FOR THE STATE OF COLORADO 389 (2019).

180. 40 C.F.R. § 146.3 (2024); 10 C.F.R. pt. 20 app. B tbl. 2, col. 2.

181. E-mails from Angela Hackel, EPA Spokesperson, to Megan. M. Hunter, author (Jan. 13, 2020–Feb. 6, 2020) (on file with author).

182. *Id.*

183. *Id.*

184. *Id.*

A. A Brief History: The Oil and Gas Industry's Understanding of Its Radioactive Waste Program

Canadian scientists discovered radon in natural gas in 1904,[185] and in the 1920s scientists in Soviet Russia showed oilfield brine contained unusually high concentrations of radium.[186] In 1953, the U.S. Geological Survey found a radioactive mineral scale had accumulated on piping that lined an oil and gas well.[187] In 1956, the notable nuclear chemist Paul Kazuo Kuroda published findings in the journal of the American Geophysical Union reporting significant amounts of radium in brines from the oilfields of Oklahoma and Arkansas.[188]

The pivotal moment occurred in 1981, when Occidental Petroleum discovered radioactivity in the oilfield piping on the Piper Alpha Platform in the North Sea.[189] Brian Heaton founded a Scotland-based company to handle North Sea radioactivity issues called Aberdeen Radiation Protection Services.[190] He explained in one legal deposition:

> When the scale was finally analyzed . . . it was shown to come within the U.K. regulations dealing with radioactive materials; and so we had to start to instigate procedures with regard to the disposal of this material as radioactive waste and, by necessity, how to deal with it, with regard to the occupational exposures.[191]

Initially, industry scientists like Heaton thought radioactive scale might be a problem limited to the North Sea, but they soon realized they were wrong. "I think it is now recognized that scale can—or radioactive scales can be formed in virtually any oilfield operation in the world," said Heaton.[192] E&P Forum, a London-based oilfield group, created a task force to assess the issue of scale in oilfield piping.[193] An Amoco official chaired the task

185. E.F. BURTON, UNIV. OF TORONTO, A RADIOACTIVE GAS FROM CRUDE PETROLEUM 9 (1904).

186. W.A. Kolb & M. Wojcik, *Enhanced radioactivity due to natural oil and gas production and related radiological problems*, 45 SCI. TOTAL ENV'T 77, 77 (1985).

187. GARLAND B. GOTT & JAMES W. HILL, DEP'T OF THE INTERIOR, RADIOACTIVITY IN SOME FIELDS OF SOUTHEASTERN KANSAS: A CONTRIBUTION TO THE GEOLOGY OF URANIUM 71 (U.S. Gov't Printing Off. 1953).

188. Bernard F. Armbrust Jr. & P.K. Kuroda, *On the Isotopic Constitution of Radium (Ra-224/Ra-226 and Ra-228/Ra-226) in Petroleum Brines*, 37 TRANSACTIONS AM. GEOPHYSICAL UNION 216 (1956).

189. Brian Heaton Dep., at 11:58, Lester v. ExxonMobil Corp., No. 2002-19657, at 11 (La. C.C. 2011).

190. *Id.* at 6.

191. *Id.* at 23.

192. *Id.* at 32.

193. Memorandum from Joseph E. Howard, Exec. Sec'y, Energy & Petroleum F. to All Members Comm. F., on "Low Specific Activity Radioactivity Scale" at 1 (Jan. 7, 1986) (on file with author).

force.[194] A letter of the E&P Forum, dated January 7, 1986, reads: "With the prospect of ever tightening safety and environmental regulatory controls on the handling and disposal of these materials, continued problems are anticipated."[195]

Right around the same time, in April 1986, Chevron found radioactive scale on the production tubing during routine maintenance on a well in the Raleigh oilfield in Mississippi.[196] This survey was done at the prompting of a Chevron engineer who had recently returned from working in the North Sea.[197] The levels were high, the risks were real, and there was already a lawsuit underway at a state courthouse in Hattiesburg, Mississippi. The case concerned Winston Street's oilfield pipe-cleaning operation, which New Orleans attorney Stuart Smith eventually took over.[198] Other liabilities loomed. And the American Petroleum Institute established the API Ad Hoc Committee on Low-Specific Activity (LSA) Scale.[199] At 9:30 a.m. on Thursday, November 20, 1986, they held their first meeting at the offices of the Sun Exploration & Production Company in Dallas, Texas.[200] Representatives from Shell, Chevron, Exxon, Mobil Oil, Conoco, Texaco, Phillips Petroleum, Amoco, Pennzoil, and ARCO Oil & Gas were present.[201] They signed their names on an attendance sheet.[202]

The meeting's organizers handed out tasks and set an ambitious timetable. J.C. Martin, of Mobil Oil, and J.M. Spanhel, of the American Petroleum Institute, were to develop an issue paper.[203] Paul V. Pavlov, of Mobil Oil, was to develop measurement protocol.[204] Mark Withers, of Sun Exploration & Production, was to analyze existing legislation on the topic.[205] By June 30, 1987, the committee was to have a final report ready for distribution.[206]

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194. Memorandum from Joseph E. Howard, *supra* note 193.

195. *Id.*

196. David L Martindale, *NORM - Science, Regulations*, *Litigation*, 41 ANN. INST. ON MIN. L. 160, 160 (1994).

197. *Id*. at 176.

198. STUART H. SMITH, CRUDE JUSTICE: HOW I FOUGHT BIG OIL AND WON, AND WHAT YOU SHOULD KNOW ABOUT THE NEW ENVIRONMENTAL ATTACK ON AMERICA 26 (Benbella Books Inc., 2015).

199. Meeting Minutes of Ad Hoc Comm. on Low Specific Activity (LSA) Scale, Sun Expl. & Prod. Co., Dall., Tex. (Nov. 20, 1986) (on file with author).

200. *Id.*

201. *Id.*

202. *Id.*

203. *Id.*

204. Meeting Minutes of Ad Hoc Comm. on Low Specific Activity (LSA) Scale, *supra* note 199.

205. *Id.*

206. *Id.*

Another industry group, the Mid-Continent Oil & Gas Association, was also assessing the radioactivity issue, and formed their own subcommittee.[207] A letter on Exxon letterhead by one John Rullman reads:

> I would like to have the fourth meeting of the Mid-Continent Oil and Gas Association (Mississippi/Alabama Division) Ad Hoc Subcommittee for Naturally Occurring, Low Level Radioactive Material on Thursday, December 11, 1986, beginning at 10:30 a.m. at Exxon's New Orleans office at 1555 Poydras Street. Go to the 22nd floor lobby and call Anne Mannina at extension 3477 for entry.[208]

The two groups had crossover. At the American Petroleum Institute meeting, the same John Rullman provided a briefing on radioactivity and its presence in the oilfield.[209] He discussed alpha particles, beta particles, and gamma rays with the oil and gas officials; explained terms like half-life and picocurie; and gave a rundown of some of the most concerning oilfield radionuclides and their hazards.[210] Radium-226, he noted, could cause "bone cancers."[211] Radon had been "[p]roven to cause cancer in uranium miners" and presented a "[s]erious lung hazard."[212] Rullman pointed out there was "not much known about . . . food chain uptake," including the uptake of radioactivity in the marine environment and landfills that were used for agriculture.[213] This was possibly a reference to the practice of land-spreading, in which drilling waste is applied directly to pastureland, a practice common in Oklahoma, Texas, and elsewhere.

The committee was aware that additional risks might lie lurking, including health risks, regulatory risks, and potential liabilities. "The strategy outlined below is predicated upon the premise that industry does not have definitive data to address this issue," the November 20 meeting minutes explained.[214] The committee's research and report were of great importance.

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207. Meeting Minutes of Ad Hoc Comm. on Low Specific Activity (LSA) Scale, *supra* note 199.

208. Letter from John D. Rullman to Members of the Mid-Continent Oil & Gas Association (Mississippi/Alabama Division) Ad Hoc Subcomm. for Naturally Occurring, Low Level Radioactive Material, at 1 (Nov. 5, 1986) (on file with author).

209. Outline Notes, John Rullman, Briefing Presentation to the Am. Petroleum Inst., Dall., Tex. (Nov. 20, 1986) (on file with author).

210. *Id.*

211. *Id.*

212. *Id.*

213. *Id.*

214. Meeting Minutes of Ad Hoc Comm. on Low Specific Activity (LSA) Scale, *supra* note 199.

On May 29, 1987, a draft was ready.[215] The group could have gone in many directions, but the product delivered was a regulatory analysis.[216]

The American Petroleum Institute report begins: "The issue of naturally occurring radioactive material is one which could be substantially impacted by regulatory enactments."[217] The main concern all along has not necessarily been for the public, or the environment, or even the oil and gas industry's workers, it has been for the industry's own neck. This report is about the oil and gas industry's liability and risk. It is broken into six sections, and discusses federal legal issues, state issues, employee issues, transportation issues, licensing issues, and the UIC program.[218]

The Marcellus brine hauler Richard Cummins once asked, "why the hell are we driving unmarked trucks and given no training?"[219] Part of the answer is that although the sludge and scale accumulated in the bottom of the truck's tanks may actually be above legal limits for radioactivity, the Department of Transportation is not testing.[220] But there is another part to the answer, and it is in the American Petroleum Institute's report from May 29, 1987.[221] They also reference the Nuclear Regulatory Commission radioactivity limits of 60 pCi/L for radium-226 and radium-228 and state: "Wells injecting water in excess of this concentration clearly fall into Class IV."[222]

Class IV wells, originally designated for radioactive waste, are banned and only exist as a category used for enforcement purposes. Class IV designations are used to ensure the closure of any remaining wells and prevent their future construction, due to the unacceptably high risk such wells pose to groundwater sources.[223] Thus, it appears that the oil and gas industry knew back in 1987 that oilfield brine was too radioactive to inject down Class II injection wells.

This again begs the question: If much of the billions of gallons of oilfield brine injected daily down Class II injection wells has enough radium to meet the SDWA's definition of radioactive waste, then how can operators lawfully

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215. Draft of Am. Petroleum Inst., *Regulatory Analysis*, report on naturally occurring material in the oil and gas industry, at 1 (May 29, 1987) (on file with author).

216. *Id.*

217. *Id.*

218. *Id.*

219. NOBEL, *supra* note 5, at 214.

220. *See* 49 C.F.R § 172.101 (listing materials regulated as hazardous materials by Department of Transportation); 49 C.F.R § 173.436 (identifying limits for radium concentrations and total consignment activity for radium-226 and radium-228 under hazardous materials regulations); *see also* Mohsen M. M. Ali et. al., *Concentrations of TENORMs in the Petroleum Industry and Their Environmental and Health Effects*, 9 RSC ADV. 39201, 39210 (2019) (showing levels of radium-226 and radium-228 in measured oil and gas industry scales and sludge exceeding aforementioned federal hazmat limits).

221. Draft of Am. Petroleum Inst., *Regulatory Analysis*, report on naturally occurring material in the oil and gas industry (May 29, 1987) (on file with author).

222. *Id.*

223. ENV'T PROT. AGENCY, *supra* note 61, at 51.

inject this waste into Class II wells? In answering this question, this article revisits the language of the SDWA governing Class II wells.

B. Class II Wells: Only for the Injection of Conventional Waste

It is a foundational concept of regulatory interpretation that every word of a law has meaning.[224] Looking at the SDWA, there is another problem with injecting fracking wastewater into Class II wells. According to the rules of EPA's UIC program, only *conventional* oil and gas wastewater can be injected into Class II wells.[225] Specifically, the regulation reads that only fluids "[w]hich are brought to the surface in connection with *conventional* oil or natural gas production" may be injected down Class II injection wells.[226]

Conventional and unconventional are terms that have long been used in the oil and gas industry to distinguish between oil and gas reservoirs. In conventional reservoirs, "oil and gas pathways are better connected and can be produced either/or by vertical/slanted wells." [227] Unconventional reservoirs "are geologically complex" and "exhibit very low permeability (near absence of connected pores for oil and gas to flow to the drilled well bore)" and thus "need to be hydraulically fractured to created oil and gas flow-pathways." [228] Further, to extract oil and gas from unconventional reservoirs, "well bores are designed to be drilled as horizontals."[229] Modern "fracking," as that term is used colloquially and throughout the oil and gas industry, involves a combination of hydraulic fracturing and horizontal drilling to access unconventional reservoirs.[230] Accordingly, based on the plain language of SDWA regulations, none of the brine and flowback from the nation's unconventional wells, drilled and brought online with the techniques of modern fracking, should be injected into Class II wells.[231]

In 2021, one of this article's authors asked EPA how it is permissible to inject *unconventional* oil and gas wastewater down Class II wells when the

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224. Williams v. Taylor, 529 U.S. 362, 404 (2000) (O'Connor, J., concurring) (quotations omitted).

225. 40 C.F.R. § 146.5(b)(1).

226. *Id.* (emphasis added).

227. *Shale Research & Development*, U.S. DEP'T OF ENERGY, https://www.energy.gov/fecm/shale-research-development (last visited May 15, 2025).

228. *Id*.

229. *Id.*

230. *See* ENV'T PROT. AGENCY ET AL., FEDERAL MULTIAGENCY COLLABORATION ON UNCONVENTIONAL OIL AND GAS RESEARCH: A STRATEGY FOR RESEARCH AND DEVELOPMENT 2 (July 18, 2014) (explaining how deploying hydraulic fracturing and horizontal drilling to extract from unconventional reservoirs has dramatically increased oil and gas production in the United States); *see also The Process of Unconventional Oil and Gas Production*, ENV'T PROT. AGENCY, https://www.epa.gov/uog/process-unconventional-natural-gas-production (last visited February 9, 2025) (explaining that hydraulic fracturing and horizontal drilling enabled the "relatively new" extraction from unconventional reservoirs).

231. 40 C.F.R. § 146.5(b)(1) (defining Class II wells as "Wells which inject fluids: (1) Which are brought to the surface in connection with *conventional* oil or natural gas production").

rules say only conventional wastewater can be injected.[232] The agency has yet to respond. However, EPA provided its reasoning on the matter in a recent EPA Environmental Appeals Board case out of southwestern Pennsylvania oil and gas country, in the heart of the Marcellus, *In re Penneco Environmental Solutions, LLC*.[233]

Petitioners in *Penneco* alleged that EPA Region 3 had unlawfully issued a Class II underground injection permit to Penneco Environmental Solutions, LLC. The permit allowed the conversion of an existing gas production well into a Class II disposal well and operation for the disposal of fluids from oil and gas production wells—including unconventional ("fracking" or "horizontal" wells).[234] In its briefing, EPA took the position that "the scope of the definition of conventional oil or natural gas production is not clear from the UIC regulations or the relevant regulatory history," and that EPA "has developed and consistently applied a broad but reasonable interpretation of the ambiguous phrase 'conventional oil or natural gas production' . . . ."[235] EPA noted that the agency added the word "conventional" to modify the phrase "oil and gas production" between its initial rule proposal in 1979 and the final adoption in 1980 without explaining the reasoning behind the addition of the word "conventional" in the preamble to its rulemaking.[236]

Despite what appears to be the very intentional addition of the word "conventional" between the proposed rule and the final adopted rule—and despite the rules of regulatory interpretation—in its briefing in *Penneco*, EPA adopted the stance that the word "conventional" in the Class II well definition in 40 C.F.R. § 146.5(b) is essentially meaningless.[237] To justify its reading-out of the word, EPA pointed to the absence of the terms "conventional" and "unconventional" in the SDWA, as well as the Act's pervasive express carve-outs for oil and gas production waste.[238] This includes a streamlined process for states to receive primary permitting and enforcement authority over Class II wells under Section 1425.[239] An additional carve-out is the SDWA's prohibition on EPA or delegated states prescribing requirements which "interfere with or impede [] the underground injection of brine or other fluids

232. E-mails from Angela Hackel, *supra* note 168.

233. In re Penneco Env't. Sols., LLC, PAS2D702BALL (EAB 2024) [hereinafter *Penneco*].

234. *Id.*

235. Region 3's Response to the Petition for Review, at 29–30, *Penneco Env't Solns, LLC*, 205 A.3d 401 (2019) (No. 931 C.D. 2018) [hereinafter EPA Region 3 Response].

236. *Id*. at 33.

237. *See id*. at 35–41 (arguing "the SDWA and its legislative history do not provide a meaning for 'conventional oil or natural gas production'" and therefore the term must be read expansively enough to include all oil and gas extraction wastewater, regardless of whether the formation or extraction techniques employed were conventional or unconventional).

238. *Id*. at 34.

239. *Id*.

which are brought to the surface in connection with oil or natural gas production . . . ."[240]

As additional support for its contention that the term "conventional" has no meaning, EPA argued the wastewater from conventional and unconventional wells is similar, providing no justification for injecting unconventional wastewater into Class I wells, while injecting conventional wastewater into Class II wells.[241] Further, EPA argued, requiring conventional wastewater to be injected into Class I wells "could lead to an increase in aboveground disposal, such as land application or discharge into surface waters, which may have increased adverse impacts to the environment."[242] Lastly, EPA argued that evolving drilling technique applications over the years complicates interpreting the terms "conventional" and "unconventional" because "the unconventional has become the conventional," with fracking now "a standard industry technique."[243] Still, none of EPA's arguments reckon with the basic issue: "conventional" is a word in the regulation, and the rules of regulatory interpretation instruct us that "conventional" must mean something.[244]

Despite Petitioners not having raised the issue of the SDWA's definition of "radioactive waste" in the *Penneco* petition, EPA also briefly addressed the issue in its own briefing. EPA noted that when it changed the classification for radioactive disposal wells from Class V to Class I in 1999, the preamble to its notice of rule change allowed operators to continue to inject radioactive material found in oil and gas waste into Class II wells:

> EPA wishes to clarify that this reclassification of Class V radioactive waste disposal wells does not affect the disposal of naturally occurring radioactive material (NORM) in Class II wells as part of oil and gas field operations. The injection of fluids associated with oil and natural gas production, including such fluids containing NORM, would continue to be regulated under existing Class II UIC requirements or under applicable regulations prescribed by the Primacy State agency.[245]

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240. EPA Region 3 Response, *supra* note 235, at 37; 42 U.S.C. § 300h(b)(2)(A).

241. EPA Region 3 Response, *supra* note 235, at 41.

242. *Id.* at 42.

243. *Id*. at 43.

244. 40 C.F.R. § 146.5(b)(1); *Williams v. Taylor*, 529 U.S. 362, 404, 120 S.Ct. 1495, 146 L.Ed.2d 389 (2000) (quoting *United States v. Menasche*, 348 U.S. 528, 538–39, 75 S.Ct. 513, 99 L.Ed. 615 (1955)) (internal quotations omitted).

245. EPA Region 3 Response, *supra* note 235, at 41; Revisions to the Underground Injection Control Regulations for Class V Injection Wells, 64 Fed. Reg. 68545, 68558 (Dec. 7, 1999).

EPA also pointed to its 1988 determination, which references Class II UIC wells as a disposal method despite oil and gas waste having "hazardous and radioactive components."[246]

On November 24, 2024, the Environmental Appeals Board rejected the petition for review in *Penneco*, finding that Petitioners had failed to preserve their argument regarding Class II wells being limited to the disposal of "conventional" oil and gas waste by not raising the issue during the public comment period.[247] However, the Board still elected to provide dicta on the matter, opining that the term "conventional" was not intended to prohibit injection of "fracking fluids."[248]

We observe that the premise of Petitioners' argument—that fracking is not "conventional oil or gas production"—seems to be incorrect.

> Fracking, which originated in the mid-1800s, is the practice of injecting high-pressure fluids and solids to break open impermeable rock formations to allow oil and gas to flow into a well. Because modern production techniques (i.e., unconventional production) did not exist in the 1800s, the use of fracking during that time period would mean fracking was used with traditional production techniques (i.e., conventional production). Thus, the inclusion of "conventional" in 40 C.F.R. § 144.6(b)(1) would not have been intended to prohibit injection of fracking fluids in Class II wells as Petitioners argue.[249]

Rather than focus on the distinction between *conventional* and *unconventional*, the Board's opining focuses on the specific technique of hydraulic fracturing. They argued that because it can be used to retrieve oil and gas from either a conventional or an unconventional formation, EPA could not have intended to exclude waste associated with fracking from injection into Class II wells.[250] Like EPA's briefing, the Board's dicta fails to reckon with the critical question: what does "conventional" mean as it appears in 40 C.F.R. § 144.6(b)(1) if not to limit waste disposal in Class II wells to waste produced from conventional oil and gas wells as opposed to *unconventional* wells?

EPA defines "unconventional oil and gas" elsewhere in its regulations. Pretreatment standards promulgated under the Clean Water Act state, "[u]nconventional oil and gas means crude oil and natural gas produced by a well drilled into a shale and/or tight formation (including, but not limited to,

246. EPA Region 3 Response, *supra* note 235, at 40.
247. *Penneco, supra* note 233, at 19–20.
248. *Id.* at 18.
249. *Id.* at 20.
250. *Id.* at 20.

shale gas, shale oil, tight gas, tight oil)."[251] These tight shale formations can only be accessed through modern fracking techniques (the combination of hydraulic fracturing and horizontal drilling).[252] Further, EPA regulations expressly address "wastewater pollutants associated with production, field, exploration, drilling, well completion, or well treatment for *unconventional* oil and gas extraction," prohibiting the direct discharge of these pollutants into publicly-owned treatment works.[253] Notably, no such standards exist for pollutants associated with *conventional* oil and gas production. EPA's 2020 study into oil and gas extraction wastewater management practices under the Clean Water Act expressly states it is a study of wastewater management from "both conventional and unconventional onshore oil and gas extraction."[254] Thus, the words "conventional" and "unconventional" have meaning, as those in the shale fields well know, but also as EPA's own regulations and publications directly indicate. The Board did not comment on the radioactivity issue, which Petitioners also had not raised in their petition, despite EPA's nod to the issue in their own briefing.

VII. OIL AND GAS WASTE MEETS THE SAFE DRINKING WATER ACT DEFINITION OF RADIOACTIVE WASTE AND SHOULD BE REGULATED ACCORDINGLY

EPA's briefing in *Penneco* frames the definition of Class II wells in the SDWA as functioning as an exemption—the Class II Loophole. The Class II Loophole described in EPA's *Penneco* briefing is that *any* liquid wastes associated with oil and gas production can go down a Class II well, no matter the waste's constituents, and no matter if it is "radioactive waste" as defined in the SDWA.[255] The Class II Loophole means copious amounts of radioactive waste is injected annually into wells that were never designed or intended to receive it.

Despite its pervasive use, the Class II Loophole is not in fact written anywhere. Instead, the Class II Loophole's very existence relies on ignoring words contained in existing regulations. Such a reading is not supported by basic, longstanding tenets of statutory construction, which similarly apply to regulatory construction. These tenets generally hold that: (1) every clause and word of a law must be given effect; (2) similarly, a law must be construed

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251. 40 C.F.R. § 435.33(a)(2).

252. NOBEL, *supra* note 5, at 149.

253. 40 C.F.R. § 435.33(a)(1) (emphasis added).

254. ENV'T PROT. AGENCY, EPA-821-S19-001, SUMMARY OF INPUT ON OIL AND GAS EXTRACTION WASTEWATER MANAGEMENT PRACTICES UNDER THE CLEAN WATER ACT 1, 5 (2020).

255. *See* EPA Region 3 Response, *supra* note 235, at 39 (emphasis added) (noting EPA "consistently views Class II wells as the correct classification of wells for the disposal of wastewater from *all* oil and natural gas production").

such that no clause, sentence, or word is superfluous, void, or insignificant; and (3) where possible, provisions should be read so as not to create a conflict. [256] As with statutory interpretation, "the starting point for interpreting a regulatory provision is its plain meaning."[257] The Class II Loophole defies each of these tenants, instead relying seemingly on whims of industry and EPA practices with no grounding in long-established SDWA regulations.

As EPA has readily acknowledged, the SDWA's definition of "radioactive waste" plainly includes oil and gas wastes with radium levels in excess of 60 pCi/L—and most produced water meets this definition.[258] The SDWA's definition of "radioactive waste" includes no language exempting oil and gas waste from this definition. Plainly, "radioactive waste" may only be disposed of in Class I wells. In addition, the SDWA defines Class II wells as being for fluids "[w]hich are brought to the surface in connection with *conventional* oil or natural gas production."[259]

EPA and industry have a demonstrated record of interpreting the Class II definition to function as a loophole allowing the injection of *any* fluids brought to the surface in connection with *any* oil and gas production. This interpretation goes against the plain language of the regulation, which limits fluids injected into Class II wells to those connected with *conventional* production. EPA's Class II Loophole gives the term "radioactive waste" no effect. Likewise, EPA's interpretation gives the term "conventional" no effect. By giving no effect to both of these terms, the Class II Loophole violates well-established rules of regulatory interpretation.[260]

In reading SDWA regulations, one must seek to harmonize the SDWA's provisions, as opposed to reading them in conflict with one another. The Class II Loophole defies this rule of regulatory construction because it unnecessarily creates a conflict between the SDWA as it defines "radioactive waste" and SDWA regulations for liquids brought to the surface in connection with oil and gas production.

Well-recognized principles of regulatory construction require reading the SDWA as affording the terms "radioactive waste" and "conventional"

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256. Williams v. Taylor, 529 U.S. 362, 404 (2000) (O'Connor, J., concurring); TRW Inc. v. Andrews, 534 U.S. 19, 31 (2001); Karczewski v. DCH Mission Valley L.L.C., 862 F.3d 1006, 1016 (9th Cir. 2017).

257. Intermountain Ins. Serv. of Vail Liab. Co. v. Comm'r, 134 T.C. 211, 218 (2010) (citing Walker Stone Co. v. Sec'y of Lab., 156 F.3d 1076, 1080 (10th Cir. 1998)).

258 . ENV'T PROT. AGENCY, OFF. OF WATER, *supra* note 167.

259. 40 C.F.R. § 146.5(b)(1) (2024) (emphasis added).

260. Williams, 529 U.S. at 404 (O'Connor, J., concurring) (quotations omitted) (quoting United States v. Menasche, 348 U.S. 528, 538–39 (1955)); TRW Inc. v. Andrews, 534 U.S. 19, 31 (2001) (quotations omitted) (quoting Duncan v. Walker, 533 U.S. 167, 174 (2001)); Walker Stone Co. v. Sec'y of Lab., 156 F.3d 1076, 1080 (10th Cir. 1998) ("When the meaning of a regulatory provision is clear on its face, the regulation must be enforced in accordance with its plain meaning.").

meaning and reading the regulations together as a harmonized whole. The result of such a reading would at the *very least* be that fluids brought to the surface with *unconventional* oil and gas production can only be injected down Class I wells designed to accept radioactive waste.

Rather than abide by the plain letter of its own regulations, EPA has used the Class II Loophole to turn a blind eye to years of fracking companies disposing of radioactive waste unlawfully. However, an agency cannot rewrite a regulation through interpretation.[261] While "the longstanding practice of the government—like any other interpretive aid—can inform a court's determination of what the law is,"[262] courts will not affirm blatant defiance of the plain language of EPA regulations.[263]

To the authors' knowledge, no one has attempted to enforce SDWA requirements that radioactive waste only be injected into Class I injection wells upon operators injecting radioactive fracking waste into Class II wells. EPA could take such action at any time. The SDWA also contains a citizen suit provision that allows "any person" to bring a lawsuit "against any person . . . who is alleged to be in violation of any requirement prescribed by or under [the SDWA]."[264] For those suffering the impacts of injection of radioactive fracking waste into Class II wells, the citizen suit provision may provide a route of enforcing existing SDWA regulations that prohibit this practice. In other words, closing the Class II Loophole is purely a matter of enforcement.

CONCLUSION

There is a certain irony here, and to understand, one can return to what V.L. Martin, with the Prairie Oil & Gas Company out of Independence, Kansas, told a meeting of oil and gas officials on April 12, 1932:

> Regardless of whether or not we consider our wastes objectionable or liable to cause damage to our neighbors or the public, the statutes of the several states make it obligatory on the producer to prevent the escape of waste from our properties. In many instances the courts have allowed damages because of the escape of such wastes. Apparently, it is only a question of time until the opposition to the

261. *See* Mullins Coal Co. of Va. v. Dir., Off. of Workers' Comp. Programs, 484 U.S. 135, 170 (1987) (Marshall, J., dissenting) ("An agency must abide by its regulations as written until it rescinds or amends them." (citing United States v. Nixon, 418 U.S. 683, 695–96 (1974))).

262. Loper Bright Enters. v. Raimondo, 603 U.S. 369, 386 (2024) (quotation omitted).

263. *See* Legal Env't Assistance Found., Inc. v. U.S. EPA., 276 F.3d 1253, 1263 (11th Cir. 2001) ("We cannot avoid the conclusion that EPA's construction of its classification scheme runs afoul of the plain language of the regulations and is therefore contrary to law.").

264. 42 U.S.C. § 300j-8(a)(1).

> escape of our waste will become strong enough to force us, as an economical measure, to dispose of them in such a manner as will not be objectionable to anyone, and, without doubt, such disposal will also be effected at a profit.[265]

Martin's final line reads: "It is also apparent that we cannot escape the moral responsibility for the effect of such wastes as may interfere with the orderly conduct of business, private or public, for after all we are the public which is affected."[266]

The story of the Bobs, gasmen in rural Ohio, appears to fulfill this prophecy. The Ohio Department of Natural Resources has now come to understand that at least four different injection well complexes across the state are leaking fracking wastewater, and the state has taken the extraordinary step of investigating the harms and shutting the wells down.[267] One such culprit was the Redbird injection well facility. A June 2020 report the Department produced on the facility determined the fracking waste that was contaminating the Bobs' gas wells had traveled one-third of a mile vertically, and *more than five miles* laterally through the earth.[268] The report stated, "naturally occurring fissures exist between the Ohio Shale formation and the Berea Sandstone formation, allowing wastewater to migrate."[269]

In a separate event, an injection well leaked brine into a conventional gas well and waste spewed out at the surface, ran down a hill, and contaminated a stream near Crooked Tree, Ohio. In January 2023, the Ohio Department of Natural Resources issued a letter to the company responsible, DeepRock Disposal Solutions, suspending operations at two of their injection wells in southern Ohio.[270] "If the Wells continue to operate, additional impacts may occur in the future and are likely to contaminate the land, surface waters, or subsurface waters," the state concluded.[271] "Thus, the continued operation of the Wells presents an imminent danger to the health and safety of the public and is likely to result in immediate substantial damage to the natural resources of the state."[272] Again, considering there are 181,431 oil and gas wastewater injection wells in America, and without them the industry would overnight be deluged with three billion gallons of toxic waste a day and nowhere to put it all, this simple admission has fantastic implications.

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265. V.L. Martin, *Disposal of Production Division Wastes* 3 (1932).
266. *Id.*
267. NOBEL, *supra* note 5, at 228.
268. Aye & Blauer, *supra* note 147, at 2.
269. *Id*. at 1.
270. Ohio Dep't of Nat. Res., Order No. 2032-02, Order by the Chief: Suspension of Injection Operations (Jan. 9, 2023).
271. *Id.*
272. *Id.*

In June 2023, the Ohio Department of Natural Resources issued another letter, suspending operations at the injection well near Felicia Mettler.[273] Her worst fears had been realized. Here too, waste was leaking out from the injection zone and entering nearby oil and gas wells, then flowing back out at the surface. This transformed them into surface-contaminating conduits for injected fracking waste. Earlier in 2024, these injection wells, operated by a company called K & H, and the ire of young Lexie Mettler's speech to her third-grade class, were shut down too. It was the hard work of not just Felicia, Autumn, and Lexie, but her environmental organizing mentor Roxanne Groff, and many, many other environmental organizers across Ohio that made this happen. Still, a stunning question remains.

If the practice of injecting oilfield wastewater deep underground at injection wells is scientifically meritless, was doubted in its conception even by the agency that currently regulates it, and typically involves injection of copious amounts of "radioactive waste" down wells explicitly not permitted to receive radioactive waste, why does this practice continue unabated across America?

273. Ohio Dep't of Nat. Res., Order No. 2023-139, Order by the Chief: Suspension of Injection Operations (June 26, 2023).