PORE TEXAS: DEFINING THE OWNERSHIP OF UNDERGROUND PORE SPACE FOR CARBON CAPTURE AND SEQUESTRATION IN TEXAS

Contact Information: Tyler Roberts

Email: tyler.roberts@ttu.edu

Phone: (830) 719-3364

Word Count: 10,424

PORE TEXAS: DEFINING THE OWNERSHIP OF PORE SPACE FOR CARBON CAPTURE AND SEQUESTRATION IN TEXAS

TYLER ROBERTS*

TABLE OF CONTENTS

* Tyler Roberts, Staff Editor, Texas Tech Law Review; J.D. Candidate 2024, Texas Tech University School of Law. The author wishes to thank her Mom, Dad, and Cason for their positive words and listening ear. She would also like to thank Craig, her fiancé, for his unwavering support and constant grace and kindness. Thank you, Professor Keffer, Dean Baker, and Jonathan Grammer, my advisers, for all of their help, advice, and words of wisdom.

ABSTRACT

The state of Texas is an anomaly. Texas leads the nation in both energy production and consumption; Texas prides itself on protecting private property rights, but land fragmentation is increasing. Texas is the largest state in the contiguous United States—and thus has the largest potential underground storage space to offset CO_2 emissions—but is unable to use it.

Big manufacturers want to decrease their carbon footprint, and landowners need to pay their increasing property taxes. Carbon capture and sequestration is an emerging technology that allows large power plants and industrial refineries to decrease their carbon footprint by permanently storing their emitted CO_2 underground in pore space. This technology has become increasingly popular around the globe, and more recently, in the United States—especially with the passage of the Inflation Reduction Act of 2022. However, Texas's carbon capture and sequestration projects are limited because its courts and legislature have not designated the owner of pore space.

Texas should adopt legislation that expressly designates ownership of pore space to the surface owner. Clarifying pore space ownership will make thousands of acres accessible for carbon sequestration in Texas, ultimately boosting our economy and environment by providing jobs, supporting industrial development, decreasing land fragmentation, and eliminating greenwashing.

I. INTRODUCTION

The demand to combat climate change is deafening and governments are responding through legislation, regulations, and social influence.[1] The energy sector, though often blamed for its large contribution to greenhouse gas emissions, offers a unique solution that in addition will allow the industry to supply the growing energy demand, mitigate greenwashing, create jobs, and decrease land fragmentation.[2] Carbon capture and sequestration is a process designed to reduce atmospheric carbon by capturing man-made carbon dioxide (CO_2) and storing it permanently underground in pore space.[3]

The United States population, technological advancements, and industrialization are rapidly increasing.[4] Texas's population alone is growing daily—just last year Texas saw its largest population increase of almost 500,000 people.[5] More people require more energy to fuel their homes, cars, factories, businesses, and everyday activities.[6] More energy is needed—either through traditional energy sources, which leave a large carbon footprint, or through renewable resources.[7] Global carbon emissions have already increased by 90% since 1970.[8] "We do not need to pit renewables against traditional fossil fuels or seek to replace one with the other . . . Texas needs an all-of-the-above energy approach."[9] And carbon capture and sequestration is just that.

The more population rises in Texas, the more natural land and its estates are broken up, divided, or sold, limiting carbon sequestration even more.[10] Large cities are swelling into surrounding areas, causing productive farm and ranch land to be broken up and sold into industrial and residential developments.[11] In just ten years, Texas lost roughly two million acres of productive farm and ranch land—increasing the value of rural land from $1,848 per acre to $3,954 per acre on average.[12] With operation costs soaring, the need for supplemental income becomes even more dire.[13] Carbon capture and sequestration projects can save farming and ranching by compensating landowners to utilize their natural land.[14]

Carbon capture and sequestration provide a way for power plants, large industrial manufacturers, and landowners to reach net-zero emissions by 2050.[15] Big manufacturers are being pushed to decrease

---

[1] *See infra* notes 5—12, 22—35 and accompanying text (describing population growth, greenwashing, and environmental regulations).
[2] Owen L. Anderson, *Geologic CO_2 Sequestration: Who Owns the Pore Space*, 9 Wy. L. Rev. 97, 97 (2009); *See infra* Part II (discussing how carbon capture and sequestration can potentially mitigate climate change, create jobs, and decrease land fragmentation).
[3] *See Carbon Capture and Sequestration (CCS) in the United States (Section 45Q)*, CONG. RSCH. SERV., R44902 (2022), https://sgp.fas.org/crs/misc/R44902.pdf.
[4] *See Fastest Growing States 2022*, WORLD POPULATION REV., https://worldpopulationreview.com/state-rankings/fastest-growing-states (last visited Oct. 27, 2022); Paul Michael, *Technology Statistics: How Fast is Tech Advancing? [Growth Charts] 2022*, https://mediapeanut.com/how-fast-is-technology-growing-statistics-facts/ (last visited Oct. 27, 2022).
[5] *Quick Facts*, U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/TX (last visited Oct. 27, 2022).
[6] *See* Hannah Evans & Janet Larsen, *Population and Climate Change: What are the Links* (2021), http://populationconnection.org/wp-content/uploads/2021/09/Population-and-Climate_PC.pdf; *See generally Sources of Greenhouse Gas*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions (last visited Oct. 27, 2022) (analyzing greenhouse gas emissions by sector).
[7] *See World Energy Needs*, CAPP, https://www.capp.ca/energy/world-energy-needs/ (last visited Nov. 15, 2022) (stating that no matter the source, energy demand will increase with population increase).
[8] *See Fastest Growing States 2022*, *supra* note 4 (showing population growth trends).
[9] State Representative Drew Darby, *Opinion: Texas Needs An All-of-the-Above Approach to Energy*, AUSTIN AM. STATESMAN (June 15, 2022, 5:58AM), https://www.statesman.com/story/opinion/2022/06/15/opinion-texas-needs-all-above-approach-energy/7603531001/.
[10] *See generally* Gary Joiner, *Texas Land Trends Tracks a Changing State* (June 14, 2017), https://texasfarmbureau.org/texas-land-trends-tracks-changing-state/ (stating that Texas land fragmentation occurs alongside population growth—losing 590,000 acres from the agricultural land base).
[11] TEX. LAND TRENDS, https://txlandtrends.org (last visited Nov. 15, 2022).
[12] *Rural Land Prices for Texas*, TEX. REAL ESTATE RSCH. CTR. (last visited Nov. 15, 2022), https://www.recenter.tamu.edu/data/rural-land/#!/state/Texas; *Texas Land Trends 1997-2017*, TEX. A&M NAT. RES. INST. 1, 15 (2017), https://txlandtrends.org/media/1shpepzz/texas-land-trends-5-year-update-2017.pdf.
[13] Amy Blake, *How A New Farm Bill with A Twist on Conservation Easements Can Save the Environment*, 54 Tex. Tech L. Rev. 755, 781 (2022).
[14] *See What is Carbon Sequestration?*, USGS, https://www.usgs.gov/faqs/what-carbon-sequestration (last visited Jan. 26, 2022) (carbon capture and sequestration uses natural land to mitigate climate change).
[15] *See generally Carbon Capture and Sequestration (CCS) in the United States*, *supra* note 3 (discussing the opportunity CCS provides for power plants and refineries); Luis A. Ribera & Bruce A. McCarl, *Carbon Markets: A Potential Source of Income for Farmers and Ranchers*, TEX. A&M

their carbon footprint, landowners need to pay their increasing property taxes, and everyone wants better air quality and a healthier environment. Carbon capture and sequestration provide an opportunity for large manufacturers to decrease their carbon footprint by storing their emitted carbon a kilometer deep underground and then compensating landowners for their storage space.[16] This financial opportunity for landowners is considerable: with a lease fee ranging from $20 to $100 per acre in 2010 (not including a royalty payment) for a long-term lease.[17]

It is expected that Texas can store between 393,490 million metric tons and 4,662,190 million metric tons of CO_2.[18] Even though Texas has the largest potential for underground storage in the nation, carbon capture and sequestration projects will be limited in Texas until pore space ownership is addressed.[19] To geologically sequester carbon beneath a severed estate today, at the very least, consent or stipulation from owners of both the surface and mineral estates is needed which is inefficient if not impossible in some cases.[20] Without a clear understanding under the law as to who owns the pore space, many uncertainties arise: Who owns the pore space? Which Should the surface owner, mineral owner, or both be compensated for the use of that pore space? Who is legally liable for sequestered carbon? These questions remain unknown as long as there is no designated pore space owner.[21] Therefore, unequivocal legislation to determine the ownership of underground pore space is crucial for the sustainability of our environment, economy, farmers, and ranchers.

This Article discusses the pore space ownership for carbon capture and sequestration in Texas. Part II provides background information regarding the development of carbon capture and sequestration within the United States. Part III and Part IV establish that Texas's underground pore space belongs to the surface estate owner—drawing comparisons and conclusions between the applications of both practical and legal principles to carbon capture and sequestration.

II. AN OVERVIEW OF CARBON CAPTURE AND SEQUESTRATION AS IT RELATES TO PORE SPACE OWNERSHIP

The United States population is growing—reaching over 334 million people this year.[22] In 2019, the United States made up roughly 15% of global carbon emissions.[23] The federal government has tried to tackle this dilemma through regulations, legislation, and more recently, tax incentives.[24] However, these methods have not proven to be fool-proof, as seen in *West Virginia v. Env't Prot. Agency*.[25]

AGRILIFE (Dec. 7, 2021), https://agrilifelearn.tamu.edu/s/product/carbon-markets-a-potential-source-of-income-for-farmers-and-ranchers/01t4x000004OUT7 (discussing the opportunity CCS provides for farmers and ranchers).

[16] *See generally Carbon Capture and Sequestration (CCS) in the United States (Section 45Q)*, *supra* note 3 (discussing the opportunity CCS provides for power plants and refineries); Ribera & McCarl., *supra note 15* (discussing the opportunity CCS provides for farmers and ranchers).

[17] Sean T. McCoy ET AL., *Implications of Compensating Property Owners for Geologic Sequestration of CO_2*, 44 Env't Sci. Tech. 2897, 2901 (2010).

[18] Christopher J. Miller, *Carbon Capture and Sequestration in Texas: Navigating the Legal Challenges Related to Pore Space Ownership*, Tex. J. of Oil, Gas, and Energy L. 399, 400 (2011).

[19] Elizabeth George, *Carbon Storage in Texas: Who Owns the Underground Pore Space?*, FORBES (Oct. 29, 2019), https://www.forbes.com/sites/uhenergy/2019/10/29/carbon-storage-in-texas-who-owns-the-underground-pore-space/?sh=138c5b122e4b.

[20] Telephone Interview with Jonathan Grammer, CEO, U.S. Carbon Capture (Jan. 20, 2023).

[21] Anderson, *supra* note 2, at 99.

[22] U.S. CENSUS BUREAU, *U.S. and World Population Clock*, https://www.census.gov/popclock/ (last visited Jan. 27, 2022).

[23] *See Frequently Asked Questions*, USGS, https://www.usgs.gov/faqs/how-much-carbon-dioxide-does-united-states-and-world-emit-each-year-energy-sources (last visited Oct. 27, 2022).

[24] *See generally Climate*, THE WHITE HOUSE, https://www.whitehouse.gov/climate/ (last visited Oct. 27, 2022) (discussing the policy movements and goals of the Biden administration); *The Tax Credit for Carbon Sequestration (Section 45Q)*, CONG. RSCH. SERV., IF11455 VERSION 2 (2021), https://crsreports.congress.gov/product/pdf/IF/IF11455/2; *Carbon Capture Provisions in the Inflation Reduction Act of 2022*, CLEAN AIR TASK FORCE, https://cdn.catf.us/wp-content/uploads/2022/08/19102026/carbon-capture-provisions-ira.pdf (last visited Oct. 27, 2022) (discussing the IRA).

[25] *See generally* West Virginia v. Env't Prot. Agency, 142 S. Ct. 2587 (2022) (holding the EPA does not have the authority to create emissions caps under the Clean Power Plan).

In June 2022, the Supreme Court found the Environmental Protection Agency (EPA) no longer has the "authority to force electric utilities to close down coal-fired power plants and shift to wind, solar, and other renewable forms of generation."[26] Essentially, the Court limited the EPA's authority to regulate greenhouse gas emissions from the power sector without specific direction from Congress.[27] As a result of this case, it is expected that the federal government and various states are expected to pass even more legislation that puts pressure on industrial operators to reduce their carbon emission levels.[28]

In hopes of promoting (instead of regulating) cleaner manufacturing practices, Congress passed the Inflation Reduction Act of 2022 (IRA), which updated the Section 45Q tax credit.[29] Known for its location in the Internal Revenue Code, the Section 45Q tax credit seeks to incentivize carbon capture and sequestration, a method of reducing greenhouse gas emissions.[30]

The IRA made the following changes to the 45Q tax credit: increased tax credit values across the board, provided a direct payment option for the credit collection, broadened the transferability provision, extended the "commence-construction window" to seven years, and expanded qualified facilities allowed to participate in 45Q.[31] Because the IRA raised 45Q incentives by up to 260%, it is expected that carbon capture and sequestration practices will greatly increase.

> By expanding and enhancing 45Q, Congress has made the tax credit significantly more accessible to a broad array of investors and developers. . . . Industrial sectors that have previously lacked the requisite incentives to decarbonize will now be more likely to participate in the carbon capture, removal, transport, and storage ecosystem.[32]

It is expected that the IRA will reduce carbon emissions by approximately 40% by 2030.[33] The more popular carbon capture and sequestration becomes among large companies, factories, and refineries, the more pore space will be needed for geologic sequestration. This presents an opportunity for landowners to use their unused pore space to eliminate greenhouse gases and receive compensation for it. In other words, the IRA is expected to incentivize involvement in carbon capture and sequestration technology, which ultimately could save farming and ranching all over the United States, especially in Texas.[34]

While there are new technological advancements every day, the demand to mitigate climate change is not going away. Carbon capture and sequestration can trap up to 90% of CO_2 emissions from power plants and industrial facilities.[35] Carbon capture and sequestration can reduce 14% of global greenhouse gas emissions by 2050.[36] Carbon capture and sequestration is a win-win for everyone involved. It is said to

---

[26] Dino Grandoni, *What You Need to Know About the Supreme Court's EPA* Case, THE WASH. POST (June 30, 2022, 2:07 PM), https://www.washingtonpost.com/climate-environment/2022/06/30/supreme-court-climate-change-case-epa/; West Virginia, 142 S. Ct. at 2608—09.

[27] West Virginia, 142 S. Ct. at 2608—09.

[28] *See* 40 C.F.R. §§ 51–52, 70–71; *Climate*, *supra* note 24*; Overview of the Clean Air Act and Air Pollution*, EPA (Aug. 10, 2022), https://www.epa.gov/clean-air-act-overview; West Virginia, 142 S. Ct. at 2608—09 (holding the EPA does not have the authority to create emissions caps under the Clean Power Plan).

[29] *The Tax Credit for Carbon Sequestration (Section 45Q)*, *supra* note 24; *Carbon Capture Provisions in the Inflation Reduction Act of 2022*, *supra* note 24, at 1.

[30] *Id.*

[31] *Carbon Capture Provisions in the Inflation Reduction Act of 2022*, *supra* note 24, at 1—2.

[32] *Id.*

[33] *Summary: The Inflation Reduction Act of 2022*, SENATE DEMOCRATS, https://www.democrats.senate.gov/imo/media/doc/inflation_reduction_act_one_page_summary.pdf (last visited Jan. 20, 2023).

[34] *See* Blake, *supra* note 13 and accompanying text; *What is Carbon Sequestration*, *supra* note 14 and accompanying text; Sean T. McCoy ET AL., *supra* note 17 and accompanying text (if carbon capture and sequestration becomes more popular, more pore space from landowners will be needed, thus providing more compensation to more landowners which ultimately will decrease land fragmentation).

[35] *See Carbon Capture*, CTR. FOR CLIMATE AND ENERGY SOLS., https://www.c2es.org/content/carbon-capture/ (last visited Oct. 27, 2022).

[36] *See id*.

be "the only way to achieve deep carbonization in the industrial sector."[37] It is a new, innovative technology that pacifies extreme environmentalists without requiring a life-altering change. Carbon capture and sequestration allow the industrial sector to continue producing energy for the growing population and allow a landowner to receive compensation for utilizing his unused pore space.

A legal analysis of pore space ownership rights when sequestering carbon underground requires a general understanding of the science behind carbon capture and sequestration. This section provides an overview of carbon capture, sequestration, pore space, and how it is and is not analogous to mineral rights in Texas and other states.

A. The Effects of Carbon Capture and Sequestration

Because approximately one-fourth of the United States' greenhouse gas emissions come from the industry sector burning fossil fuels for energy, large industrial companies and manufacturers are being pushed to become carbon-neutral.[38] This push for "greener and cleaner" practices has become a trend—especially among younger generations.[39] In fact, a recent survey revealed that 66% of adults in the United States are willing to pay more for sustainable products.[40]

The increasing demand for environmentally-sound products from governments, consumers, and the media is crippling—so much so that many companies have resorted to greenwashing.[41] Greenwashing is "the act or practice of making a product, policy, activity, etc. appear to be more environmentally friendly or less environmentally damaging than it really is."[42] For example, in 2015, Volkswagen "was caught faking its emissions reports" on diesel vehicles the company marketed "as one of the most environmentally friendly options available."[43]

Greenwashing first started in the 1960s and has become more popular since.[44] In 2010, TerraChoice found that 95% of "green" products were falsely marketed.[45] Greenwashing is terrible for our society and our environment: "consumers won't trust environmental-related claims in the future, regulators will impose restrictions, and progress towards sustainability will be impaired."[46]

Carbon capture and sequestration is an obvious solution to greenwashing. This new technology provides large manufacturers with a way to meet consumer demand and decrease their carbon footprint without having to change their entire manufacturing practices.[47] However, in order for carbon capture and

---

[37] *See id.*

[38] *See Sources of Greenhouse Gas*, *supra* note 6; *The Race to Zero Emissions and Why the World Depends on It*, UNITED NATIONS (Dec. 2, 2020) https://news.un.org/en/story/2020/12/1078612.

[39] *See* Alec Tyson ET AL., *Gen Z, Millennials Stand Out for Climate Change Activism, Social Media Engagement with Issue*, PEW RSCH. CTR. (May 26, 2021), https://www.pewresearch.org/science/2021/05/26/gen-z-millennials-stand-out-for-climate-change-activism-social-media-engagement-with-issue/.

[40] *Majority of U.S. Consumers Say They Will Pay More for Sustainable Products*, SUSTAINABLE BRANDS (Aug. 29, 2022, 8:00 AM), https://sustainablebrands.com/read/marketing-and-comms/majority-of-us-consumers-say-they-will-pay-more-for-sustainable-products.

[41] *See* Amish Shah, *How Companies Can Avoid Greenwashing and Make A Real Difference In Their Environmental Impact*, FORBES (Aug. 8, 2022, 7:45 AM), https://www.forbes.com/sites/forbesbusinesscouncil/2022/08/08/how-companies-can-avoid-greenwashing-and-make-a-real-difference-in-their-environmental-impact/?sh=2f3b995352b8.

[42] *Greenwashing*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/greenwashing (last visited Oct. 26, 2022).

[43] Eric Koons, *Greenwashing Examples 2022: Top 10 Greenwashing Companies*, ENERGY TRACKER ASIA (July 12, 2022), https://energytracker.asia/greenwashing-examples-of-top-companies/.

[44] *See What is Greenwashing and How To Spot It*, GREEN BUS. BUREAU (Dec. 7, 2021), https://greenbusinessbureau.com/green-practices/what-is-greenwashing-and-how-to-spot-it/.

[45] *Id.*

[46] Alex Assoune, *The Disastrous Effects of Greenwashing You Need to Know*, PANAPRIUM, https://www.panaprium.com/blogs/i/greenwashing-effects (last visited Nov. 9, 2022).

[47] *What is Carbon Capture and Storage*, NAT'L GRID, https://www.nationalgrid.com/stories/energy-explained/what-is-ccs-how-does-it-work (last visited Dec. 16, 2022).

sequestration to provide a long-term viable solution to climate change, sequestration developers must be able to access thousands of acres of kilometer-deep pore space.[48]

It is estimated that the United States can store all its CO_2 emissions from electricity-generating sectors for centuries.[49] While Texas provides the largest potential pore space for carbon sequestration, access to thousands of acres of kilometer-deep pore space is not an easy task.[50] Without clear title to pore space landowners, who would normally use their pore space to sequester CO_2, are afraid to because doing so may subject them to future litigation.[51]

Metropolitan areas can no longer accommodate the growing population and are thus expanding outwards to suburbs and rural areas.[52] From 1997 to 2017, the Texas population increased from 19 million to 28 million—a 48% increase.[53] During this same time, farming and ranching operations increased by only 8%.[54] Consequently, land values have skyrocketed, causing land to be broken up and sold into residential and commercial development.[55] Farmers and ranchers are facing crippling tax rates, inflation is at an all-time high, and profits are decreasing.[56] Farm and ranch land is becoming more and more expensive to upkeep, yet the demand to feed the growing population with sustainable agriculture continues to increase—what choice does this leave for the farmer or rancher? [57]

Historically, Texas has prided itself on protecting private property rights. However, land fragmentation has only continued to increase.[58] As a farm or ranch becomes less profitable, landowners have less wealth to continue the operation, and the land is sold.[59] Carbon capture and sequestration provide landowners an opportunity to gain back some of that lost wealth. Just like a farmer is paid for his harvested cotton, or a mineral owner receives a royalty for the oil produced from his estate, a landowner has an opportunity to be compensated for storing CO_2 in his pore space beneath his land.[60] This supplemental

---

[48] Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, 2010 U. ILL. L. REV. 363, 365 (2010).
[49] Angela C. Jones & Ashley J. Lawson, CONG. RSCH. SERV., R44902, *Carbon Capture and Sequestration (CCS) in the United States* (2022), https://sgp.fas.org/crs/misc/R44902.pdf.
[50] *See* Amish Shah, *How Companies Can Avoid Greenwashing And Make A Real Difference In Their Environmental Impact* (Aug. 8, 2022, 7:45 AM), https://www.forbes.com/sites/forbesbusinesscouncil/2022/08/08/how-companies-can-avoid-greenwashing-and-make-a-real-difference-in-their-environmental-impact/?sh=2f3b995352b8; Anderson, *supra* note 2, at 99.
[51] JOHN S. LOWE ET AL., CASES AND MATERIALS ON OIL AND GAS LAW 72 (West Academic Publishing, 8th ed. 2022).
[52] *See* TEX. A&M AGRILIFE EXTENSION, TEX. A&M NAT. RES. INST., https://txlandtrends.org/#facts (last visited Dec. 16, 2022); Allison Lund, *Featured Map: Land Fragmentation Risk Index*, TEX. A&M NAT. RES. INST. (Mar. 6, 2020), https://nri.tamu.edu/blog/2020/march/featured-map-fragmentation-risk-index/ (showing the land fragmentation trend increasing near urban areas).
[53] *See* TEX. A&M NAT. RES. INST., *supra* note 52.
[54] *Id.*
[55] *Id.*; Allison Lund, *supra* note 52. (showing the land fragmentation trend increasing near urban areas).
[56] Blake, *supra* note 13.
[57] *See Rural Land Prices for Texas*, TEX. REAL EST. RSCH. CTR., https://www.recenter.tamu.edu/data/rural-land/#!/state/Texas; *Texas Land Trends 1997-2017* (last visited Dec. 16, 2022); TEX. A&M NAT. RES. INST. 1, 15 (2017), https://txlandtrends.org/media/1shpepzz/texas-land-trends-5-year-update-2017.pdf; Kathleen Kassel, *Farming and Farm Income*, USDA: ECON. RSCH. SERV. (Sept. 01, 2022), https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/ (explaining the trends of farm production and size via graph); *Food Security, Climate Change and the Sustainable Development Goals*, UNITED NATIONS, https://www.un.org/en/academic-impact/food-security-climate-change-and-sustainable-development-goals (last visited Dec. 16, 2022) ("With the population predicted to increase to over 9.6 billion people by 2050, and food demand set to increase by between 60 and 100 percent, the topic of increasing agricultural output to feed the growing population whilst reducing our global footprint is by far one of the biggest challenges society faces today").
[58] *See generally Texas Private Real Property Rights Preservation Act Guidelines*, TEX. ATTORNEY GEN. (last visited Nov. 14, 2022), https://www.texasattorneygeneral.gov/sites/default/files/files/divisions/general-oag/TexasPropertyRightsPreservationActGuidelines.pdf (noting the "Property Rights Act is the Legislature's acknowledgement of the importance of protecting private real property interests in Texas"); Gary Joiner, *Texas Land Trends Tracks a Changing State* (June 14, 2017), https://texasfarmbureau.org/texas-land-trends-tracks-changing-state/ (stating that Texas land fragmentation occurs alongside population growth—losing 590,000 acres from the agricultural land base).
[59] Blake, *supra* note 13; Erin McKinstry, *As Generations Age, Farmland Owners Increasingly Less Connected to Land*, INVESTIGATE MIDWEST, (Apr. 21, 2018) https://investigatemidwest.org/2018/04/21/as-generations-age-farmland-owners-increasingly-less-connected-to-land/.
[60] *See generally* Nw. Landowners Ass'n v. State, 978 N.W.2d 679, 690—92 (N.D. 2022) (holding a statute unconstitutional that authorized oil and gas operators to utilize pore space without compensating the owner); McCoy ET AL., *supra* note 17, at 2897 (discussing the ramifications of compensating landowners for carbon sequestration).

income for their pore space use could make a landowner stay afloat and thus able to continue feeding America.

1. Understanding Carbon Capture and Sequestration

Carbon capture and sequestration is an extension of developed technologies from the chemical, oil, and natural gas industries.[61] Carbon capture and sequestration is "a set of new technologies that can greatly reduce CO_2 emissions from new and existing coal- and gas-fired power plants and large industrial sources."[62] This process can be broken down into three steps: (1) CO_2 is captured from power plants or refineries; (2) transported (usually via pipelines); and (3) injected underground into deep porous rock formations for storage to prevent it from escaping into the atmosphere.[63]

In reality, carbon capture and sequestration is an extremely complex process that takes years of planning, development, and negotiation by many people.[64] Generally, a power plant or industrial refinery that wishes to offset its carbon emissions contracts with a developer who then finds a transporter and eligible pore space for long-term storage.[65] This process may differ by jurisdiction, but in Texas, for example, a geologic storage facility can be owned by one person and operated by another.[66]

More specifically, to sequester carbon the captured CO_2 is compressed into a dense fluid state and then injected 4,000 to 8,500 feet deep underground.[67] Once injected, the CO_2 then "flows through and fills the [microscopic] pore spaces in permeable layers of the rock matrix"—partially displacing the fluids that were already present, such as oil, gas, or saline.[68] Because carbon sequestration can occur offshore or onshore in "oil fields, depleted gas fields, deep coal seams and saline formations," the subterranean geologic makeup varies.[69] Ideally, once CO_2 reaches and fills the pore space, it will eventually become trapped underground by permeable rock.[70] Therefore, an ideal sequestration site will keep large volumes of converted CO_2 for hundreds of years—"effectively occupying the pore space in perpetuity."[71] Furthermore, natural geologic formations containing crude oil and natural gas have proven to retain CO_2 underground for millions of years.[72]

Notwithstanding *West Virginia*, under the Safe Drinking Water Act (SDWA), the EPA has the authority to protect underground sources of drinking water and thus regulates the injection of CO_2 through

---

[61] Klass & Wilson, *supra* note 48.
[62] *Carbon Dioxide Capture and Sequestration: Overview*, U.S. EPA, https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-capture-and-sequestration-overview_.html (last visited Oct. 1, 2022).
[63] *Id.*
[64] *See* Vincent Gonzales & Krupnick ET AL., *Carbon Capture and Storage 101*, RES. FOR THE FUTURE (Feb. 3, 2022), https://www.rff.org/publications/explainers/carbon-capture-and-storage-101/ (discussing the various processes involved in carbon capture and sequestration).
[65] *See generally* Adam Whitmore, *Contracts to Support Deployment of Carbon Capture*, NAT. GAS WORLD: NAT. GAS NEWS (Feb. 14, 2022, 4:00PM), https://www.naturalgasworld.com/contracts-to-support-deployment-of-carbon-capture-96255 (discussing the various contracts involved in CCS); *Carbon Capture and Sequestration (CCS) in the United States (Section 45Q)*, *supra* note 3.
[66] 16 Tex. Admin. Code §5.023(a)(2)(b) (2022) (Tex. R.R. Comm'n.).
[67] Bert Metz ET AL., *IPCC Special Report on Carbon Dioxide Capture and Storage*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 1, 200 (2005), https://archive.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf (also known as "supercritical"); Klass & Wilson, *supra* note 48, at 365.
[68] Bert Metz ET AL., *IPCC Special Report on Carbon Dioxide Capture and Storage*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 1, 200 (2005), https://archive.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf; Klass & Wilson, *supra* note 48, at 365.
[69] Klass & Wilson, *supra* note 48, at 365.; Bert Metz ET AL., *IPCC Special Report on Carbon Dioxide Capture and Storage*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 1, 200 (2005), https://archive.ipcc.ch/pdf/special-reports/srccs/srccs_wholereport.pdf.
[70] Klass & Wilson, *supra* note 48, at 365; Sam Holloway, *Storage of Fossil Fuel-Derived Carbon Dioxide Beneath the Surface of the Earth*, 26 ANN. REV. ENERGY ENV'T 145, 156 (2001), https://www.annualreviews.org/doi/pdf/10.1146/annurev.energy.26.1.145.
[71] Klass & Wilson, *supra* note 48, at 365.
[72] *Id.*; *See infra* notes 242—48 and accompanying text (while there is a possibility of CO_2 migrating once sequestered, trespass liability can be minimized by expressly defining pore space ownership).

the Underground Injection Control (UIC) programs.[73] While the EPA establishes minimum standards and criteria for UIC programs, the EPA may grant primary enforcement authority (primacy) for regulating and permitting wells that inject CO_2 for carbon sequestration, known as Class VI Wells.[74] Currently, the EPA has only granted primacy for Class VI wells to two states—North Dakota and Wyoming.[75] However, Texas has primacy for Class II Wells used for enhanced oil recovery (EOR) wells.[76]

"Carbon sequestration", "carbon storage", and "geologic sequestration" are used simultaneously in the industry.[77] Carbon sequestration, however, alludes to the entire process as well as the long-term storage of CO_2, and thus carbon sequestration will be used for the purposes of this Article.[78] To clarify, carbon capture and sequestration may be referred to in its entirety or broken down into more specific processes (i.e., carbon capture and carbon sequestration).

2. A Deep Dive into Defining Pore Space

To inject CO_2 underground for permanent sequestration, "the injector must either own or have permission from the owner of the subterranean pore space."[79] Under the common law rule of "*cujus est solum, ejus est usque ad coelum et ad inferos*," an owner of land in fee-simple owns their land "from the heavens to the depths."[80] Therefore the fee-simple surface owner also owns the underground (or subsurface) pore space.[81] When this fee-simple interest is severed into a surface estate and mineral estate, the issue of pore space ownership arises.[82]

Within the United States, there is no uniform definition of underground storage space, or pore space.[83] Pore space is an empty underground storage space, roughly a kilometer deep, where CO_2 can be injected for long-term storage.[84] Pore spaces are "voids within rocks, soils, and geologic formations that collectively form a potential storage resource or reservoir" for gasses, fluids, CO_2, or brines.[85] Pore space can also be expanded "through increases in pressure or by removal of existing substances."[86] Some courts have used the way storage space was created as a guideline for determining the ownership of pore space.[87]

---

[73] Jones & Lawson, *supra* note 49.
[74] *Id.*; *See Class VI – Wells Used for Geologic Sequestration of Carbon Dioxide*, U.S. EPA https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide (last visited Nov. 17, 2022).
[75] Lauren A. Bachtel ET. AL., *Carbon Capture, Utilization, and Storage: Class VI Wells and US State Primacy*, MAYER BROWN (June 9, 2022), https://www.mayerbrown.com/en/perspectives-events/publications/2022/06/carbon-capture-utilization-and-storage-class-vi-wells-and-us-state-primacy.
[76] *See Class II Oil and Gas Related Injection Wells*, U.S. EPA, https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-carbon-dioxide (last visited Jan. 27, 2023); Kenneth B. Medlock III & Keily Miller, *Expanding Carbon Capture in Texas: Working Paper from Stakeholder Discussions on "Collaborative Action to Reduce CO_2 Emissions in Texas*," RICE U. BAKER INST. FOR PUB. POL'Y (Jan. 27, 2021), https://www.bakerinstitute.org/research/expanding-carbon-capture-texas-working-paper-stakeholder-discussions-collaborative-action.
[77] Telephone Interview with Jonathan Grammer, CEO, U.S. Carbon Capture (Oct. 1, 2022).
[78] *Id.; See* Dr. Samanthi, *Difference Between Carbon Capture and Storage and Carbon Sequestration*, (June 28, 2021), https://www.differencebetween.com/difference-between-carbon-capture-and-storage-and-carbon-sequestration/#Carbon%20Sequestration.
[79] Anderson, *supra* note 2, at 99.
[80] *Id.*; LOWE ET AL., *supra* note 51, at 45.
[81] Anderson, *supra* note 2, at 99; LOWE ET AL., *supra* note 51, at 45.
[82] Anderson, *supra* note 2, at 99.
[83] Klass & Wilson, *supra* note 48, at 365.
[84] *Pore Space As A Property Right: What Is It, Who Owns It and What is it Worth?*, WYO. LIVESTOCK ROUNDUP, (Dec. 16, 2017), https://www.wylr.net/2017/12/16/pore-space-as-a-property-right-what-is-it-who-owns-it-and-what-is-it-worth/.
[85] Tara Righetti, ET AL., *The Carbon Storage Future of Public Lands*, 38 PACE ENV'T L. REV. 181, 188 (2021).
[86] *Id.*
[87] *See* Mapco, Inc. v. Carter, 817 S.W.2d 686, 671—75 (Tex. 1991) (establishing that the mineral owner owns a storage space when it is created by partially excavating a mineral-bearing strata); Klass & Wilson, *supra* note 48, at 365.

Jurisdictions also vary on what constitutes pore space. In North Dakota for example, pore space is defined as "a cavity or void, whether natural or artificially created in a subsurface sedimentary stratum."[88] However, Wyoming legislatively defines pore space as a "subsurface space which can be used as storage space for carbon dioxide and other substances."[89]

The geologic makeup of pore space also varies—with more permeable and porous rock bodies more desirable for longer storage with less chance of migration.[90] Natural geologic formations containing crude oil and natural gas, for example, have proven to retain CO_2 underground for millions of years.[91] And consequently, "it is very likely that the fraction of stored CO_2 will be greater than 99% over 100 years."[92]

"Potential carbon 'storage basins' can cover vast tracks of land, crossing property borders, state lines, and national boundaries, complicating efforts to coordinate the large numbers (potentially thousands) of surface landholders over a single reservoir."[93] Without a clear designation of the ownership of pore space, Texas is missing out on big economic and environmental opportunities.[94]

B. Carbon Capture and Sequestration in the United States

Carbon capture and sequestration projects are becoming increasingly popular throughout the world—this includes current operating projects in Norway, Algeria, and Canada, and planned projects in China, Australia, and other European countries.[95] Carbon capture and sequestration is also growing in the United States. In 2021, there were twelve commercial facilities capturing and injecting CO_2 in the United States—with two more operations under construction in Texas.[96] Furthermore, the United States facilities have reported a "cumulative capacity to capture an estimated 40 million metric tons of CO_2 each year."[97]

Currently, operating or developing carbon capture and injection facilities occur in seven industrial sectors: power generation, natural gas processing, hydrogen production, chemical production, and fertilizer production.[98] In 2021, the Archer Daniels Midland facility in Decatur, Illinois injected 2 million metric tons of captured CO_2 from ethanol production into an underground saline reservoir.[99] In 2022, North Dakota issued a Class VI permit for Red Trail Energy to capture and inject 180,000 tons of CO_2 per year in Richardton, North Dakota.[100]

Several states have developed legislation governing carbon capture, sequestration, and pore space.[101] While many states have granted pore space ownership to the surface estate owner, there is no

[88] N.D. CENT. CODE ANN § 47-31-02 (West 2009).
[89] WYO. STAT. ANN. § 34-1—152(d) (West 2021).
[90] James Katzer, ET AL., *The Future of Coal*, MASS. INST. OF TECH. (2007), https://web.mit.edu/coal/The_Future_of_Coal.pdf.
[91] Klass & Wilson, *supra* note 48, at 365.
[92] Katzer, ET AL., *supra* note 90.
[93] *Id.*
[94] James Robert Zadick, *The Public Pore Space: Enabling Carbon Capture and Sequestration by Reconceptualizing Subsurface Property Rights*, 36 WM. & MARY ENV'T. L. & POL'Y REV. 257, 268 (2011).
[95] Klass & Wilson, *supra* note 48, at 365.
[96] Jones & Lawson, *supra* note 49.
[97] *See Carbon Capture and Sequestration (CCS) in the United States (Section 45Q)*, *supra* note 3.
[98] *See id.*
[99] Jones & Lawson, *supra* note 49.
[100] *Id.* (citing *North Dakota Approves First Carbon Capture and Storage Project Under State Primacy in the United States*, INDUS. COMM'N OF N.D., www.nd.gov/ndic/ic-press/News-DMR211019.pdf (Aug. 1, 2022)).
[101] Todd Janzen, *Who Owns "Pore Space" Deep Under Your Land?*, JANZEN AG TECH BLOG, (Nov. 16, 2022) https://www.aglaw.us/janzenaglaw/2022/11/14/who-owns-pore-space-deep-under-your-land (i.e., Montana, Oklahoma, Louisiana, Kentucky, New York, Michigan, West Virginia, New Mexico, California, Wyoming, and North Dakota all have either caselaw or statute regarding pore space ownership for carbon sequestration); Anderson, *supra* note 2, at 126—38.

uniform legislation among the states.[102] The use of pore space has become increasingly popular among various energy industries—causing it to become the subject of legislation and litigation.[103]

1. A Glance at Carbon Capture and Sequestration in North Dakota

In 2009, the North Dakota legislature addressed carbon capture and sequestration by adopting two new chapters to the North Dakota Century Code: Chapter 47-31 relating to pore space; and Chapter 38-22 relating to the regulations of CO_2 sequestration.[104] This legislation codified the definition of pore space as "a cavity or void, whether natural or artificially created in a subsurface sedimentary stratum," explicitly granting this space to the surface owner.[105] Thus, a conveyance of title to the surface "conveys the pore space in all strata underlying the surface of the real property."[106] However, North Dakota prohibited the severance of pore space from the overlying surface property because "undivided estates in land and clarity in land titles reduce litigation, enhance comprehensive management, and promote the security and stability useful for economic development, environmental protection, and government operations."[107] North Dakota also specified that a pore space lease does not constitute a severance.[108]

Regarding the relationship between a severed mineral and pore space estate, the new legislation does not apply retroactively and "does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."[109]

The North Dakota legislature also declared the geologic storage of CO_2 as a public interest to reduce greenhouse gas emissions—giving the state the power of eminent domain.[110] Furthermore, because the EPA granted the North Dakota Industrial Commission primacy, the North Dakota legislature gave the Industrial Commission enforcement and regulatory authority that includes the inspection of equipment, facility, and operations, as well as jurisdiction over the permit process.[111] This legislation also provided the storage operator title to injected CO_2 "until the commission issues a certificate of project completion," and thus the storage operator is liable for any damages caused by the injected CO_2.[112]

While the North Dakota legislature opened the door to eminent domain, they found it pertinent to preserve private property rights by explicitly stating that Chapter 38 in no way prejudiced private property owners' rights within a storage facility. Even more, issuing a permit or statutory language does not prevent a mineral owner or lessee "from drilling through or near a storage reservoir to explore for and develop minerals" as long as the drilling activities complied with commission requirements to preserve the storage facility's integrity.[113]

In 2019, North Dakota enacted Senate Bill 2344 which gave oil and gas operators unrestricted use of pore space, barred any cause of action for substances injected into or migrated from pore space, and

---

[102] Janzen, *supra* note 101 (noting that Montana, Oklahoma, Louisiana, New York, Michigan, New Mexico, West Virginia, California, North Dakota, and Wyoming all recognize the surface estate owner has owns the pore space); Anderson, *supra* note 2, at 126—38 (specifically discussing each state's caselaw and legislation).
[103] Derrick Braaten, FRACTRACKER ALLIANCE, *Developments in the Law of Pore Space in North Dakota*, (Aug. 31, 2022), https://www.fractracker.org/2022/08/carbon-capture-and-storage-developments-in-the-law-of-pore-space-in-north-dakota/#sdfootnote2sym.
[104] N.D. CENT. CODE ANN. §§ 38-22, 47-31 (West 2009).
[105] *Id.* §§ 47-31-01—02, 04; R. Lee Gresham & Owen L. Anderson, *Legal and Commercial Models for Pore-Space Access and Use for Geologic CO2 Sequestration*, 72 U. PITT. L. REV. 701, 711 (2011).
[106] N.D. CENT. CODE ANN. § 47-31-04 (West 2009).
[107] *Id.* § 47-31-05; Gresham & Anderson, *supra* note 105.
[108] N.D. CENT. CODE ANN. §§ 47-31-05—06 (West 2009); Gresham & Anderson, *supra* note 105.
[109] N.D. CENT. CODE ANN. §§ 47-31-07, 09 (West 2009).
[110] *Id.* § 38-22-01.
[111] *Id.* § 38-22-03.
[112] *Id.*§ 38-22-16.
[113] *Id.* § 38-22-13.

excluded pore space from the definition of Land as defined in the North Dakota Oil and Gas Production Damage Compensation Act.[114] This legislation essentially disallowed landowners from receiving automatic compensation for the use of their pore space.[115]

As a result of Senate Bill 2344, the Northwest Landowners Association brought suit—challenging the constitutionality of the statute.[116] And in the summer of 2022, the North Dakota Supreme Court struck down parts of the North Dakota statute, holding that the statute essentially constituted a taking by permitting operators to "physically invade a landowner's property by injecting substances into the landowner's pore space."[117] Furthermore, the court held that "surface owners had a right to compensation for the use of their pore space for disposal and storage operations."[118] This North Dakota Supreme Court decision was a landmark decision for the future of carbon sequestration because it recognized private property rights.

2. Wyoming Pore Space Legislation

Wyoming pore space statutes are similar to North Dakota. Wyoming statutorily defined pore space as the "subsurface space which can be used as storage space for carbon dioxide and other substances."[119] Additionally, in almost the exact language as North Dakota, Wyoming vests the ownership of pore space to the surface owner and then further clarifies that the conveyance of title of the surface includes the underlying pore space unless explicitly excluded.[120]

However, unlike North Dakota, Wyoming statute allows the severance of pore space from the surface estate, notwithstanding the fact that the mineral estate remains dominant.[121] Wyoming also limits a severed pore space owner's use of the surface estate to the "scope" described in the conveyance instrument.[122] Lastly, transfers of pore space rights must include "a specific description of the location of the pore space being transferred," and any transfers made after July 1, 2008, that do not include said description are "null and void at the option of the owner of the surface estate."[123] In other words, where there is a difference in opinion, the surface owner may declare his original intentions.[124]

C. Carbon Capture and Sequestration in Texas

Containing roughly 22% of the United States' underground storage capacity makes Texas ideal for carbon capture and sequestration. However, the lack of pore space legislation has limited carbon sequestration's appeal to many landowners who would normally be involved otherwise.[125] "Requiring project developers to obtain consent from all pore-space owners within the migratory path of the CO_2 plume could have the practical effect of prohibiting the development of many sequestration projects."[126] For these reasons, carbon capture and sequestration projects in Texas are primarily located on unsevered land.[127]

---

[114] Michelle Sheffler, ET AL., *North Dakota Supreme Court Solidifies Surface Owners' Rights to Profit from and Seek Damages for Unauthorized Use of Pore Space*, HAYNES BOONE (Aug. 10, 2022), https://www.haynesboone.com/news/alerts/north-dakota-pore-space.
[115] *Id.*
[116] Nw. Landowners, 978 N.W.2d at 685.
[117] N.D. CENT. CODE ANN. § 47-31-09 (West 2009); Nw. Landowners, 978 N.W.2d at 691.
[118] Nw. Landowners, 978 N.W.2d at 692.
[119] WYO. STAT. ANN. § 34-1-152(d) (West 2009).
[120] *Compare* WYO. STAT. ANN. § 34-1-152(a)—(b) (West 2009) ("The ownership of all pore space in all strata below the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata."), *with* N.D. CENT. CODE ANN. § 47-31-03 (West 2009) ("Title to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate.").
[121] WYO. STAT. ANN. §§ 34-1-152(b), (e) (West 2009).
[122] *Id.* § 34-1-152(f).
[123] *Id.* § 34-1-152(g).
[124] *See id.*
[125] LOWE ET AL., *supra* note 51, at 72.
[126] *Id.*
[127] *See supra* notes 128—130 and accompanying text.

In 2021, the Texas General Land Office (GLO) contracted 40,000 acres of state-owned land with Talos Energy Inc. (operator) and Carbonvert, Inc. (partner) for offshore carbon sequestration.[128] Located in Jefferson County, these submerged lands are expected to store between 225 and 275 million metric tons of CO_2.[129] This project will help the GLO to meet "market-driven decarbonization goals while raising money for the Permanent School Fund." [130]

More recently in 2022, "oil giant" Occidental Petroleum announced its carbon capture and sequestration project with the King Ranch.[131] Located on 106,000 acres in Kleberg County, this project is estimated to sequester a total of 3 billion tons of CO_2 in the King Ranch's underground reservoirs.[132]

Also in 2022, the EPA approved independent midstream oil and gas company, Stakeholder Midstream, for its monitoring, reporting, and verification plan for permanent carbon sequestration at its Pozo Acido injection well in the Texas Permian Basin.[133] Currently, Stakeholder Midstream captures and sequesters approximately 85,000 metric tons of CO_2 per year—the equivalent of eliminating carbon emissions from 11,000 households or taking 18,000 vehicles off the road.[134]

1. Texas Case Law Relating to Carbon Capture and Sequestration

Texas courts have never explicitly addressed the ownership of pore space.[135] In fact, when underground storage rights issues arise, Texas courts have historically been inconsistent—finding for the surface estate owner for over fifty years, then holding for the mineral estate owner in 1991—causing mass confusion among landowners, developers, and amongst the courts themselves.[136]

This ongoing perplexity of underground storage rights first arose in *Emeny v. United States* in 1969.[137] Applying Texas case law, the Federal Court of Claims recognized underground storage rights belonged to the surface estate owner.[138] In that case, the defendant fee-simple owners (the United States) leased tracts solely for the exploration and production of oil and gas.[139] When the lessee later developed "the Bush Dome," a stratum, for the underground storage of natural gas and non-native helium-gas mixtures in the Dome's pore space, the landowners brought suit.[140] The Court of Claims held that a conveyance of oil and gas rights did not include "the geological structures beneath the surface, including any such structure that might be suitable for the underground storage of foreign or extraneous gas produced elsewhere," and

---

[128] Matt Atwood, *Industry Leaders Usher in New Era of Carbon Sequestration Near Jefferson County*, TEX. GEN. LAND OFF. (GLO) (Sept. 3, 2021), https://www.glo.texas.gov/the-glo/news/press-releases/2021/september/cmr-george-p-bush-announces-new-coastal-partnership-for-carbon-sequestration1.pdf.
[129] *Id.*
[130] *Id.*
[131] Justine Calma, *King Ranch Will Be The Tite of The Largest Carbon Capture Project Yet*, THE VERGE (Nov. 1, 2022, 1:45 PM), https://www.theverge.com/2022/11/1/23434500/oil-giant-occidental-carbon-removal-dac-king-ranch-texas.
[132] *Id.*
[133] *EPA Approves First-of-its-Kind Permanent Carbon Sequestration Plan in Permian Basin*, PIPELINE & GAS J. (Sept. 13, 2022), https://pgjonline.com/news/2022/september/epa-approves-first-of-its-kind-permanent-carbon-sequestration-plan-in-permian-basin.
[134] *Carbon Capture and Sustainable Energy*, STAKEHOLDER MIDSTREAM, https://www.stakeholdermidstream.com/carbon-capture-and-sustainable-energy (last visited Nov. 17, 2022).
[135] Anderson, *supra* note 2, at 98; *See infra* Part II.C.1 (discussing Texas case law relating to pore space ownership).
[136] *Compare* Emeny v. United States, 412 F.2d 1319, 1325 (Ct. Cl. 1969) (holding for the surface estate owner), *and* Humble Oil & Refining Co. v. West, 508 S.W.2d 812, 815 (Tex. 1974) (holding for the surface estate owner), with Mapco, 817 S.W.2d at 688 (holding for the mineral estate owner regarding a man-made underground salt cavern).
[137] Emeny, 412 F.2d at 1320—25.
[138] *Id.* at 1325.
[139] *Id.* at 1321.
[140] *Id.* at 1320—23.

thus the oil and gas lease did not grant the lessee "any right to use the Bush Dome for the storage of gas produced elsewhere."[141]

Five years later in *Humble Oil & Refining Co. v. West*, the Texas Supreme Court followed the *Emeny* court's proposition and held for the surface estate despite West's 1/6 mineral royalty reservation stating, "Humble, owns the lands in fee simple, and this includes not only the surface and mineral estates but also the matrix of the underlying earth, i.e., the reservoir storage space."[142]

Furthermore, in *Makar Production Co. v. Anderson*, the Seventh District Court of Appeals in Amarillo prohibited the lessee from bringing off-lease saltwater onto the leased tracts and injecting that saltwater into the underlying subsurface strata, because there was no express grant of those rights in the oil and gas lease conveyance.[143] Thus implying that disposal rights are not leased by implication in Texas.[144]

More recently in *Lightning Oil Co. v. Anadarko E&P Onshore*, the Texas Supreme Court considered whether a lessee's mineral estate included the right to bar a surface owner or an adjacent lessee's activities from drilling through where the mineral estate owner's minerals are located.[145] There, the court held that the mineral estate only includes ownership of the minerals embedded in the subsurface—leaving the surface owner the "mass of the subsurface" including the pore space where the minerals are located.[146] Thus, requiring each estate owner to accommodate the other one in accordance with the accommodation doctrine.[147]

The principle that the surface estate included underground storage space was also extended in June 2022, in *Myers-Woodward v. Underground Services Markham*.[148] In considering who owned the cavern space created by the mineral estate owner's salt brining, the Texas appellate court held that the surface owner owned the subsurface of the property, including the cavern space.[149]

While Texas courts have predominantly held that the surface owner maintains title to underlying pore space, in 1991 the Beaumont Texas Court of Appeals sided with the mineral estate owner.[150] In *Mapco, Inc. v. Carter*, the court held that the mineral owner was entitled to payment for storage rights in an empty, underground salt cavern that had been partially extracted (not naturally occurring).[151] Thus some argue, that according to *Mapco*, when CO_2 is stored in a man-made storage space, the mineral estate owner owns the pore space.[152]

In sum, *Mapco* is the only case in Texas where the mineral estate owner was recognized as having subsurface storage rights.[153]

---

[141] *Id.* at 1323.
[142] Humble Oil & Refining Co. v. West, 508 S.W.2d 812, 815 (Tex. 1974).
[143] *Makar Prod. Co. v. Anderson*, No. 07-99-0050-CV, 1999 WL 1260015, at *1 (Tex. App. 1999).
[144] Anderson, *supra* note 2, at 103.
[145] Lightning Oil Co. v. Anadarko E&P Onshore, 520 S.W.3d 39, 46 (Tex. 2017).
[146] *Id.* at 42—43.
[147] *Id.* at 44.
[148] Myers-Woodward v. Underground Services Markham, No. 13-20-00172-CV, 2022 WL 2163857, at *11—12 (Tex. App—Corpus Christi-Edinburg June 16, 2022).
[149] *Id.*
[150] *See infra* notes 137—45 and accompanying text (discussing Texas caselaw that held the surface estate included title to subsurface storage rights); Mapco, Inc. v. Carter, 817 S.W.2d 262, 266, 269—70 (Tex. App.—Beaumont 1991).
[151] *Mapco*, 817 S.W.2d at 262, 269—70.
[152] *See generally id.* (holding for the mineral estate owner regarding a man-made underground salt cavern); Anderson, *supra* note 2, at 106.
[153] *See supra* Part III.C.1 (discussing Texas caselaw addressing subsurface storage rights).

2. Understanding the Accommodation Doctrine

It is a "well-settled law" that when minerals are severed from the surface estate, the mineral estate is dominant and thus may use the surface for the exploration and production of minerals as reasonably necessary.[154] However, this right is limited by the accommodation doctrine established by the Texas Supreme Court in *Getty Oil Co v. Jones.*[155]

The accommodation doctrine provides that if the mineral lessee fails to accommodate an existing use of the surface, the surface owner must establish the following to obtain relief: "(1) the lessee's use completely precludes or impairs the existing use, and (2) there is no reasonable alternative method available to the surface owner by which the existing use can be continued."[156] If the surface owner meets this burden of proof, he must prove that there are "alternative reasonable, customary, and industry-accepted methods available to the lessee" that will allow mineral recovery and the surface owner to continue his existing land use.[157] Once all three elements are proven, the mineral owner must "reasonably accommodate the surface owner's existing use by adopting a reasonable alternative method for mineral recovery."[158] Furthermore, the accommodation doctrine does not apply if the conveying instrument expressly defines the parties' surface rights and uses.[159]

Since *Getty Oil Co.*, the Texas Supreme Court has applied the accommodation doctrine to several other mineral rights such as groundwater,[160] natural gas, solar,[161] and various other conflicting estate interests.[162]

3. The Development of Texas Statutes Addressing Carbon Capture and Sequestration

Even though pore space ownership remains statutorily silent, Texas was one of the first states to address carbon capture and sequestration through legislation.[163] Through a series of bills in 2007 and 2009, the Texas legislature sought to promote carbon capture and sequestration projects by establishing a regulatory framework and providing tax incentives.[164]

The 2007 House Bill 3732 streamlined the permitting process for ultra-clean energy projects, expanded the definition of an "advanced clean energy project" to include carbon capture and sequestration practices, and created several tax incentives for the sequestering anthropogenic (i.e., man-made) CO_2.[165] This bill also provided authority to the Railroad Commission of Texas (RRC) for EOR projects, and the Texas Commission on Environmental Quality (TCEQ) for sequestration projects in non-oil or gas reservoirs.[166] Also in 2007, the Texas Legislature passed House Bill 1967 to address the transportation and infrastructure of carbon capture and sequestration projects.[167] This bill extended the same rights and

[154] *See* Getty Oil Co. v. Jones, 470 S.W.2d 618, 621 (Tex. 1971).
[155] *Getty Oil*, 470 S.W.2d at 623.
[156] Merriman v. XTO Energy Inc., 407 S.W.3d 244, 249 (Tex. 2013).
[157] *Id.*
[158] Emily Rogers & Holly Heinrich, *Water Rights*, 47 TEX. ENV'T L.J. 103, 104 (2017) (citing *id.*).
[159] Tiffany Dowell Lashmet, *Case Addresses Solar Lease, Mineral Owner, and the Accommodation Doctrine*, TEX. AGRIC. LAW BLOG (Jan. 25, 2021), https://agrilife.org/texasaglaw/2021/01/25/case-addresses-solar-lease-mineral-owner-and-the-accommodation-doctrine/.
[160] *See* Coyote Lake Ranch, v. City of Lubbock, 498 S.W.3d 53, 65 (Tex. 2016).
[161] *See* Lyle v. Midway Solar, 618 S.W.3d 857, 862 (Tex. App.—El Paso 2020) ("the accommodation doctrine could apply to this dispute").
[162] Gresham & Anderson, *supra* note 105, at 742; *see infra* Part III.C (discussing how accommodation doctrine applies to various disputes).
[163] Ali Abazari & Travis W. Wussow, *Carbon Capture and Storage We're Almost There*, 74 TEX. BAR J. 398, 399 (2011).
[164] Miller, *supra* note 18, at 401.
[165] *Id.;* House Rsch. Org., Bill Analysis, Tex. H.B. 3732, 80th Leg., R.S. (2007).
[166] Miller, *supra* note 18, at 401.
[167] *Id.*; House Rsch. Org., Bill Analysis, Tex. H.B. 1967, 80th Leg., R.S. (2007).

obligations of pipelines transporting commodities, such as crude petroleum, to pipelines carrying CO_2 products—allowing those pipelines to obtain "common carrier status."[168]

The Texas legislature continued to address carbon capture and sequestration in the next legislative session, by providing additional tax incentives and creating the framework for an offshore carbon sequestration project in state-owned land in the Gulf of Mexico.[169] Furthermore, Senate Bill 1387 addressed onshore ownership issues of carbon sequestration projects.[170] Specifically, Senate Bill 1387 gave the RRC jurisdiction over carbon sequestration in a potential productive oil or gas reservoir.[171] Senate Bill 1387 also provided a permitting process for the ownership and use of sequestered CO_2 and directed the RRC to adopt rules and procedures for the permitting, monitoring, reporting, and verification processes that were "consistent with any federal rules or regulations."[172] Even more, this bill established that stored CO_2 was considered "property of the storage operator unless willfully abandoned, administratively transferred, or transferred or conveyed by operation of some other law or legal document," and allowed the owner to recover the stored CO_2 in the future.[173]

The Texas legislature also established a Clean Energy Tax Credit in 2015.[174] This credit is applied to projects sequestering at least 70% of the carbon dioxide resulting from or associated with the generation of electricity by the facility.[175] However, this tax credit is no longer available as it could not be issued past September 1, 2018.[176]

In 2021, Texas enacted House Bill 1284—consolidating regulatory authority for Class VI underground injection control (UIC) under the RRC should the EPA grant Texas Class VI primacy.[177] House Bill 1284 established the "Anthropogenic Carbon Dioxide Storage Trust Fund," to be used by the RRC for carbon capture and sequestration projects including "permitting, inspecting, monitoring, investigating, recording, and reporting on geologic storage facilities and associated anthropogenic carbon dioxide injection wells."[178]

In 2022, the RRC adopted rules to be put in place should the EPA grant Texas Class VI primacy.[179] These rules are very specific and reflect the onerous carbon capture and sequestration process.[180] Under the adopted rules, the RRC must ensure CO_2 sequestration will not harm or endanger any underground source of drinking water, surface water, "existing or prospective oil, gas, geothermal, or other mineral resources," and human health or safety.[181] The RRC will also require approval from the Groundwater Advisory Unit of the Oil and Gas Division and TCEQ before the issuance of a carbon sequestration permit, and have set forth criteria for the construction of anthropogenic CO_2 injection wells and storage facilities.[182]

---

[168] House Rsch. Org., Bill Analysis, Tex. H.B. 1967, 80th Leg., R.S. (2007).
[169] Miller, *supra* note 18, at 402; House Rsch. Org., Bill Analysis, Tex. H.B. 1796, 81st Leg., R.S. (2009).
[170] House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009); *Texas Passes Significant CCS Legislation*, BUREAU OF ECON. GEOLOGY, https://www.beg.utexas.edu/gccc/news/2009/09-july-21 (July 21, 2009).
[171] House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009); *Texas Passes Significant CCS Legislation*, *supra* note 170.
[172] House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009).
[173] *Id.*
[174] TEX. TAX CODE ANN. §171.602 (2015).
[175] *Id.*
[176] *Id.* §171.602(f).
[177] House Rsch. Org, Bill Analysis, Tex. H.B. 1284, 87th Leg., R.S. (2021).
[178] *Id.;* TEX. NAT. RES. CODE. § 121.003.
[179] Memorandum from the Gen. Couns. of the Tex. R.R. Comm'n. on Amends. to 16 TAC Chapter 5, relating to Carbon Dioxide (CO2)to Chairman Wayne Christian (Aug. 30, 2022) (on file with the Office of the Secretary of State).
[180] *See id.*
[181] *Id.;* 16 TEX. ADMIN. CODE § 5.206(b) (2022) (Tex. R.R. Comm'n.).
[182] 16 TEX. ADMIN. CODE §§ 5.206(b)—(h) (2022) (Tex. R.R. Comm'n.).

4. Mineral Rights and Practices in Texas Analogous to Pore Space Ownership for Carbon Capture and Sequestration

Texas's extensive experience and knowledge in energy production is obvious: having its first producing oil well in 1866, and since then adding natural gas, water, wind, and solar energy.[183] This predominance was further noted in an interview with State Representative Drew Darby: "West Texas oil and gas, Panhandle and Gulf Coast wind, and Hill Country sun are all power derived from our state's natural resources that help drive economic development, generate income for landowners, fund roads and education, and strengthen our national security."[184] While the idea of injecting CO_2 into the subsurface to reduce carbon emissions may seem unfamiliar, processes such as EOR, natural gas storage, and saltwater disposal are analogous and thus may provide a model for carbon sequestration projects and legislation.[185]

For decades CO_2 has been injected into the subsurface to boost oil production through processes such as secondary recovery and EOR.[186] These are not new processes, especially in Texas.[187] In fact, Texas has captured, transported, injected, and stored more than 480 million tons of CO_2 through these practices; therefore, making Texas a world leader in the use of this technology.[188]

Secondary recovery is a process using water or CO_2 for increased oil and gas production.[189] Waterflooding is a form of secondary recovery where water is pumped down injection wells to drive any remaining oil out of the rock toward producing wells.[190] However, unlike CO_2, when saltwater is injected into the subsurface for EOR, all or some of it may permanently remain in the subsurface, however, it could also potentially be withdrawn to be reused.[191]

Following a waterflood in the secondary stage, EOR injects nitrogen, heat, polymers, chemicals, and CO_2 or water underground.[192] When CO_2 is injected at the optimum pressure, it navigates through the pore spaces of the rock, mixes with the oil, and forms a liquid that then flows to production wells.[193] Once the mixture is pumped to the surface, the produced fluids are separated allowing the CO_2 to be re-used and re-injected.[194]

In just the Permian Basin alone, approximately 30 million tons of CO_2 are injected underground each year to help recover oil and gas resources.[195] While this amount may seem minor in relation to the amount of sequestered carbon required to mitigate climate change, these recovery processes have provided significant knowledge and experience that is being used in carbon capture and sequestration projects all

[183] *First Producing Oil Well in Texas Comes In*, TEX. STATE HIST. ASS'N, https://www.tshaonline.org/texas-day-by-day/entry/1139 (last visited Dec. 16, 2022).
[184] State Representative Drew Darby, *supra* note 9.
[185] *See* Gresham, *supra* note 105, at 701, 704, 767; *see also Coyote Ranch*, 498 S.W.3d at 65 (holding that groundwater is also analogous to carbon sequestration).
[186] Klass & Wilson, *supra* note 48, at 373–76; *See Carbon Capture and Sequestration (CCS) in the United States (Section 45Q)*, *supra* note 3.
[187] *See infra* notes 188—99 (discussing Texas's history with processes analogous to carbon sequestration).
[188] House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009).
[189] Austin Lee ET AL., *The Way Forward: A Legal and Commercial Primer on Carbon Capture, Utilization, and Sequestration*, 16 TEX. J. OIL, GAS & ENERGY L. 43, 51 (2021).
[190] *Untapped Domestic Energy Supply and Long Term Carbon Storage Solution*, NAT'L ENERGY TECH. LAB., (Mar. 2010), https://www.netl.doe.gov/sites/default/files/netl-file/co2_eor_primer.pdf.
[191] Anderson, *supra* note 2, at 102.
[192] Madeline Mathews, *Carbon Sequestration and Pore Space Ownership in Texas*, 41 TEX. ENV'T. L.J. 205, 208 (2011).
[193] *Untapped Domestic Energy Supply and Long Term Carbon Storage Solution*, *supra* note 190.
[194] Anderson, *supra* note 2, at 102.
[195] Klass & Wilson, *supra* note 48, at 375.

over Texas and the United States today.[196] Because EOR with CO_2 is an established practice, "[i]t is very likely that initial [geological sequestration] projects will be linked to enhanced oil recovery projects."[197]

Natural gas is also similar to carbon sequestration in that it is injected into the subsurface for storage.[198] However, unlike carbon sequestration, natural gas is only stored temporarily and is thus an ongoing process.[199] The storage of natural gas is dependent on demand—natural gas can be stored underground when it is produced in excess and withdrawn from underground storage to meet demand.[200] Like carbon sequestration, natural gas is primarily stored in depleted aquifers, oil, and natural gas fields, and salt formations.[201]

Secondary recovery, EOR, and natural gas storage have foreshadowed potential property rights issues if pore space ownership is not explicitly defined.[202] "Although substantial work remains to characterize and quantify these mechanisms, they are understood well enough today to trust estimates of the percentage of CO_2 stored over some period of time—the result of decades of studies in analogous hydrocarbon systems, natural gas storage operations, and CO_2-EOR."[203]

III. TEXAS SHOULD ADOPT LEGISLATION TO ESTABLISH OWNERSHIP RIGHTS FOR PORE SPACE

Texas is designed to lead the nation in carbon capture and sequestration. Made up of almost 172 million acres, Texas contains the largest potential for underground storage space in the nation.[204] Texas is also the top energy producer in the United States—producing 43% of U.S. oil, 25% of U.S. natural gas, and 26% of U.S. wind-powered energy.[205] Texas's geological makeup and extensive experience in the industry place Texas in a position to lead the world in providing energy stability and reliability—through carbon capture and sequestration.[206]

As the movement towards environmentally friendly manufacturing practices increases, governments, consumers, and society continue to push large power plants, companies, and refineries to offset carbon emissions.[207] This immense pressure pushes companies to scramble to satisfy this demand as quickly as possible—sometimes even resorting to greenwashing.[208] Carbon capture and sequestration has the potential to mitigate climate change by decreasing the amount of carbon in the atmosphere by up to 90%.[209] Even more, carbon capture and sequestration is seen as the only long-term solution to reduce atmospheric greenhouse gases in the industrial sector.[210] And, with recent tax incentives expansions such

---

[196] *Id.*
[197] Anderson, *supra* note 2, at 98 (quoting Elizabeth J. Wilson & Mark A de Figueiredo, *Geologic Carbon Dioxide Sequestration: An Analysis of Subsurface Property Law*, 36 ENV'T L. REP. 10114, 10115 (2006)).
[198] *Id.* at 115.
[199] *Id.*
[200] *Underground Natural Gas Storage*, ENERGY INFRASTRUCTURE, https://www.energyinfrastructure.org/energy-101/natural-gas-storage (last visited Dec. 16, 2022).
[201] *Id.*
[202] Klass & Wilson, *supra* note 48, at 373–76.
[203] James Katzer, ET AL., *supra* note 90.
[204] *Maps of Texas*, NATIONS ONLINE, https://www.nationsonline.org/oneworld/map/USA/texas_map.htm (last visited Nov. 14, 2022) (providing that Texas is the largest state in the contiguous United States); Kenneth B. Medlock III & Keily Miller, *supra* note 76; *See Carbon Dioxide Capture and Sequestration: Overview*, *supra* note 62.
[205] *A Review of the State's Current Traditional and Renewable Energy Capabilities*, COMPTROLLER.TEXAS.GOV (Sept. 2022), https://comptroller.texas.gov/economy/fiscal-notes/2022/sep/energy.php; State Representative Drew Darby, *supra* note 9.
[206] *See Texas Leads the Nation in Both Crude Oil Production and Electricity Generation*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY (Apr. 11, 2022) https://www.energy.gov/eere/vehicles/articles/fotw-1233-april-11-2022-texas-leads-nation-both-crude-oil-production-and; *Research*, Carbon NEUTRAL COAL., https://carbonneutralcoalition.com/research/ (last visited Oct. 27, 2022).
[207] *See supra* Part I—II.A (discussing the consequences of pushing climate change).
[208] *See* Shah, *supra* note 41.
[209] Katzer, ET AL., *supra* note 90.
[210] *Carbon Capture*, CTR. FOR CLIMATE AND ENERGY SOL., https://www.c2es.org/content/carbon-capture/ (last visited Dec. 16, 2022).

as the IRA, carbon capture and sequestration is a more attractive option for companies to utilize and thus has more potential to positively impact the world's climate.

While Texas is estimated to have the largest pore space available for carbon sequestration, carbon capture and sequestration projects are currently limited in Texas.[211] A majority of Texas's industrial carbon emissions (i.e., carbon eligible for capture) occur in urban areas; and because pore space ownership is unsettled in Texas, carbon sequestration projects primarily desire large, contiguous tracts of unsevered land which are primarily located in rural Texas.[212] Transporting captured CO_2 from highly populated, urban areas thousands of miles to rural Texas is costly and inefficient.

Logically, one may ask: why not just sequester carbon closer to where it's captured? The answer is simple—until pore space ownership is legislatively defined, carbon sequestration will remain limited to large tracts of unsevered land which are rare in metropolitan areas.[213] Even in rural areas, it can be uncommon for the same person to own the surface and the minerals—making large tracts of unsevered land harder to find and thus limiting carbon capture and sequestration in Texas even more.[214]

Carbon capture and sequestration provide a huge opportunity for Texas: to increase jobs, promote the preservation of the agricultural industry, maintain large industrial companies, and potentially eliminate greenwashing.[215] Until the true owner of pore space is legislatively defined, millions of acres—that are geologically available for carbon sequestration—sit unused. Statutorily determining the ownership of Texas pore space will lower transaction and transportation costs of carbon capture and sequestration, support private property rights, minimize potential conflicts between mineral estate owners and surface estate owners, and eliminate federal and regulatory interference in carbon capture and sequestration projects.[216] For carbon capture and sequestration to flourish conflicting case law governing title to pore space must be clarified through unequivocal legislation.

A. Proposed Model Legislation Addressing the Ownership of Pore Space in Texas

The rise of carbon sequestration in Texas is contingent upon obtaining the legal right to use pore space.[217] Because the Texas legislature and Texas courts have failed to explicitly define this property right, they have essentially limited carbon sequestration in Texas. Therefore, unequivocal legislation addressing the ownership of pore space is crucial.

First, Texas should adopt legislation that explicitly grants the ownership of pore space to the surface owner because (1) in Texas, an ownership right in property is retained by the grantor unless expressly conveyed to the grantee;[218] (2) two separate estates (severed estates) are created when a fee-simple owner conveys the mineral estate;[219] (3) Texas law recognizes the mineral estate's dominance over the servient surface estate subject to the limitation of the accommodation doctrine;[220] (4) Texas case law supports the

[211] Miller, *supra* note 18.
[212] *See supra* Part I—II.A (an overview of carbon capture and sequestration and why it is currently limited in Texas).
[213] Miller, *supra* note 18.
[214] *See generally* Kevin Beiter & Austin Brister, *Severed Mineral Estates and Surface Use Disputes Part One: Extent of Implied Easement*, MCGINNIS LOCHRIDGE LLP, https://oilandgaslawdigest.com/uncategorized/severed-mineral-estates-and-surface-use-disputes-part-one-extent-of-implied-easement/ (last visited Jan 26, 2023) (stating how severed estates are common in Texas and presenting the consequences of severed estates).
[215] *See* Anderson, *supra* note 2; *See infra* Part II (discussing how carbon capture and sequestration can potentially mitigate climate change, create jobs, and decrease land fragmentation).
[216] *See infra* Part III (discussing the benefits of statutorily addressing pore space ownership in Texas).
[217] McCoy ET AL., *supra* note 17, at 2897.
[218] Anderson, *supra* note 2, at 99 (citing Duhig v. Peavy-Moore Lumber Co., 144 S.W.2d 878, 880 (Tex. 1940)).
[219] Anderson, *supra* note 2, at 99 (citing Humphreys-Mexia Co. v. Gammon, 254 S.W. 296, 299 (Tex. 1923) (severed estates may also be created when a fee-simple owner transfers a surface estate but retains the minerals).
[220] Anderson, *supra* note 2, at 100 (citing Getty Oil, 470 S.W. 2d at 621).

surface estate owner owning the pore space;[221] and (5) several states grant the surface owner ownership of the underlying pore space.[222]

In addition to granting pore space to the surface owner, legislation should define pore space to include both natural and artificially created subsurface areas and allow the severance of pore space.[223] The Texas legislature should also make clear that this legislation does not hinder the dominance of the mineral estate nor the application of the accommodation doctrine, and thus this legislation in no way hinders private property rights.[224] Furthermore, the surface owner should be compensated for the use, or lease, of his or her pore space and should be able to voluntarily unitize his or her pore space for carbon sequestration purposes.[225]

Subject to the EPA giving primacy to Texas, and following Senate Bill 1284 enacted from the 87th Texas Legislative Session, the RRC should be given the sole authority to approve the voluntary unitization of pore spaces necessary for carbon sequestration.[226] Unitization would "allow an entire storage facility to be treated as a unit."[227] Like natural gas, pore space unitization agreements should "not bind a landowner, royalty owner, lessor, lessee, or any other person who does not execute them. The agreements bind only the persons who execute them, their heirs, successors, assigns, and legal representatives. No person shall be compelled or required to enter into such an agreement."[228] It may also be helpful to follow §§ 101.012–101.018 of the Texas Natural Resources Code when determining the effectiveness of unitization agreements.[229]

B. Texas Law Lays the Foundation for Proposed Pore Space Legislation

Texas has tried to keep pace with the growing popularity of carbon capture and sequestration. The legislature intended to provide "clear legal guidelines" for this new technology by granting the RRC jurisdiction over Class VI Injection Wells, providing tax incentives, protecting individuals involved from competing federal regulations and potential fees, including the carbon gasification industry in current common carrier pipelines, and directing new carbon capture and sequestration studies.[230] While these are crucial for carbon capture and sequestration projects in Texas, there remains a statutory gap for pore space ownership. This gap leaves the surface and mineral owners vulnerable to liability.[231]

Legislation granting pore space ownership to the surface owner is the missing piece of the statutory puzzle, and it is supported by Texas case law. Because an ownership right in property is retained by the grantor unless expressly conveyed to the grantee, pore space should be expressly designated to the surface owner.[232] The court in *Makar* established this notion when it granted an injunction simply because the oil and gas lease, even though obtaining a permit for the saltwater disposal by the RRC, did not expressly convey disposal rights.[233] It follows then, that because an oil and gas lease in Texas conveys a fee simple determinable—only the oil and gas in place—underground storage and disposal rights are neither impliedly conveyed nor reserved.[234] Thus, title to pore space may not be implied through a conveyance or reservation

[221] *See infra* Section III.B (stating how Texas case law supports the surface estate receiving pore space ownership).
[222] *See infra* Section III.E (citing other states' laws relating to pore space ownership and drawing analogies to current and potential new Texas law).
[223] *See infra* note 241 and accompanying text (explaining why natural and artificially created pore space should be adopted in Texas and citing support).
[224] *See infra* Section III.C (establishing how the accommodation doctrine is applicable to pore space ownership).
[225] *See infra* notes 227—26 (citing support for voluntary unitization).
[226] *See infra* notes 223—26 (citing support for voluntary unitization).
[227] Abazari & Wussow, *supra* note 163.
[228] TEX. NAT. RES. CODE ANN. § 101.012.
[229] *See id.* §§ 101.012—101.018.
[230] *See supra* Section II.C.3.
[231] *See* Gresham & Anderson., *supra* note 105, at 775; House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009).
[232] *See* Anderson, *supra* note 2, at 99 (citing Duhig 144 S.W.2d at 880).
[233] *Makar*, WL 1260015, at *1.
[234] Anderson, *supra* note 2, at 103.

of minerals but should be determined statutorily.[235] Property rights should also not be determined by a regulatory agency, such as the RRC.[236]

Granting the surface owner title to pore space for carbon sequestration is also somewhat analogous to natural gas storage. In *Emeny*, the Federal Court of Claims applied Texas law and concluded that gas storage rights reside with the surface estate owner.[237] In that case, the court further noted that a mineral conveyance in Texas does not include "geological structures beneath the surface."[238] This principle was maintained by the Texas Supreme Court in *Humble Oil*, which held that the surface estate included the "matrix of the underlying earth, i.e., the reservoir storage space."[239] It follows then that pore space is part of the "matrix of the underlying earth."[240]

Furthermore, pore space ownership should include natural and artificially created pore space. This adheres to Texas case law as seen in *Humble Oil* where the court held that "the surface overlying a leased mineral estate is the surface owner's property, and those ownership rights include the *geological structures beneath the surface*."[241]

Another issue without a clear statutory resolution is the possibility of trespass liability regarding carbon sequestration.[242] Because carbon capture and sequestration technology is fairly new, it is unclear if and how far sequestered CO_2 can migrate over time.[243] If Texas courts follow EOR and hydraulic fracturing operations it is likely that there will trespass will not be an issue for sequestered CO_2 that crosses subsurface lines."[244] In *Coastal Oil & Gas Corp. v. Garza*, the Texas Supreme Court held that hydraulic fracking that crossed property lines did not constitute actionable trespass because of the rule of capture.[245] The rule of capture, the court explained, "gives a mineral rights owner title to the oil and gas produced from a lawful well bottomed on the property," regardless of whether they flowed to the well from a neighboring landowner's tract.[246] The court also noted that the RRC's authority may be considered, although not controlling, when determining the existence of trespass.[247] Professor and distinguished oil and gas scholar, Owen Anderson, seconded this by adding, "[b]ecause CO_2 injection, unlike hydraulic fracturing, will be subject to a regulatory permitting regime, the courts should have even fewer concerns about CO_2 injection for enhanced recover or CO_2 sequestration."[248]

While the facts somewhat differ, the court in *Anadarko* further established surface owners' right to pore space while addressing a claimed trespass issue.[249] Anadarko obtained a mineral interest adjacent to the Briscoe Ranch; however, because Anadarko's lease prohibited Anadarko from accessing its minerals through surface activities on the Chaparral Wildlife Management Area immediately above its mineral estate, the adjacent Briscoe Ranch allowed Anadarko to drill horizontal wells from their land to access Anadarko's adjacent minerals.[250] Lightning Oil Company, the mineral estate owner of the Chaparral Wildlife Management Area (which Anadarko would be drilling through), did not like this and sued

[235] *Id.*
[236] *Id.*
[237] *Emeny*, 412 F.2d at 1323.
[238] *Id.*
[239] *Humble Oil*, 508 S.W.2d at 815.
[240] *Lightning Oil*, 520 S.W.3d at 48; Mathews, *supra* note 192, at 217.
[241] *Humble Oil*, 508 S.W.2d at 815.
[242] Miller, *supra* note 18, at 417—18.
[243] *Id.*
[244] *Id.*
[245] Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1, 12—13 (Tex. 2008).
[246] *Id.* at 13.
[247] Anderson, *supra* note 2, at 115.
[248] *Id.*
[249] *Id.* at 99.
[250] *Lightning Oil*, 520 S.W.3d at 49.

Anadarko for trespass and tortious interference of Lightning's mineral lease and estate.[251] Relying on its prior decisions in *Humble Oil* and *Coastal Oil*, the court held the following:

> the rights conveyed by a mineral lease generally encompass the rights to explore, obtain, produce, and possess the minerals subject to the lease; they do not include the right to possess the specific place or space where the minerals are located.[252]

In other words, Anadarko's unauthorized interference with the *place* where Lightning's minerals were located constitutes "a trespass to the mineral estate only if the interference infringes on the mineral lessee's ability to exercise its rights."[253]

In 2020, 95% of Texas was privately owned.[254] While indicative of a respect for protecting private property rights by some, this statistic demonstrates how many people may be susceptible to the power of eminent domain. A landowner should be able to do with his property (and therefore his pore space) as he wishes, and thus eminent domain authority should not extend to pore space for carbon capture and sequestration.

Some argue that because carbon capture and sequestration is analogous to natural gas storage and transportation, the power of eminent domain should be used to store and transport and store CO_2.[255] However, eminent domain has been a long, hard fight for landowners and oil companies in Texas. While the Texas Supreme Court provided some insight regarding this issue in 2017, it did not completely settle the issue.[256]

In *Denbury Green Pipeline-Texas v. Texas Rice Land Partners,* the Texas Supreme Court specified that in order "[t]o qualify as a common carrier with the power of eminent domain, the pipeline must serve the public; it cannot be built only for the builder's exclusive use."[257] While planning to build a pipeline in east Texas in 2008, Denbury Green Pipeline was granted eminent domain power by the RRC on the assumption the company was, in fact, a common carrier pipeline.[258] Landowner, Texas Rice Partners, however, denied Denbury access to their property after receiving notice of the planned pipeline across their land.[259] After almost a decade of litigation, the Texas Supreme Court found that "at some point after construction, the Green Line would serve the public," and thus was granted the power of eminent domain.[260]

Overall, the *Denbury* case provided the proper standard to analyze eminent domain authority for common carrier pipelines.[261] This case also raised the question of whether the same test would apply to other types of pipelines.[262]

Unlike natural gas, permanently storing CO_2 does not provide a necessary daily good or service for the consumer.[263] Furthermore, fair compensation, competition, and private property rights are essential to

---

[251] *Id.*
[252] *Id.*
[253] *Id.*
[254] A.A. Lund, ET AL., *2020 Evaluation Report Highlighting the Ecological and Economic Value of Conserved Lands,* TEX. A&M NAT'L RSCH. INST. (2020), https://nri.tamu.edu/media/3025/tfrlcp2020evaluationreport.pdf.
[255] Mathews, *supra* note 192, at 222.
[256] *Texas Supreme Court Issues Ruling in Denbury Green,* TEX. A&M AGRILIFE EXTENSION, https://agrilife.org/texasaglaw/2017/01/10/texas-supreme-court-issues-ruling-denbury-green/ (Jan. 10, 2017).
[257] *Denbury Green Pipeline-Texas, v. Texas Rice Land Partners,* 510 S.W.3d 909, 913 (Tex. 2017).
[258] *Id.* at 11—12; *See* TEX. NAT. RES. CODE §111.019(a) ("Common carriers have the right and power of eminent domain.").
[259] *Denbury*, 510 S.W.3d at 911.
[260] *Id.* at 916.
[261] *Id.*; *Texas Supreme Court Issues Ruling in Denbury Green, supra* note 256.
[262] *Texas Supreme Court Issues Ruling in Denbury Green, supra* note 256.
[263] *See* TEX. NAT. RES. CODE §111.011 (codifying that common carriers must be a business in the public interest)

the maintenance of a free market. Carbon capture and sequestration provide a valuable opportunity for the industrial sector to receive a tax break, and for landowners to receive compensation.[264]

If a carbon capture and sequestration project need additional pore space, a "reasonably safe answer would be to compensate surface owners on the theory that they own the pore spaces and hence the sequestration rights."[265] Not eminent domain. Furthermore, because the dominant mineral owner must "reasonably accommodate" the surface owner's use of his land, there is no need to further regulate private property use. If proposed mineral production would unreasonably interfere with sequestered carbon, the mineral owner may have to explore and produce its minerals through an established industry alternative, such as horizontal drilling or proposing another location for the vertical drill.[266]

C. The Accommodation Doctrine Overcomes Surface Rights Issues

Legislation should explicitly grant the surface owner title to pore space because the accommodation doctrine recognizes the mineral estate as dominant over the surface estate.[267] The accommodation doctrine was first established by the Texas Supreme Court in *Getty Oil.*[268] In *Getty Oil*, the Supreme Court considered the conflicting interests of a mineral estate owner and surface estate owner of the same tract of land.[269] The surface owner, Jones, sought to preclude Getty from using any vertical space above the surface for pumping units that prevented Jones's use of his automatic sprinkler system.[270] Although Getty obtained the mineral estate before Jones purchased the surface estate, the Court ruled in favor of Jones.[271] Relying on *Humble Oil*, the Court said:

> It is well settled that the oil and gas estate is the dominant estate in the sense that the use of as much of the premises as is reasonably necessary to produce and remove the minerals is held to be impliedly authorized by the lease; but that the rights implied in favor of the mineral estate are to be exercised with due regard for the rights of the owner of the servient estate.[272]

More specifically, the Court stated that the mineral lease is limited by "lateral and subsurface boundaries"—the ownership of real property including the surface and the subsurface, and the use of that land (by the surface owner) extending to adjacent air.[273] While the mineral estate is dominant over the surface estate, Getty's later and vertical use of the surface, air space, and subsurface of the land was not reasonable and was thus "restricted to that which was reasonably necessary."[274] In other words, the accommodation doctrine "requires the mineral owner to accommodate the surface owner's reasonable existing uses."[275]

Conversely, the accommodation doctrine also prohibits the surface owner from unreasonably interfering with the mineral owner's interests.[276] A mineral estate is a fee simple determinable in the minerals in place—not the space around those minerals—and the right to explore and produce them.[277]

---

[264] *See supra*, Part II (discussing the importance of addressing pore space ownership as it relates to carbon capture and sequestration).
[265] Anderson, *supra* note 2, at 107.
[266] Robert J. Burnett, *Pore Space Ownership: The North Dakota Supreme Court Issues Landmark Decision*, HOUSTON HARBAUGH ATTORNEYS AT LAW, (Mar. 15, 2022) https://hh-law.com/insights/articles/the-accommodation-doctrine-balancing-the-interests-of-the-surface-owner-and-the-mineral-owner/ ("the mineral owner may be required to accommodate the surface owner…when under the established industry practices, there are alternatives available to recover the mineral owner's minerals"); *See* Haupt Inc. v. Tarrant County Water, 870 S.W.2d 350 (Tex. App. Waco 1994).
[267] Gresham & Anderson, *supra* note 105, at 742.
[268] *Getty Oil*, 470 S.W.2d at 620.
[269] *Id.*
[270] *Id.*
[271] *Id.* at 621–23.
[272] *Id.* at 621.
[273] *Id.* (citing Brown v. Lundell, 344 S.W.2d 863, 865 (1961).
[274] *Id.*
[275] Anderson, *supra* note 2, at 100.
[276] *Id.* (citing *Ball v. Dillard*, 602 S.W.2d 521, 523 (Tex. 1980)).
[277] *See Getty Oil*, 470 S.W.2d at 621; *Id.*

Therefore, even if the exploration and production of minerals include penetrating the surface owner's pore space, the surface owner must still reasonably accommodate the mineral owner.[278] It follows then that if carbon sequestration unreasonably interferes with the capture of conveyed minerals, the mineral owner may seek an injunction.[279]

As shown above, the accommodation doctrine provides the necessary framework for multiple owners of severed estates to work together with various intervening power and renewable energy sources. That is why the Texas Supreme Court has continued to apply the accommodation doctrine to several other mineral rights, such as groundwater, natural gas, solar, and various other conflicting estate interests.[280] Thus, it is an obvious conjecture for this doctrine to apply to pore space used for carbon sequestration. As stated by the Texas Supreme Court in *Anadarko* when it declined to alter the accommodation doctrine because it has long "provided a sound and workable basis for resolving conflicts" between mineral and surface estate owners."[281]

Legislation granting pore space ownership to the surface owner would not alter the accommodation doctrine's application. The severed estate owners must still reasonably accommodate each other.[282] If the mineral owner's right to use includes the exploration and production of minerals in the surface owner's pore space, then the mineral owner also has the right to inject substances, like saltwater or CO_2, for EOR even if those injected substances remained long-term.[283] Even though merely incidental, this does not change the surface owner's right to inject CO_2 for long-term carbon sequestration in their pore space.[284] Because the surface and mineral owners' right to use potentially collide, and even though impliedly governed by the accommodation doctrine, explicit legislation addressing pore space ownership is needed.

For these reasons, it should be declared that the commercial production of hydrocarbons (i.e., crude oil, natural gas, etc.) has priority over the use of pore space for carbon sequestration so long as those minerals are "in paying quantities."[285] Because the oil and gas industries are crucial to Texas's economy, it is important to avoid unnecessary interference with mineral developers and to avoid underground waste of mineral resources.[286] However, it is also important to ensure that the mineral estate is still producing minerals at a profit. This follows the holding in *Lyle v. Midway Solar*, where the court stated that "under the accommodation doctrine, *an attempt to develop* the minerals is required for legal remedy."[287] This theory is crucial, the court reasoned, because without it, "a mineral owner who undertakes no effort to develop his mineral estate could complain about any surface activity that might hinder, at some point in the future, oil and gas exploration."[288]

D. In Lieu of a Legislative Remedy, Follow Meyers-Woodward to Provide Pore Space Rights to Surface Owner

If Texas declines to adopt legislation governing the ownership of pore space in Texas, then pore space ownership should be governed by the Texas appellate court's recent decision in *Myers-Woodward.* In that case, the court determined who owned and had royalty rights to a salt cavern created by the mineral

[278] Anderson, *supra* note 2, at 100—01; Telephone Interview with Jonathan Grammer, CEO, U.S. Carbon Capture (Jan. 20, 2023).
[279] Anderson, *supra* note 2, at 101.
[280] *See* Gresham, *supra* note 105, at 701, 704, 767; *Coyote Lake Ranch*, 498 S.W.3d at 65 (holding that groundwater is also analogous to carbon sequestration); *Midway Solar*, 618 S.W.3d at 862 ("the accommodation doctrine could apply to this dispute").
[281] *Lighting Oil*, 520 S.W.3d at 50, 52 (quoting *Coyote Lake Ranch*, 498 S.W.3d at 63).
[282] Anderson, *supra* note 2, at 101 (citing *Ball v. Dillard*, 602 S.W.2d 521, 523 (Tex. 1980).
[283] *Id.*
[284] *Id.*
[285] *Id.* at 107.
[286] *Id.*
[287] Tiffany Dowell, *Case Addresses Solar Lease, Mineral Owner, and the Accommodation Doctrine*, TEX. A&M AGRILIFE EXTENSION, (Jan. 25, 2021) https://agrilife.org/texasaglaw/2021/01/25/case-addresses-solar-lease-mineral-owner-and-the-accommodation-doctrine/.
[288] *Id.*

estate owner.[289] Underground Services Markham owned the executive mineral interest in the salt under the Myers-Woodward property and was seeking to store hydrocarbons in the subsurface.[290] The Myers's and Woodwards owned the surface and had a 1/8 non-participating royalty interest in the minerals of the tract, and thus argued they owned the "surface, subsurface, the matrix of the underlying earth, and the reservoir storage space beneath the surface."[291]

Noting that the trial court incorrectly relied on *Mapco* in its decision, the appellate court held for the surface estate.[292] The mineral estate owner can extract minerals, lease their mineral estate, and receive a royalty and any other compensation for the minerals.[293]

> The mineral estate owner is entitled to extract and lease the minerals. No case law supports a conclusion that a mineral estate owner who does not own the surface estate owns the subsurface of the property and may then use the subsurface for its own monetary gain even after extracting all the minerals. . . . the mineral estate owner owns the minerals but not the *subsurface*.[294]

Until 2022, no case law in Texas addressed the issue of injecting CO_2 for storage purposes.[295] Even so, *Myers-Woodward* established that the surface estate owner owns the subsurface of the property which included salt caverns.[296] While this alternative grants pore space ownership to the surface owner, it does not explicitly define the subsurface of the property as it applies to carbon sequestration, and thus, an unambiguous legislative solution is still preferable.[297]

E. Other States' Laws Promote Model Legislation in Texas

Several states have enacted legislation to address pore space ownership.[298] At the forefront are North Dakota, Wyoming, Montana, and Oklahoma, however, the Texas Legislature should look specifically to North Dakota and Wyoming statutes when determining the specific language of the legislation to govern pore space. [299]

Wyoming was the first state in the United States to statutorily address pore space ownership by stating, "The ownership of all pore space in all strata below the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata."[300] Furthermore, Wyoming also clarified that the mineral estate remains dominant over the surface estate.[301] Like Wyoming, Texas should also explicitly designate pore space ownership to the surface estate owner and clarify the mineral estate's dominance. Not only is this in accordance with the accommodation doctrine, but it is also supported by Texas case law.[302]

Wyoming also legislatively defines pore space as a "subsurface space which can be used as storage space for carbon dioxide and other substances."[303] And North Dakota defines pore space as, "a cavity or

---

[289] Myers-Woodward, WL 2163857 at *1.
[290] *Id.*
[291] *Id.* at *1, *10.
[292] *Id.* at *13.
[293] *Id.* at *11 (citing *Lightning*, 520 S.W.3d at 49).
[294] *Id.* (citing *XTO Energy*, 584 S.W.3d at 487).
[295] *See supra*, Section II.C.1 (analyzing Texas caselaw applicable to pore space ownership).
[296] *Myers-Woodward*, WL 2163857 at *11.
[297] *Id.*
[298] Janzen, *supra* note 101 (noting that Montana, Oklahoma, Louisiana, New York, Michigan, New Mexico, West Virginia, California, North Dakota, and Wyoming all recognize the surface estate owner has owns the pore space).
[299] *Id.*
[300] WYO. STAT. ANN. § 34-1-152 (West 2008).
[301] *Id.*
[302] *See supra* Section II.B.2 (discussing Wyoming statute as it relates to pore space ownership and carbon sequestration).
[303] WYO. STAT. ANN. § 34-1-152(d) (West 2021).

void, whether natural or artificially created in a subsurface sedimentary stratum."[304] Wyoming's definition of pore space is broad however, North Dakota's definition is more desirable and thus should be reflected in Texas legislation because it expressly allows natural and artificially created pore space which coincides with Texas case law.[305]

Soon after Wyoming's first steps addressing pore space ownership, North Dakota adopted a statute that said, "[t]itle to pore space in all strata underlying the surface lands and waters vested in the owner of the overlying surface estate."[306] North Dakota's bill further attaches pore space rights to the surface estate by prohibiting the severance of pore space from the title to the overlying surface property.[307]

In *Northwest Landowners*, the North Dakota Supreme Court struck down carbon capture and sequestration legislation that prohibited landowner compensation for "land" damages by the mineral owner because it constituted an unconstitutional taking, stating: compensation is required for physical invasions even if the owner suffers only a 'minimal economic impact.'[308] "Therefore, because Senate Bill 2344 deprives surface owners from demanding compensation for physical occupation of their property, Senate Bill 2344 is an unconstitutional taking on its face in violation of the state and federal constitutions."[309]

Texas should mirror the North Dakota Supreme Court's holding in its legislation. The court's holding affirmed pore space ownership as an independent property interest entitled to broad constitutional protection, recognized the pore space owner is entitled to compensation for pore space usage, and proclaimed that the unauthorized injection of any gas, fluid, or like substance injected into the pore space or the migration of those substances from nearby injection wells could constitute an actionable subsurface trespass.[310]

Dating back to the 1877 Civil Code for the Dakota Territory, recognizing surface owner rights has been a custom for centuries, and was first reflected in North Dakota Century Code § 47-01-12 which stated, "the owner of land in fee has the right to the surface and to everything permanently situated beneath or above it."[311] This, like Texas case law, only includes the subsurface space and not the substances or minerals in that space.[312] This is similar to the long-established law in Texas. Additionally, pore space owners are entitled to compensation for the use of their pore space because it is a private property interest right governed by the United States and Texas constitutions.[313]

North Dakota also prohibited the severance of pore space from the overlying surface property because "undivided estates in land and clarity in land titles reduce litigation, enhance comprehensive management, and promote the security and stability useful for economic development, environmental protection, and government operations."[314] However, Texas recognizes the surface, minerals, and groundwater as severable estates, and thus the severance of pore space should be considered.[315]

---

[304] N.D. CENT. CODE ANN. § 47-31-02 (West 2009).
[305] *See supra* Section II.B (discussing North Dakota and Wyoming state law as it relates to pore space ownership for carbon sequestration).
[306] N.D. CENT. CODE ANN. § 47-31-09 (West 2009).
[307] *Id.*
[308] Nw. Landowners, 978 N.W.2d at 690—92 (citing Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 434–36 (1982)); Burnett, *supra* note 266.
[309] Burnett, *supra* note 266; *See supra* Section II.B (discussing North Dakota and Wyoming state law as it relates to pore space ownership for carbon sequestration).
[310] Burnett, *supra* note 266.
[311] Mosser v. Denbury Resources, Inc., 898 N.W.2d 406, 412 (2017) (quoting N.D. CENT. CODE ANN. § 47-01-12 (West 2009)).
[312] *See supra* Section III.B (discussing Texas caselaw analogous to pore space ownership for permanent carbon sequestration)
[313] U.S. CONST. AMEND. V (The Fifth Amendment guarantees that private property shall not "be taken for public use, without just compensation."); TEX. CONST. ART. § 17.
[314] N.D. Cent. Code Ann §47-31-05 (2009); Gresham & Anderson, *supra* note105.
[315] *See supra* Section II.C (stating Texas caselaw, statute, the accommodation doctrine, and mineral practices); *see also Coyote Ranch*, 498 S.W.3d at 65 (holding that groundwater is also analogous to carbon sequestration).

IV. CONCLUSION

"Texas is approaching a crossroads of a growing demand for energy and the need for sound environmental policy."[316] The pressure to eliminate greenhouse gases through social influence and regulations is more likely today than ever before.[317] Through the recent passage of the IRA, Congress has proved its commitment to carbon capture and sequestration. However, Texas law is silent on pore space ownership as it relates to carbon capture and sequestration—effectively stripping Texas of the opportunity for mass carbon capture and sequestration.

Carbon capture and sequestration is a proven method of reducing atmospheric CO_2 by using natural land—making Texas a prime candidate for carbon capture and sequestration.[318] Carbon capture and sequestration projects can lead to job creation, compensation for landowners, and environmental benefits that contribute to its political feasibility.[319] However, the success of these projects in Texas are dependent on legislatively addressing pore space ownership.

Texas is positioned to lead the nation in carbon capture and sequestration but is unable to because pore space ownership is unknown. Not only does the state have extensive experience in the oil and gas industry, but it is home to the largest potential underground storage space.[320] Even more, Texas case law provides the legal framework that, by analogy, can be used as a foundation to grant pore space ownership to the surface estate owner.[321]

"The current state of affairs demands we fortify our energy resources to respond to any crisis, and we can do this by continuing our more comprehensive 'all-of-the-above' approach to energy."[322] Carbon capture and sequestration encompass this approach. Texas property law, customs, and case law incline a legislative designation of pore space ownership to the surface owner. The bigger push on large companies to offset carbon emissions, the more popular carbon capture and sequestration will become, and the more pore space will be needed. Texas here it comes!

[316] House Rsch. Org, Bill Analysis, Tex. S.B. 1387, 81st Leg., R.S. (2009).
[317] *Id.*
[318] *What is Carbon Sequestration*, *supra* note 14 and accompanying text (noting that since is the largest state in the contiguous United States it has the most natural land and thus Texas has the largest storage space capacity).
[319] *See* Anderson, *supra* note 2; *See infra* Part II (discussing how carbon capture and sequestration can potentially mitigate climate change, create jobs, and decrease land fragmentation).
[320] Miller, *supra* note 18.
[321] *See supra* Section III.B (explaining how Texas caselaw may serve as a framework to adopt legislation addressing pore space ownership for carbon sequestration); Miller, *supra* note 18.
[322] State Representative Drew Darby, *supra* note 9.