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## We're All in This Together: The Test for Carbon Dioxide Subsurface Trespass

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# We're All in This Together: The Test for Carbon Dioxide Subsurface Trespass

Jacob Bryant\*

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## INTRODUCTION

On October 14, 2021, Louisiana announced a \$4.5 billion project by Air Products, an industrial gas supplier, to construct the largest carbon sequestration project in the world.<sup>1</sup> As Governor Edwards put it, “[t]here’s an energy transition under way and we’re powerless to stop it.”<sup>2</sup> The project, called the “Race to Zero Campaign,” was announced a few weeks after Governor Edwards disclosed that Louisiana joined a global effort to reduce greenhouse gas (GHG) emissions called.<sup>3</sup> Governor Edwards stated that “[w]e’re either going to take advantage of those opportunities or we’re going to lose. No state is more impacted by climate change than Louisiana.”<sup>4</sup> Like many others, Governor Edwards is relying on carbon capture and sequestration to combat climate change.

Carbon capture and sequestration is the process of capturing carbon dioxide as it is released from industrial power plants and either reusing or storing the carbon dioxide in the subsurface.<sup>5</sup> Through this process, carbon sequestration ensures that carbon dioxide will not enter the atmosphere and damage the climate. Once captured from the air, carbon dioxide is transported to an appropriate location for deep injection in geological formations and stored in minuscule pore spaces.<sup>6</sup> With its potential to store carbon dioxide for thousands of years, carbon sequestration is necessary to mitigate the impacts of climate change. Notwithstanding its necessity,

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1. Greg Hilburn, *Louisiana Lands Largest Carbon Capture Energy Project in the World*, THE ADVERTISER (Oct. 14, 2021, 11:10 AM), <https://www.theadvertiser.com/story/news/local/louisiana/2021/10/14/louisiana-worlds-largest-clean-energy-project-carbon-sequestration/8449104002/> [<https://perma.cc/FCW8-FY2J>].

2. *Id.*

3. *Id.*

4. *Id.*

5. *Carbon Capture, Utilization & Storage*, U.S. DEP’T OF ENERGY, <https://www.energy.gov/carbon-capture-utilization-storage> [<https://perma.cc/F959-RK-NM>] (last visited Jan. 28, 2023).

6. Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, 2010 U. ILL. L. REV. 363, 365, 373 (2010).

some legal issues regarding subsurface trespasses may prevent carbon capture and storage (CCS) projects from becoming feasible.

This Comment addresses whether Louisiana courts should find an actionable trespass when carbon dioxide from a carbon sequestration project migrates into subsurface pore spaces where the project operator has not secured subsurface rights. Courts and legislatures establish doctrines to account for subsurface property rights in other contexts, while also considering public policy. However, issues of pore ownership and subsurface trespasses remain a serious threat to the viability of CCS. By evaluating the application of property law and trespass law in other subsurface settings and different jurisdictions, this Comment analyzes the prevailing method that courts use to remedy these issues.

To further the goal of mitigating climate change and address the uncertainty surrounding carbon sequestration, Louisiana should pass new legislation to address subsurface property rights. Given the social value of CCS, the state should define these rights in Title 30 of the Revised Statutes to facilitate predictability for the operators. In the meantime, Louisiana courts should rule that no subsurface trespass occurs when carbon dioxide migrates through the pores, especially when the landowner endures little to no actual damages. The courts should balance the interests of landowners, operators, and the general public while holding operators liable when the negative impacts outweigh the positive outcomes of CCS. The social value carbon sequestration achieves by mitigating climate change damages outweighs any slight negative impacts that the landowners may experience as a consequence of not having a remedy for their alleged trespass.

Part I of this Comment provides relevant background information on an increasingly popular way to fight climate change, carbon capture, as well as explaining CCS, its popularity, and how Louisiana is uniquely situated to benefit from carbon sequestration. Part I also provides a discussion of agency highpoints and shortcomings in carbon capture. Part II analyzes current statutory law on pore space ownership and its uses in other states. To provide a comprehensive understanding of subsurface trespass, Part II also examines ownership theories behind pore spaces. Part III analyzes case law in other subsurface contexts, including waste disposal injections, natural gas storage, and hydraulic fracturing, followed by an examination of whether solutions from those areas can apply to subsurface trespasses of injected carbon dioxide for CCS projects. Part IV analyzes relevant sections in the Louisiana Revised Statutes for a better understanding of Louisiana law. Finally, Part V proposes a solution for Louisiana courts and discusses whether courts should apply similar subsurface doctrine and law from oil and gas to carbon sequestration or

provide for a different way to remedy the trespass claims altogether. This solution considers the unique nature of carbon sequestration when compared to other subsurface trespasses along with current public policy.

## I. BACKGROUND

### A. *What is Carbon Capture and Why is it important?*

In his first months of office, President Biden signed an executive order placing the climate crisis near the top of his agenda.<sup>7</sup> The Biden administration hopes that by utilizing CCS technology, the United States can reduce its carbon emissions in industrial processes and create an industry with net zero carbon emissions.<sup>8</sup> With a bipartisan bill, the Storing CO<sub>2</sub> and Lowering Emissions Act (“SCALE Act”), the legislative branch moved towards increasing federal investment in CCS projects.<sup>9</sup> The SCALE Act establishes a new financing program that supports CCS infrastructure, provides more funding to the Environmental Protection Agency (EPA) for allowing specific injection wells, and backs state and local governments for carbon dioxide utilization products.<sup>10</sup>

In Louisiana, Governor Edwards consistently advocated for CCS projects to combat carbon emissions from the oil and gas industry.<sup>11</sup> Through a 2020 executive order, Governor Edwards created the Climate Initiatives Task Force to reduce the state’s GHG emissions to net zero by

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7. *Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*, THE WHITE HOUSE (Apr. 22, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/> [https://perma.cc/VTJ4-WEM9].

8. *See id.*; *see also The Biden Plan for a Clean Energy Revolution and Environmental Justice*, BIDEN HARRIS: DEMOCRATS, <https://joebiden.com/climate-plan/> [https://perma.cc/F5BZ-Y9DQ] (last visited Jan. 28, 2023).

9. *See Lee Beck & Stuart Ross, U.S. House and Senate Introduce Bipartisan Scale Act – Landmark CO<sub>2</sub> Capture, Transport and Storage Infrastructure Bill; CATF Comments*, CLEAN AIR TASK FORCE (Mar. 17, 2021), <https://www.catf.us/2021/03/u-s-house-and-senate-introduce-bipartisan-scale-act-comments/> [https://perma.cc/K5ES-9XD8].

10. *See id.*

11. *See Tegan Wendland, Louisiana’s Governor Wants The Oil and Gas State to Go Carbon Neutral*, NPR (May 11, 2021, 5:00 AM), <https://www.npr.org/2021/05/11/994802529/louisianas-governor-wants-the-oil-and-gas-state-to-go-carbon-neutral> [https://perma.cc/RN4H-PTKY].

2050.<sup>12</sup> The Governor’s task force recognizes the potentially devastating impact of climate change on Louisiana and aims to prevent these effects.<sup>13</sup> For instance, the task force proposed that the Louisiana Department of Natural Resources work with universities to better understand other carbon dioxide utilizations to further reduce GHGs.<sup>14</sup>

Due to the dominance of the oil and gas industry in Louisiana, the pelican state is a prime candidate for CCS projects.<sup>15</sup> The industry accounts for a large portion of the state’s economic activity, including \$73 billion of Louisiana’s gross domestic product.<sup>16</sup> Currently, 61 facilities in the state qualify for tax credits that help fund CCS projects, and 32 of these facilities are considered economically feasible.<sup>17</sup> Also, the state currently awaits the EPA’s decision on its application for primacy over the Class VI storage wells—the storage wells used for CCS projects.<sup>18</sup> Primacy would give Louisiana agencies primary jurisdiction to “facilitate the permitting, siting, operation, monitoring, regulation, and closure over its Class VI injection wells used to inject carbon dioxide” for CCS projects.<sup>19</sup> All of Louisiana’s efforts seek to economically benefit the state while heavily reducing its carbon footprint.

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12. *Climate Initiatives Task Force*, LA. OFF. OF THE GOV., <https://gov.louisiana.gov/page/climate-initiatives-task-force> [https://perma.cc/R4SH-EQTC] (last visited Jan. 28, 2023).

13. *See generally id.*

14. Randee Iles & Jeffrey D. Lieberman, *Renewable Energy Efforts Highlighted in Draft Plan to Reduce Greenhouse Gas Emissions in Louisiana*, LISKOW & LEWIS: THE ENERGY L. BLOG (Sept. 21, 2021), <https://www.theenergylawblog.com/2021/09/articles/energy/renewable-energy-efforts-highlighted-in-draft-plan-to-reduce-greenhouse-gas-emissions-in-louisiana/> [https://perma.cc/ZT8H-7CGK].

15. *See* Wendland, *supra* note 11.

16. *Economic Impact*, LA. MID-CONTINENT OIL & GAS ASS’N, <https://www.lmoga.com/benefits-of-the-industry/economic-impact> [https://perma.cc/55R2-5F86] (last visited Jan. 28, 2023) (the oil and gas industry also supports one out of every nine jobs in the state).

17. *Louisiana Implementing Carbon Capture and Storage Technology*, REG’L CARBON CAPTURE DEPLOYMENT INITIATIVE, (2020) [https://carboncapture.ready.betterenergy.org/wp-content/uploads/2020/08/LA\\_7\\_23\\_2020.pdf](https://carboncapture.ready.betterenergy.org/wp-content/uploads/2020/08/LA_7_23_2020.pdf) [https://perma.cc/C62D-33MT].

18. Colleen C. Jarrott, *Primacy: The Gateway to Carbon Capture Storage in Louisiana*, BAKER DONELSON (July 20, 2021), <https://www.bakerdonelson.com/primacy-the-gateway-to-carbon-capture-storage-in-louisiana> [https://perma.cc/5U75-YY4B].

19. *Id.*

Given the climate conditions, CCS ensures that carbon emissions from industrial facilities will not enter the atmosphere and cause further destruction.<sup>20</sup> Fossil fuel-fired power plants comprise 30% of the United States' total GHG emissions—facilities the energy industry will likely rely on for years to come.<sup>21</sup> Thus, CCS projects are necessary to combat climate change.<sup>22</sup> Once captured, carbon dioxide is injected into deep geological formations and compacted to a fluid state that enters minuscule pore spaces in the penetrable areas of rock.<sup>23</sup> Sometimes, these carbon sequestration locations include the space below the surface of depleted oil fields.<sup>24</sup> CCS projects aim to reduce emissions by keeping the carbon sequestered underground for thousands of years.<sup>25</sup> Some current CCS projects can capture anywhere from 90 to 100% of a facility's carbon dioxide emissions.<sup>26</sup>

While carbon dioxide will likely remain underground, injected carbon dioxide will initially be less dense than the brine it displaces, increasing the likelihood of carbon dioxide migrating in the subsurface.<sup>27</sup> Moreover, the permeable nature of pore spaces allows the carbon to migrate horizontally, but not vertically.<sup>28</sup> Carbon dioxide mobility varies across geological sites depending on the specific nature of the subsurface formation.<sup>29</sup> For instance, certain areas might have high permeability, which allows for a greater storage of carbon dioxide.<sup>30</sup> Less permeable

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20. *Carbon Capture, Utilization & Storage*, *supra* note 5.

21. *Carbon Capture, Utilization, and Storage: Climate Change, Economic Competitiveness, and Energy Security*, U.S. DEP'T OF ENERGY 1 (Aug. 2016), [https://www.energy.gov/sites/prod/files/2016/09/f33/DOE%20Issue%20Brief%20-%20Carbon%20Capture%20Utilization%20and%20Storage\\_2016-08-31.pdf](https://www.energy.gov/sites/prod/files/2016/09/f33/DOE%20Issue%20Brief%20-%20Carbon%20Capture%20Utilization%20and%20Storage_2016-08-31.pdf) [<https://perma.cc/V3ML-KK42>].

22. *Id.*

23. Klass & Wilson, *supra* note 6.

24. *Id.* at 365, 373.

25. *Id.*

26. Vincent Gonzales et al., *Carbon Capture and Storage 101*, RES. FOR THE FUTURE, <https://www.rff.org/publications/explainers/carbon-capture-and-storage-101/> [<https://perma.cc/2EEE-G6R8>] (last updated Feb. 3, 2022).

27. Klass & Wilson, *supra* note 6, at 373–74.

28. *Id.* at 365, 373.

29. *Id.* at 374.

30. Peter Keleman et al., *An Overview of the Status and Challenges of CO2 Storage in Minerals and Geological Formations*, FRONTIERS (Nov. 15, 2019), <https://www.frontiersin.org/articles/10.3389/fclim.2019.00009/full> [<https://perma.cc/3MEL-JAXC>].

areas can result in significant pressure buildup due to the lack of mobility.<sup>31</sup>

### *B. Regulatory Scheme for Public Health*

As a consequence of the various injection processes, the EPA designated a new class of wells, Class VI injection wells, specifically for CCS projects.<sup>32</sup> To protect underground sources of drinking water (USDWs), the EPA finalized Class VI injection wells under the Underground Injection Control Program (UIC).<sup>33</sup> The Safe Drinking Water Act instructs the EPA to develop minimum requirements for injection wells to protect human health and prevent contamination of the USDWs.<sup>34</sup> The UIC aims to ensure “[i]njected fluids stay within the well and the intended zone” and do not pollute the public water system.<sup>35</sup> Public health concerns extend beyond the water system.<sup>36</sup> For instance, migration of injected carbon dioxide can create pressurized zones or result in potentially harmful gaseous accumulations of carbon dioxide.<sup>37</sup> Additionally, as with other injection wells, a well blowout could occur if the operator loses control of the pressure in the well.<sup>38</sup>

The UIC provides several requirements for the siting, construction, operation, testing, monitoring, and closure of long-term CCS projects to prevent potential harm caused by the injection of carbon dioxide into pore spaces.<sup>39</sup> Some of these requirements include extensive site characterization requirements, injection well construction requirements for materials that are compatible with and can withstand contact with carbon dioxide over the life of a CCS project, comprehensive monitoring

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31. *Id.*

32. *See Class VI – Wells Used for Geological Sequestration of Carbon Dioxide*, EPA, <https://www.epa.gov/uic/class-vi-wells-used-geologic-sequestration-co2> [https://perma.cc/468Z-L9FM] (last updated Oct. 14, 2022).

33. *Id.*

34. *General Information About Injection Wells*, EPA, <https://www.epa.gov/uic/general-information-about-injection-wells> [https://perma.cc/8GAS-BFG6] (last updated Aug. 2, 2022).

35. *Id.*

36. Madeline Mathews, *Carbon Sequestration and Pore Space Ownership in Texas*, 41 TEX. ENVTL. L. J. 205, 210 (2011).

37. *Id.* at 210–11.

38. *Id.* at 211.

39. *Class VI – Wells Used for Geologic Sequestration of Carbon Dioxide*, *supra* note 32 (including the relative buoyancy of CO<sub>2</sub>, subsurface mobility, corrosivity in the presence of water, and the large injection volumes anticipated by CCS projects).



requirements, and more.<sup>40</sup> By complying with the UIC criteria, operators have some flexibility in selecting geologic settings, including oil and gas fields that could be converted into CCS sites.<sup>41</sup> A regional office of the EPA or a state with primacy status monitors these Class VI wells, making them the UIC's primary enforcers.<sup>42</sup>

### C. No Legal Resolution

Alongside the safety concerns, a Class VI well permit also fails to address concerns about property rights and pore space ownership.<sup>43</sup> Some states passed statutes determining the ownership of pore spaces, while other states rely on courts to close this statutory gap.<sup>44</sup> Most property law derives from the common law "ad coelum" doctrine,<sup>45</sup> which asserts that to "whomever the soil belongs, he owns also to the sky and to the depths," meaning "the owner of the land owns everything from the heavens to the earth's core."<sup>46</sup> Louisiana codified the doctrine in Civil Code article 490, which states:

Unless otherwise provided by law, the ownership of a tract of land carries with it the ownership of everything that is directly above or under it. The owner may make works on, above, or below the land as he pleases, and draw all the advantages that accrue from them, unless he is restrained by law or by rights of others.<sup>47</sup>

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40. *Id.*

41. *Id.*

42. *General Information About Injection Wells*, *supra* note 34.

43. Owen L. Anderson, *Geologic CO<sub>2</sub> Sequestration: Who Owns the Pore Space?*, 9 WYO. L. REV. 97, 121 (2009) (A regional EPA permitting authority stated that the permitting program "does not have authority to determine surface, mineral, or storage rights when issuing permit decisions. Issues relating to property ownership or lessee rights are legal issues between permittee and property owners.").

44. Tara K. Righetti, *Correlative Rights and Limited Common Property in the Pore Space: A Response to the Challenge of Subsurface Trespass in Carbon Capture and Sequestration*, 47 ENVTL. L. REP. NEWS & ANALYSIS 10420, 10424 (2017) ("Wyoming . . . defines 'pore space' as 'subsurface space which can be used as storage space for carbon dioxide or other substances.'" (quoting WYO. STAT. ANN. § 34-1-152 (West 2022))).

45. Trae Gray, *A 2015 Analysis and Update on U.S. Pore Space Law—The Necessity of Proceeding Cautiously with Respect to the "Stick" Known As Pore Space*, 1 OIL & GAS, NAT. RES. & ENERGY J. 277, 281 (2015).

46. *Id.*

47. LA. CIV. CODE art. 490 (2022).

While the ad coelum doctrine could create simpler rules, courts recognize the doctrine's inapplicability in the modern world.<sup>48</sup> In *United States v. Causby*, the U.S. Supreme Court noted that application of this doctrine in airspace would cause major problems when the Court compared airspace to a public highway.<sup>49</sup> For instance, the Court hypothesized that every operator of a transcontinental flight would face continual trespass claims.<sup>50</sup> *Causby* specifically considered whether constant army planes flying over the plaintiff's land at low altitudes constituted a "taking" under the Fifth Amendment.<sup>51</sup> After recognizing the problems with the ad coelum doctrine, the Court commented that, "[t]o recognize such private claims to the airspace would clog these highways, seriously interfere with their control and development in the public interest, and transfer into private ownership that to which only the public has a just claim."<sup>52</sup> What comes with absolute ownership, as the ad coelum doctrine advocates, is the absolute power of exclusion wielded by the property owner, which includes the ability to exclude others that are thousands of feet above or below their property.<sup>53</sup> This result does not always comport with the transboundary nature of modern oil and gas industry practices.<sup>54</sup> Due to the significant size of land needed for oil and gas projects, the depth at which these productions occur, and the public necessity of oil and gas production, a rule of absolute exclusion does not fit within this modern system for oil and gas operations. Moreover, many states allow the property owner to sever mineral rights from the surface owner, giving both groups certain rights over the same land.<sup>55</sup> Given the nature of carbon sequestration, carbon dioxide will likely span across numerous different tracts of land, causing problems for potential injectors.<sup>56</sup>

Considering the inclusion of property rights, problems arise when injected carbon dioxide travels into geological pores. For instance, the fugacious nature of injected carbon dioxide causes carbon to travel

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48. *United States v. Causby*, 328 U.S. 256, 261 (1946) ("But that doctrine has no place in the modern world.").

49. *Id.*

50. *Id.*

51. *Id.* at 258.

52. *Id.* at 261.

53. Righetti, *supra* note 44, at 10427.

54. *See id.*

55. Keith B. Hall, *Ruminations on the Continuing Evolution of Trespass Law in the Context of Mineral Development*, 8 LSU J. ENERGY L. & RESOURCES 505, 507 (2020); LA. REV. STAT. § 31:15 (2022).

56. Righetti, *supra* note 44, at 10422.

throughout the pores, without regard to surface level property boundaries.<sup>57</sup> Thus, one major threat to CCS projects rests on whether carbon migration into subsurface areas, where the operator has not obtained legal access, constitutes a trespass. According to the Second Restatement of Torts, a trespass may be committed beneath the surface of the earth.<sup>58</sup> Since trespass law aims at compensating an owner for the violation of that owner's exclusive right of possession, the Restatement is consistent with the *ad coelum* doctrine.<sup>59</sup> While typical remedies for trespass include restitution or injunctive relief, courts usually do not award these damages for subsurface trespasses; instead, courts limit subsurface trespass remedies.<sup>60</sup> However, the permanent storage of carbon dioxide in CCS projects might require a different analysis than other subsurface trespasses. Even though trespass law is well established and appears to be commonly understood, the process of carbon dioxide injection into the subsurface raises new issues in this area of law.

## II. PORE SPACE OWNERSHIP AND UNITIZATION

Over the years, a few states have enacted legislation in an attempt to clarify pore space ownership for carbon sequestration purposes.<sup>61</sup> These statutory definitions guide courts on whether a subsurface trespass occurred. Additionally, these statutes provide courts with an analytical framework to determine whether a valid trespass claim exists amongst competing subsurface rights. Because trespass law is based on excluding unwanted guests from one's property, examining these statutes helps develop an appropriate solution for the potential trespass of CCS projects.

### A. Wyoming, North Dakota, and Montana

Some states proactively defined the geological pore space and vested the ownership of these pore spaces with the surface owner in order to clarify conflicting jurisprudence.<sup>62</sup> For instance, Wyoming Statutes Annotated section 34-1-152 defines pore space as the "subsurface space which can be used as storage space for carbon dioxide or other

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57. Klass & Wilson, *supra* note 6, at 373.

58. RESTATEMENT (SECOND) OF TORTS § 159 (AM. L. INST. 1965).

59. Hall, *supra* note 55, at 509–10.

60. Righetti, *supra* note 44, at 10429.

61. See WYO. STAT. ANN. § 34-1-152 (West 2022); see N.D. CENT. CODE ANN. § 47-31-02 (West 2022); see MONT. CODE ANN. § 82-11-180 (West 2022).

62. See WYO. STAT. ANN. § 34-1-152 (West 2022).

substances.”<sup>63</sup> Wyoming’s definition explicitly mentions the process of storing carbon dioxide, suggesting a legislative intent to define the term for potential CCS projects. The North Dakota Century Annotated Code section 47-31-02 defines pore space as “a cavity or void, whether natural or artificially created, in a subsurface sedimentary stratum.”<sup>64</sup> North Dakota’s definition focuses more on the scientific aspects of the geological formations rather than Wyoming’s definition.

While Wyoming and North Dakota have different and distinct definitions, both states declare the surface owner as the owner of the respective pore space beneath their tract of land.<sup>65</sup> North Dakota Century Annotated Code section 47-31-03 states that “[t]itle to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate.”<sup>66</sup> Wyoming Statutes Annotated similarly states that the pore space below “the surface lands and waters of this state is declared to be vested in the several owners of the surface above the strata.”<sup>67</sup> Additionally, Montana Code Annotated section 82-11-180 places ownership of the pore spaces, or as the statute says “geologic storage reservoir,” with the surface owner.<sup>68</sup> All three states include the element of private property rights with their respective statutes and codify the sentiment of the *ad coelum* doctrine in deep geological formations.<sup>69</sup> The *ad coelum* doctrine illustrates one of the basic elements of private property—the right of the property owner to exclude others from their property. While these three statutes create some certainty in geological pore ownership, they alone will not solve the issue of migrating carbon dioxide within the subsurface.

The three states resolved the legal uncertainty with private property rights in subsurface pore spaces by creating unitization statutes for carbon sequestration projects.<sup>70</sup> Unitization, normally used for oil and gas projects, is the coordinated operation of a geological reservoir “by all the owners of rights in the separate tracts overlying the reservoir.”<sup>71</sup> With

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63. *Id.* § 34-1-152(d) (West 2022).

64. N.D. CENT. CODE ANN. § 47-31-02 (West 2022).

65. *Id.* § 47-31-03 (West 2022); WYO. STAT. ANN. § 34-1-152 (West 2022).

66. N.D. CENT. CODE ANN. § 47-31-03 (West 2022).

67. WYO. STAT. ANN. § 34-1-152 (West 2022).

68. MONT. CODE ANN. § 82-11-180 (West 2022).

69. *See generally* Gray, *supra* note 45.

70. WYO. STAT. ANN. § 35-11-315 (West 2022); N.D. CENT. CODE ANN. § 38-22-08 (West 2022); MONT. CODE ANN. § 82-11-204 (West 2022).

71. Jacqueline Lang Weaver & David F. Asmus, *Unitizing Oil and Gas Fields Around the World: A Comparative Analysis of National Laws and Private Contracts*, 28 HOUS. J. INT’L L. 3, 6 (2006).

unitization agreements, the reservoir is considered a single “unit” for development purposes, where one operator manages the entire development of the field.<sup>72</sup> In the oil and gas industry, unitization typically has three main purposes: (1) protection of correlative rights;<sup>73</sup> (2) prevention of economic waste; and (3) prevention of physical waste.<sup>74</sup> Unitization of oil and gas fields alleviates the negative consequences of the rule of capture.<sup>75</sup> The rule of capture allows individuals to extract oil and gas through drilling and mining operations, even if the oil and gas migrated from another individual’s land, without being held liable.<sup>76</sup> Enabling operators to extract oil in this way without incurring liability encourages unnecessary drilling and construction of facilities, creating economic and physical waste.<sup>77</sup> Thus, states enact unitization statutes to avoid the negative effects of competitive drilling and operating.<sup>78</sup>

Similarly, Wyoming, North Dakota, and Montana passed unitization statutes for carbon sequestration to complement their determination of private ownership over the pore spaces.<sup>79</sup> Wyoming Statutes Annotated section 35-11-316, titled “Unitization of geologic sequestration; hearings on application, order; modifications,” provides that Wyoming’s Oil and Gas Conservation Commission’s approval for construction of a CCS project will not be effective “until the plan of unitization has been signed or in writing ratified or approved by those persons who own at least eighty percent (80%) of the pore space storage capacity within the unit area.”<sup>80</sup> An Oil and Gas Conservation Commission regulation explains that to receive approval for a proposed plan:

The applicant must provide the method used to determine the quantity of pore space storage capacity to be allocated to each

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72. *Id.* at 16.

73. Righetti, *supra* note 44, at 10434 (“Correlative rights are the rights of mineral owners within a common source of supply to produce their equitable share of the oil and gas within a shared hydrocarbon reservoir.”).

74. Weaver & Asmus, *supra* note 71, at 35.

75. *See generally id.* at 7.

76. Caleb Madere, *Covert Capture: Hydraulic Fracturing and Subsurface Trespass in Louisiana*, 75 LA. L. REV. 865, 873 (2015); LA. REV. STAT. § 31:14 (2022) (“A landowner has no right against another who causes drainage of liquid or gaseous minerals from beneath his property if the drainage results from drilling or mining operations on other lands.”).

77. Weaver & Asmus, *supra* note 71, at 12.

78. *See generally id.* at 6.

79. WYO. STAT. ANN. § 35-11-316 (West 2022); N.D. CENT. CODE § 38-22-08 (West 2022); MONT. CODE ANN. § 82-11-204 (West 2022).

80. WYO. STAT. ANN. § 35-11-316 (West 2022).

separately owned tract within the permit area. This allocation represents . . . each tract's actual share of the pore space to be used in the sequestration permit area.<sup>81</sup>

Wyoming's statutes combined with their regulations illustrate the state's complex procedure to account for the private owners of pore spaces.<sup>82</sup>

North Dakota and Montana require consent of at least 60% of the pore area's surface owners, but differ in their basis for the consent.<sup>83</sup> North Dakota sets the 60% threshold as a permit requirement for CCS projects, while Montana does not.<sup>84</sup> North Dakota also requires CCS operators to make a "good-faith effort to get the consent of *all* persons who own the storage reservoir's pore space."<sup>85</sup> Requiring a "good faith effort" to obtain the consent of all owners is coupled with the provision that "all nonconsenting pore space owners are or will be equitably compensated."<sup>86</sup> Thus, while not all of the surface owners must contract in the unitization agreement, all surface owners receive some compensation.<sup>87</sup> The nature of private subsurface property rights urged Wyoming, North Dakota, and Montana to require some form of unitization to overcome absolute exclusions.

While the three states implemented a unitization scheme similar to oil and gas reservoirs, the adopted statutes do not apply perfectly to carbon sequestration projects. First, the harms of the "rule of capture" do not apply to carbon sequestration as in oil production.<sup>88</sup> In carbon sequestration projects, an individual is less likely to utilize the difficult self-help strategy of drilling their own well, causing both economic and

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81. 055-3 WYO. CODE R. § 3-43 (LexisNexis 2022).

82. *See generally* WYO. STAT. ANN. § 35-11-316 (West 2022); *see generally* 055-3 WYO. CODE R. § 3-43 (LexisNexis 2022).

83. N.D. CENT. CODE ANN. § 38-22-08(5) (West 2022) ("[T]he storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space."); MONT. CODE ANN. § 82-11-204 (West 2022) ("[U]pon the application of persons owning leasehold interests underlying 60% of the surface within the delineated area.").

84. N.D. CENT. CODE ANN. § 38-22-08 (West 2022); MONT. CODE ANN. § 82-11-204 (West 2022).

85. N.D. CENT. CODE ANN. § 38-22-08(4) (West 2022) (emphasis added).

86. *Id.* § 38-22-08(14) (West 2022).

87. *Id.*

88. *See* Righetti, *supra* note 44, at 10435 ("Although a storage project may involve many wells, including wells for monitoring, because the resource is exogenous, not every owner of pore space will have access to that resource, and therefore the ability to 'capture' the pore space via independent operations on his or her own land is limited.").

physical waste.<sup>89</sup> Even though a Class VI well operator has some economic advantages, the advantages from oil recovery are not found in CCS projects. The profitable nature of CCS projects became less concrete when contrasted with oil extraction. For example, one issue with the profitability of CCS projects is whether one should consider the tax incentives provided by the government in determining the shared benefit. Wyoming requires the determination of economic benefits from the pore space use to be “fair and equitable,” but fails to specify how to achieve that goal.<sup>90</sup> A lack of clarification suggests that the economic waste associated with the rule of capture is not a substantial concern in CCS projects, unlike oil and gas production. Additionally, the physical waste associated with the rule of capture—the waste of actual oil and production resources—does not apply here. Instead of extracting resources from the subsurface, carbon sequestration involves injecting carbon dioxide into the subsurface permanently.<sup>91</sup> Therefore, unlike oil and gas production, CCS projects do not require unitization agreements to prevent physical or economic waste.

Protecting property rights throughout carbon sequestration projects is important, but unitization does not directly achieve that goal. Consequently, enacting unitization statutes fails to completely solve the issue of subsurface trespasses.<sup>92</sup> Each state only requires that a certain percentage of surface owners agree to the unitization agreement, disregarding other landowners’ opinions.<sup>93</sup> One scholar, Tara Righetti, argued that statutes like Wyoming’s encourage potential holdouts to contract with the operators, since an operator could continue production without the holdout’s consent.<sup>94</sup> Those potential holdouts would only join the agreement to receive compensation. However, even Righetti acknowledged that Wyoming’s statute does not preclude subsurface

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89. *See id.* at 10432 (“Unlike mineral interests, pore space use for CCS is incompatible with a self-help remedy . . . an owner of non-hydrocarbon pore space has little reprieve.”).

90. WYO. STAT. ANN. § 35-11-316 (West 2022) (“The method of generating economic benefits from the use of pore space in the unit area is fair and equitable and is reasonably designed to maximize the value of such use.”).

91. *See* Klass & Wilson, *supra* note 6.

92. *See generally* Stone v. Chesapeake Appalachia, LLC, No. 12-CV-102, 2013 WL 2097397 (N.D.W.Va. Apr. 10, 2013) (found an actionable trespass even with a unitization agreement involved).

93. *See* WYO. STAT. ANN. § 35-11-316 (West 2022); *see also* N.D. CENT. CODE ANN. § 38-22-08 (West 2022); *see also* MONT. CODE ANN. § 82-11-204 (West 2022).

94. *See* Righetti, *supra* note 44, at 10436.

trespass claims from the migration of injected carbon dioxide.<sup>95</sup> Moreover, requiring these agreements still places additional financial and legal barriers on CCS project operators, which discourages development. Even though unitization statutes are implemented for the public interest, creating additional legal barriers, like unitization agreements, harms the public interest.

### III. TRESPASS IN OTHER AREAS AND OTHER STATES

Whether a state statutorily declares pore space as property of the surface owner or not, courts will undoubtedly face the issue of migrating carbon dioxide. Since no precedent directly discusses the trespass issue, Louisiana courts should examine other courts' views of subsurface rights in different contexts. This Comment first looks at waste disposal cases, then examines cases involving storage of natural gas, and concludes with enhanced oil recovery cases. After analyzing the three subsurface areas, Louisiana courts should utilize and apply those approaches to the unique facts of carbon sequestration projects.

#### *A. Analysis of Waste Disposal Injection*

Louisiana courts should consider analogizing migrating carbon dioxide subsurface issues to waste disposal injection jurisprudence. Industrial processes produce hazardous waste that can be legally disposed of in the subsurface, subject to EPA guidance on treatment and disposal of such waste. The EPA also provides subsurface injection guidance for carbon dioxide.<sup>96</sup> Cases from a variety of jurisdictions provide insight into both pore space ownership interests and how courts apply the ad coelum doctrine to the subsurface.

In a 2003 ruling from the Court of Appeals of Texas, Austin, *FPL Farming, Ltd. v. Texas Natural Resource Conservation Commission*, the defendant obtained a permit to construct two waste disposal injection wells for commercial nonhazardous industrial waste around 7,350 to 8,200 feet deep in a saltwater formation.<sup>97</sup> Upon finding that a waste plume would reach the subsurface underneath the plaintiff's property within ten years, the parties settled and the plaintiff withdrew their request for a contested

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95. *See id.*

96. *Typical Wastes Generated by Industry Sectors*, EPA, <https://www.epa.gov/hwgenerators/typical-wastes-generated-industry-sectors> [<https://perma.cc/UGP7-F6U4>] (last updated June 15, 2022).

97. *FPL Farming, Ltd. v. Tex. Nat. Res. Conservation Comm'n*, No. 03-02-00477-CV, 2003 WL 247183, at \*1 (Tex. App. Feb. 6, 2003).



hearing on the permit.<sup>98</sup> Three years after the initial settlement, the defendant increased the maximum injection rate by more than six times the original rate, causing the plaintiff to file another request for a contested hearing on the permit.<sup>99</sup> Under Texas Water Code Annotated section 27.051, injection wells cannot receive a permit if “existing rights, including but not limited to, mineral rights, will be impaired.”<sup>100</sup> An administrative law judge recommended granting the permit and found that the plaintiff had no “absolute right to exclude others from the deep subsurface below its property, that it did not own the oil and gas mineral interests associated with its property, that its existing rights would not be impaired by the proposed amendments.”<sup>101</sup> The plaintiff contended the Commission incorrectly interpreted the statute by focusing on the plaintiff’s intended use of the property instead of existing property rights.<sup>102</sup> The plaintiff also alleged, based on the ad coelum doctrine, that the Commission’s finding that the plaintiff did not have an absolute property right in the deep subsurface was wrong.<sup>103</sup> On the other hand, the current trend of property owners not exercising the absolute right to exclude deep subsurface migration supported the Commission’s finding.<sup>104</sup> The Commission noted that if property owners have absolute exclusion rights, the rights “would effectively ban the use of injection wells” because property owners would have a trespass claim on their land through the migration of substances to the subsurface.<sup>105</sup> The court agreed with the Commission and found that “some measure of harm must accompany the migration for there to be impairment,” rather than the migration alone being the impairment.<sup>106</sup>

The Ohio Supreme Court reached the same conclusion as the Texas Court of Appeals a few years earlier in *Chance v. BP Chemicals, Inc.*<sup>107</sup> Similarly to *FPL Farming, Ltd.*, the plaintiffs filed this action against the defendant for a trespass from the migration of hazardous waste byproducts in the subsurface.<sup>108</sup> The plaintiffs argued that the defendant’s actions

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98. *Id.*

99. *Id.*

100. *Id.* at \*3 (citing TEX. WATER CODE ANN. § 27.051 (West 2022)).

101. *Id.* at \*1.

102. *Id.* at \*3.

103. *Id.*

104. *Id.* (the Commission also argued that intent of the State’s Act was to protect legitimate existing and foreseeable reasonable uses of the subsurface).

105. *Id.*

106. *Id.* at \*4.

107. *See generally* *Chance v. BP Chems., Inc.*, 77 Ohio St. 3d 17 (Ohio 1996).

108. *Id.*

made the substrate of their property unusable for other purposes such as oil and gas extraction, causing a decrease in their property values.<sup>109</sup> By relying on the ad coelum doctrine, the plaintiffs claimed that the presence of migrated waste below their property violated their property rights.<sup>110</sup> The Ohio Supreme Court affirmed the jury's verdict in favor of the defendant on the trespass claim and determined the absolute ownership right does not exist in the subsurface, analogizing subsurface rights to the airspace rights discussed in *Causby*.<sup>111</sup> Finding that the plaintiffs have some limited subsurface rights, the *Chance* court stated that subsurface property rights include the "right to exclude invasions of the subsurface property that actually interfere with appellants' reasonable and foreseeable use of the subsurface."<sup>112</sup> The *Chance* court elaborated that "some type of physical<sup>113</sup> damage or interference with use must be shown in an indirect invasion situation such as this."<sup>114</sup>

Both *FPL Farming, Ltd* and *Chance* suggest that, even if a surface owner has some property rights in the subsurface, those rights are not equivalent to property rights on the surface. The cases follow the rationale from *Causby* by limiting the ad coelum doctrine, but fall short of making a full comparison of the subsurface pore space to airspace rights. However, *FPL Farming, Ltd* and *Chance* illustrate how courts can use *Causby* to modify the ad coelum doctrine in areas beyond airspace.

The United States District Court for the Eastern District of Louisiana echoed the same line of reasoning by requiring an actual injury or inconvenience for a plaintiff to receive compensation.<sup>115</sup> In *Raymond v. Union Texas Petroleum Corp.*, the plaintiff asserted a trespass claim for the unauthorized use of the plaintiff's pore space by the defendant for salt

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109. *Id.* at 18.

110. *Id.* at 19, 24–25 (The trial court also denied a motion by the plaintiff to amend their complaint to add a request for a judgment declaring them the owner of everything below the surface, including the geological formations that had injected waste.)

111. *Id.* at 29, 25–26.

112. *Id.* at 26.

113. *Id.* at 27 (the Supreme Court found no abuse of discretion in the trial court's decision to exclude evidence of the environmental stigma associated with deep well injections, causing their property value to decrease).

114. *Id.* at 26–27 (this was also in regard to the contested nature of the extent of the migration in this case. Both parties contested the actual location of the migration which led to a difficulty in proving that the property was actually invaded).

115. *Raymond v. Union Tex. Petrol. Corp.*, 697 F. Supp. 270, 274–75 (E.D. La. 1988).

water disposal.<sup>116</sup> While the plaintiff and defendant had a pooling agreement, the plaintiff argued that the agreement did not allow for the disposal of salt water waste that resulted from the production on someone else's land.<sup>117</sup> The *Raymond* court relied on a similar Louisiana Supreme Court case, *Nunez v. Wainoco Oil & Gas Company*, to find no actionable trespass.<sup>118</sup> The *Raymond* court further noted the lack of evidence of the migration causing any harm or inconvenience to the subsurface that would require compensation.<sup>119</sup> Moreover, the *Raymond* court reasoned that requiring an oil producer to obtain consent from the landowners where the salt water might migrate would contradict public interest.<sup>120</sup> When speculating about the alternative outcome, the *Raymond* court hypothesized that “[i]f a landowner whose subsurface might be subject to invasion by salt water could preclude disposal of the salt water by withholding his consent, the operator would have to drill another disposal well in a different area, or otherwise find another method for disposal.”<sup>121</sup>

All three cases illustrate how courts understand subsurface property rights and follow the reasoning of *Causby* by limiting the application of the ad coelum doctrine. First, the cases express the same view—that a plaintiff must show some actual harm for an actionable trespass, rather than simply a subsurface migration of injected waste in the pore spaces. The *Chance* court articulated another factor for a trespass claim by requiring an interference with a reasonable and foreseeable use of the pore spaces. Instead of stating that an individual hoped to use the subsurface for future production, that individual must show that drilling was reasonably foreseeable. Next, limitations on subsurface property rights—like requiring an actual harm element—might modify the ad coelum doctrine and eliminate/limit its application in the subsurface formations. Moreover, since carbon dioxide is considered a disposable waste, the reasoning for carbon dioxide storage resembles that of waste disposal. Finding an appropriate and feasible way to dispose of these substances is clearly in the public's best interest, as different hazardous wastes cause various health problems, such as cancer or physiological defects.<sup>122</sup> In a

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116. *Id.* at 273.

117. *Id.* at 271–72.

118. *Id.* at 274 (However, “[i]t should be noted that the court in *Nunez* does not preclude a landowner from recovering compensation for damages to his property or measurable inconvenience.”).

119. *Id.* at 274–75.

120. *Id.* at 274.

121. *Id.*

122. See generally *Health and Ecological Hazards Caused by Hazardous Substances*, EPA, <https://www.epa.gov/emergency-response/health-and-ecologi>

similar way, the presence of carbon dioxide in the atmosphere contributes to the harmful effects of climate change.

Finally, the *Raymond* court raised an important policy concern of not allowing one nonconsensual landowner to end a waste disposal project over multiple landowners' properties.<sup>123</sup> This utilitarian ideal supposes that one holdout should not jeopardize a project promoting public interest. Louisiana courts may consider such a policy concern when analyzing the migration of carbon dioxide because of the similarities between the public necessity of carbon dioxide storage and other waste disposal. Therefore, Louisiana courts should adopt a resolution for injected carbon dioxide that parallels the solution for waste disposal injections.

### *B. Analysis of Natural Gas Storage Injection*

Next, courts should also analyze the subsurface issues regarding storage of natural gas deep in the geological formations. While the cases primarily deal with ownership of the gas, the analysis provides a better understanding of the property rights of other substances stored underground.

In the early 20th century, courts struggled to apply the traditional extraction of oil and gas theories to the subsurface storage of natural gas.<sup>124</sup> For example, Kentucky courts originally held that natural gas stored in the subsurface was not the property of the injector.<sup>125</sup> In *Hammonds v. Central Kentucky Natural Gas Co.*, the plaintiff brought a suit to recover damages for a trespass by the defendant.<sup>126</sup> The defendant injected natural gas into vacated subsurface reservoirs underneath the plaintiff's property without the plaintiff's consent.<sup>127</sup> The *Hammonds* court argued that natural gas stored in the subsurface returns to its natural state and assumes its original character, similar to a tamed animal being restored to the natural free state.<sup>128</sup> Thus, the defendant was not liable for a trespass for the natural gas under the plaintiff's property since the injector did not own the gas.<sup>129</sup>

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cal-hazards-caused-hazardous-substances [https://perma.cc/N6JU-L7XN] (last updated Jan. 24, 2022).

123. *Raymond*, 697 F. Supp. at 274.

124. See *Hammonds v. Cent. Ky. Nat. Gas Co.*, 75 S.W.2d 204 (1934); see also *Cent. Ky. Nat. Gas Co. v. Smallwood*, 252 S.W.2d 866 (Ky. 1952).

125. *Hammonds*, 75 S.W.2d at 206; see generally *Cent. Ky. Nat. Gas Co.*, 252 S.W.2d at 868–69.

126. *Hammonds*, 75 S.W.2d at 204.

127. *Id.*

128. *Id.* at 205.

129. *Id.*

If courts applied the reasoning from *Hammonds* to injected carbon dioxide wells today, no trespass would occur since no one owns the migrating gas.

A few decades later, the Supreme Court of Kentucky, in *Texas American Energy Corp. v. Citizens Fidelity Bank & Trust Co.*, expressly overturned the rule in *Hammonds*.<sup>130</sup> Meanwhile, in *Lone Star Gas Co. v. Murchison*, the Court of Civil Appeals of Texas, Dallas, faced the issue of whether to adopt the reasoning in *Hammonds*.<sup>131</sup> The appellate court refused to apply *Hammonds*' reasoning and found that "the owner of gas does not lose title . . . by storing the same [gas] in a well-defined underground reservoir."<sup>132</sup> The *Lone Star Gas Co.* court noted that public interest and the development of the oil and gas industry required this result since the efficient and economic use of natural gas requires the subsurface storage of gas.<sup>133</sup> Moreover, the necessity of a large storage reserve during the summer months to meet the storage demands of areas thousands of miles away from gas fields provided the *Lone Star Gas Co.* court with more policy arguments in favor of this decision.<sup>134</sup> Thus, the *Lone Star Gas Co.* court concluded that the rule in *Hammonds* "when considered in light of present day development of the gas industry, is unimpressive."<sup>135</sup>

Following *Lone Star Gas Co.*, the Supreme Court of Kentucky expressly overturned the rule in *Hammonds*.<sup>136</sup> The court in *Texas American Energy Corp.* rejected the analogy made in *Hammonds*—that natural gas storage is similar to an animal being restored to the wild.<sup>137</sup> As the *Texas American Energy Corp.* court put it, "when previously extracted oil or gas is subsequently stored in underground reservoirs . . . title to such oil or gas is not lost and said minerals do not become subject to the rights of the owners of the surface above the storage fields."<sup>138</sup>

While the actual ownership of the gas is not of concern for this analysis, *Hammonds* and *Lone Star Gas Co.* exemplify courts modifying property rights after considering public policy interests. In *Lone Star Gas*

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130. *Tex. Am. Energy Corp. v. Citizens Fid. Bank & Tr. Co.*, 736 S.W.2d 25 (Ky. 1987).

131. *Lone Star Gas Co. v. Murchison*, 353 S.W.2d 870 (Tex. Civ. App. 1962).

132. *Id.* at 879.

133. *Id.* at 878–880 ("Natural underground reservoirs are the only economically feasible way to store such reserves."); *Id.* at 876.

134. *Id.* at 878.

135. *Id.* at 879.

136. *Tex. Am. Energy Corp. v. Citizens Fid. Bank & Tr. Co.*, 736 S.W.2d 25 (Ky. 1987).

137. *See id.* at 27–28.

138. *Id.* at 28 (The court proceeded to declare stored gas as "goods" under the Uniform Commercial Code of Kentucky.).

Co., the court clearly considered the economic impact of its decision on the entire oil and gas industry.<sup>139</sup> Additionally, when the *Lone Star Gas Co.* court declared the ownership of the stored natural gas, it considered the purpose of the storage—i.e., to meet summer month demands.<sup>140</sup> Applying a similar rationale to subsurface trespasses of injected carbon dioxide suggests a consideration of the economic impact and purpose of storing carbon dioxide with any interest of the oil and gas industry. If Louisiana courts find an actionable trespass whenever carbon dioxide migrates within the subsurface, then this trespass will increase the costs for the entire project. CCS project operators would have to consider the potential litigation before beginning construction. Thus, a decision in favor of a trespass will likely discourage the development of CCS projects due to the increased cost.

As is the case for natural gas storage, the purpose of storing carbon dioxide is in the public's best interest. Storing carbon dioxide underground helps prevent the disastrous effects of climate change, which impacts the entire world. Thus, if Louisiana courts follow the reasoning from *Lone Star Gas Co.* and *Texas American Energy Corp.*, the purpose of reducing carbon emissions will remain at the forefront of the resolution.

### C. Analysis of Hydraulic Fracturing

Finally, courts should examine the subsurface issues arising out of hydraulic fracturing.<sup>141</sup> Hydraulic fracturing is the process of using hydraulic pressure to create or increase the size of cracks in the geological formations underground to increase the flow of oil and gas.<sup>142</sup> The lack of control over the length and direction of the fracture creates the prospect of a subsurface trespass.<sup>143</sup> Two major cases take contradictory views on whether a subsurface trespass exists when the fracturing extends beyond its planned length.<sup>144</sup>

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139. See *Lone Star Gas Co.*, 353 S.W.2d at 879.

140. *Id.* at 878.

141. Hydraulic fracturing may also be referred to as “fracking.”

142. Hall, *supra* note 55, at 520.

143. *Id.* at 521.

144. See generally *Coastal Oil & Gas Corp. v. Garza Energy Tr.*, 268 S.W.3d 1 (Tex. 2008); see also *Stone v. Chesapeake Appalachia, LLC*, No. 5:12-CV-102, 2013 WL 2097397 (N.D.W. Va. Apr. 10, 2013).

*1. Analysis of Coastal Oil & Gas Corp. v. Garza Energy Trust*

The Supreme Court of Texas in *Coastal Oil & Gas Corp. v. Garza Energy Trust* did not find an actionable subsurface trespass two miles underground because the rule of capture barred recovery for damages occurring from hydraulic fracturing.<sup>145</sup> In *Garza*, the plaintiffs sued the defendant company for various claims, including trespass and alleged that the defendant's fracking invaded the reservoir underneath the plaintiff's land.<sup>146</sup> An appellate court affirmed a jury verdict for the plaintiff in all of the claims—including the trespass claim—and awarded the plaintiff damages.<sup>147</sup> While the plaintiff claimed that the fracking operation made it possible for gas to trespass beneath the land, the Supreme Court of Texas ultimately found no actionable trespass due to the rule of capture.<sup>148</sup>

Even though this holding does not directly apply to carbon sequestration cases, the *Garza* court's reasoning provides insight into the various views of subsurface property rights. Initially, the *Garza* court noted that the ad coelum doctrine did not originally consider oil wells, stating that "[t]he law of trespass need no more be the same two miles below the surface than two miles above."<sup>149</sup> In the *Garza* court's reasoning for applying the rule of capture, the court explained that hydraulic fracturing is common in the industry and necessary for the production of oil in many geological formations.<sup>150</sup>

Additionally, the *Garza* plaintiff argued that creating production through hydraulic fracturing is indistinguishable from drilling a deviated well if the fracturing crosses property boundaries.<sup>151</sup> Disagreeing with the plaintiff, the *Garza* court provided four reasons why it viewed hydraulic fracturing and deviated wells differently.<sup>152</sup> First, the *Garza* court found that other remedies already exist for the surface owner,<sup>153</sup> including the surface owner's ability to drain his own well, sue for a breach of implied

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145. *Coastal Oil & Gas Corp.*, 268 S.W.3d at 4.

146. *Id.* at 7–8 (the plaintiff also sued for breach of its implied covenants to develop a specific tract of land and a claim for bad faith pooling).

147. *Id.* at 8 (the court of appeals only reversed the award of attorney fees for breach of the implied covenant to market claim, since the jury found no damages).

148. *Id.* at 13.

149. *Id.* at 11 (the court noted that flying an airplane two miles above someone's property would not constitute a trespass).

150. *Id.* at 13.

151. *Id.* (a deviated well is one that departs from the vertical point significantly and is unlawful).

152. *Id.* at 14.

153. *Id.*

covenant in the lease, and require pooling through the state commission.<sup>154</sup> Second, changing the rule of capture would usurp the state agency's role of regulating oil and gas production if the court allowed recovery for the value of the gas drained by hydraulic fracturing.<sup>155</sup> Third, the judiciary is ill-equipped to determine the value of oil and gas drained by hydraulic fracturing.<sup>156</sup> Not only would the valuing process be difficult since the actions occur miles beneath the surface, but judges and juries cannot "take into account social policies, industry operations, and the greater good which are all tremendously important in deciding whether fracking should or should not be against the law."<sup>157</sup> The *Garza* court did not want to alter the rule of capture on which "an industry and its regulation have relied for decades."<sup>158</sup> Fourth, relying on numerous amicus curiae briefs, the court believed hydraulic fracturing should not change the rule of capture, since no one in the industry supported that change.<sup>159</sup> Accordingly, the defendant was not liable for an actionable trespass.<sup>160</sup>

## 2. Analysis of *Stone v. Chesapeake Appalachia*

A few years later, in *Stone v. Chesapeake Appalachia, LLC*, the United States District Court for the Northern District of West Virginia declined to apply the reasoning of *Garza*, finding instead that hydraulic fracturing underneath someone's land without the surface owner's consent constitutes an actionable trespass.<sup>161</sup> The court viewed the *Garza* decision as a "blank check to steal from the small landowner," since that decision incentivizes the company to take the gas from the landowner without any contractual obligations.<sup>162</sup>

In *Stone*, the plaintiff filed suit against the defendants for breach of contract, trespass from hydraulic fracturing, and failure to protect the

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154. *Id.*

155. *Id.* at 14–15 ("Such recovery assumes that the gas belongs to the owner of the mineral in the drained property, contrary to the rule of capture.").

156. *Id.* at 16.

157. *Id.*

158. *Id.*

159. *Id.*

160. *Id.* at 17 ("It should go without saying that the rule of capture cannot be used to shield misconduct that is illegal, malicious, reckless, or intended to harm another without commercial justification, should such a case ever arise.").

161. *Stone v. Chesapeake Appalachia, LLC*, No. 5:12-CV-102, 2013 WL 2097397, at \*8 (N.D.W. Va. Apr. 10, 2013).

162. *Id.* at \*6 ("Under such a rule, the companies may tell a small landowner that either they sign a lease on the company's terms or the company will just hydraulically fracture under the property and take the oil and gas without compensation.").



plaintiff's property from drainage.<sup>163</sup> The defendants argued that the rule of capture barred the trespass claim and urged the court to apply the reasoning from *Garza*.<sup>164</sup> However, the *Stone* court found the dissenting opinion in *Garza* to be more persuasive, noting its best point to be its "criticism of the majority's first rationale—that the law already provides full recourse—through drilling his own well, suing the lessee for violation of the covenant to protect against drainage, or applying to the Railroad Commission for forced pooling."<sup>165</sup> The majority in *Stone* agreed with the *Garza* dissent—that not all property owners have the capacity to drill their own well.<sup>166</sup> Regarding the difficulty in proving damages for a subsurface trespass, the *Stone* court quoted the *Garza* dissent, stating that "similarly, proving the value of damages from breach of the implied covenant to protect from drainage requires expert testimony about a *hypothetical* well that should have been drilled to protect the lease, and calculation of the *hypothetical* effects that *hypothetically* would have" occurred underground.<sup>167</sup> The *Stone* court's view illustrates that there is a difficult analysis to prove damages. Finally, the *Stone* court noted that the desires of the industry should not outweigh landowners' property rights.<sup>168</sup> Thus, the defendant was liable for an actionable trespass from hydraulic fracturing, since the rule of capture did not bar a trespass claim.<sup>169</sup>

While the rule of capture likely does not have any application in a CCS project, the *Stone* and *Garza* courts' views on subsurface property rights illustrate competing arguments. First, the *Garza* court echoed the same limitation on the ad coelum doctrine as the waste disposal cases and required some actual injury. The *Garza* court noted the doctrine's popularization at a time when oil and gas production was not prominent.<sup>170</sup> Since carbon sequestration projects did not exist during the development of the ad coelum doctrine, Louisiana courts will likely limit the doctrine's absolute exclusion principle as well. Louisiana courts might also require some form of actual injury, as in the *Garza* case, since the depth at which CCS projects occur compares to the two miles that the hydraulic fracturing occurred in *Garza*.

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163. *Id.* at \*1.

164. *Id.* at \*2 .

165. *Id.* at \*6.

166. *Id.*

167. *Id.* at \*7 (emphasis added).

168. *Id.*

169. *Id.* at \*8.

170. *See* Coastal Oil & Gas Corp. v. Garza Energy Tr., 268 S.W.3d 1, 11 (Tex. 2008).

Next, *Garza* and *Stone* considered the implications of their decision on the public and industry as a whole. One reason the *Garza* court considered applying the rule of capture to hydraulic fracturing stems from the necessity of oil production in many geological formations.<sup>171</sup> The *Garza* court also reasoned that the rule of capture should not change since the oil and gas industry consistently relies on the rule.<sup>172</sup> While holding differently, the *Stone* court considered the economic impact of the outcome while discussing the issues of incentivizing companies to take gas from small landowners.<sup>173</sup> Therefore, if Louisiana courts look to *Stone* and *Garza* for a helpful analysis, they may consider the economic impact of finding a trespass from injected carbon dioxide. As mentioned earlier, an actionable trespass will likely raise operation costs and discourage development of carbon sequestration projects. Moreover, CCS technology is important to the entire oil and gas industry's ability to continue production throughout the climate crisis. If carbon sequestration fails, the industry will be forced to decline since a large portion of carbon emissions comes from oil and gas facilities and Louisiana has a goal of reaching net zero in carbon emissions by 2050.<sup>174</sup> Thus, decisions finding an actionable trespass may negatively impact the oil and gas industry's economy entirely.

Next, *Stone* and *Garza* raised the issue of the self-help remedy for surface owners.<sup>175</sup> As discussed earlier, the self-help remedy would likely not apply to CCS projects. Lastly, the courts discussed determining damages for a trespass from hydraulic fracturing.<sup>176</sup> Even though the *Stone* court noted that other courts already determined compensation values for other speculative claims, the *Garza* court's reasoning is more applicable for CCS projects. Hydraulic fracturing involves the eventual extraction of oil for a profit. However, simply storing carbon dioxide to reduce emissions does not directly involve the same kind of profit as oil extraction. Thus, without a dollar sign attached to stored carbon dioxide, Louisiana courts are not the best venue for addressing such a speculative issue. Given the abstract nature of awarding an appropriate judgment amount, Louisiana courts should resolve this issue in a way that prevents the courts from having to make that determination.

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171. *See id.* at 13.

172. *Id.* at 16.

173. *Stone*, No. 5:12-CV-102, 2013 WL 2097397, at \*6.

174. *See Climate Initiatives Task Force*, *supra* note 12.

175. *See Coastal Oil & Gas Corp.*, 268 S.W.3d at 14; *see also Stone*, No. 5:12-CV-102, 2013 WL 2097397, at \*6.

176. *See Coastal Oil & Gas Corp.*, 268 S.W.3d at 16; *see also Stone*, No. 5:12-CV-102, 2013 WL 209397, at \*7.

## IV. LOUISIANA LAW

A. *Analysis of Statutes*

Louisiana courts should not only examine how courts decide subsurface issues in other areas, but also analyze Louisiana law for helpful guidance from the legislature. For example, Title 30 of the Louisiana Revised Statutes titled “Minerals, Oil, and Gas and Environmental Quality,” either directly concerns carbon storage projects or gives some guidance from another subsurface context. Lastly, courts will likely look to a key Louisiana Supreme Court case interpreting Louisiana Civil Code article 490, *Nunez v. Wainoco Oil & Gas Co.*, which provides insight into how the courts should view the applicability of the ad coelum doctrine.

1. *Louisiana Revised Statute Section 30:10*

Section 10, titled “Agreements for drilling units; pooling interests; terms and conditions; expenses,” concerns pooling agreements for oil production purposes.<sup>177</sup> Specifically, section 10 discusses pooling interests of several landowners together in a single unit for drilling operations to increase efficiency.<sup>178</sup> In a pooling agreement, one party is the “operator” conducting the production on behalf of the interested parties.<sup>179</sup> If the Commissioner of the Department of Conservation finds it necessary to prevent waste or unnecessary drilling, they can force the parties into a drilling unit, even without a contractual agreement between the parties.<sup>180</sup> The pooling orders provide that “the owner of each tract [have] the opportunity to recover or receive his just and equitable share of the oil and gas in the pool without unnecessary expense.”<sup>181</sup> Section 10 is similar to the Wyoming, North Dakota, and Montana statutes discussed earlier, however this section specifically applies to oil and gas production wells rather than carbon sequestration projects.

While section 10’s “pooling” provision seems like a potential solution for Louisiana’s carbon sequestration projects, the statute does not apply

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177. LA. REV. STAT. § 30:10 (2022).

178. *Id.* When two or more separately owned tracts of land are embraced within a drilling unit which has been established by the commissioner as provided in R.S. 30:9(B), the owners may validly agree by a separate contract to pool, drill, and produce their interests and to develop their lands as a drilling unit. Hall, *supra* note 55, at 541; *see also* LA. REV. STAT. § 30:10 (2022).

179. Hall, *supra* note 55, at 541; *see also* LA. REV. STAT. § 30:10 (2022).

180. LA. REV. STAT. § 30:10 (2022).

181. *Id.*

perfectly. Pooling statutes, like section 10, are primarily enacted to prevent every surface owner from drilling their own well, which can quickly deplete an oil field and result in unnecessary injection wells on the surface. Carbon sequestration projects do not have the same problem as oil extraction projects do, with landowners racing to extract the oil beneath their surface to make a profit before others drill. Moreover, the statutory scheme of “pooling” does not itself create clear subsurface property rights. Carbon dioxide can still migrate in the subsurface underneath land outside of the unit.

The difference in profitable extractions of oil and storage of carbon dioxide demonstrates another reason why section 10 should not apply to CCS projects. Wyoming, North Dakota, and Montana enacted statutes giving the surface owner ownership rights over the pore spaces underneath his land. Introducing private ownership likely led to the enactment of unitization statutes in all three of those states. Thus, to account for the private owner’s economic interest in CCS projects, the three states developed a statutory scheme, such as unitization, for fair development of the projects. As long as Louisiana does not declare that surface owners privately own the pore spaces, there will be less of an economic concern on behalf of surface owners. Therefore, unitization agreements should not apply to CCS projects in Louisiana given the absence of concern regarding private surface owners fighting for an economic advantage.

Nevertheless, while section 10 will likely not resolve subsurface trespass issues, understanding the Louisiana legislature’s goal of preventing waste is useful. One might argue the pooling statute’s enactment aimed solely to prevent economic waste by extracting oil too quickly. As discussed earlier, a concern for purely economic waste is not as applicable in carbon sequestration projects. However, one might argue that section 10 refers to more than just economic waste, since the statute includes the phrase “avoid drilling unnecessary wells.”<sup>182</sup> Focusing beyond economic interest illustrates the legislature’s concern for causing as little harm to the environment as possible. For example, oil extraction wells can harm wildlife habitats through the infrastructure necessary to produce a well.<sup>183</sup> A concern for more than just economic waste could direct Louisiana’s legislature and courts to resolve the issue of injected carbon dioxide trespass with the impact on the environment as a determining factor.

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182. *See id.*

183. *See generally 7 Ways Oil and Gas Drilling Is Bad for the Environment*, THE WILDERNESS SOCIETY (July 9, 2021), <https://www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment> [<https://perma.cc/34RB-Z8AE>].

2. *Louisiana Revised Statute Section 30:22*

Next, section 22 of title 30, “Underground storage of natural gas, liquid hydrocarbons and carbon dioxide,” deals directly with carbon sequestration projects.<sup>184</sup> First, section 22 states that the subsurface storage of carbon dioxide “is in the public interest and for a public purpose.”<sup>185</sup> Section 22 lists conditions that the commissioner must find after a public hearing.<sup>186</sup> For example, the commissioner must find that “the use of the underground reservoir for the storage of liquid hydrocarbons or carbon dioxide will not contaminate other formations containing fresh water, oil, gas, or other commercial mineral deposits.”<sup>187</sup> Lastly, section 22 grants the commissioner authority to “issue any necessary order providing that all natural gas, liquid hydrocarbons, or carbon dioxide which has previously been reduced to possession and which is subsequently injected into an underground storage reservoir shall at all times be deemed the property of the injector.”<sup>188</sup>

Section 22 explains the procedural requirements the commissioner must go through to determine the safety of a CCS project. Similar to the process of receiving a permit for a Class VI injection well, the Louisiana legislature requires the commissioner to make sure any CCS project will not “endanger lives or property.”<sup>189</sup> Thus, the resolution of the trespass claim can be made knowing that Louisiana has statutory schemes in place to determine the safety of CCS projects. Section 22 also resolves one subsurface property issue by clearly stating that the injector owns the carbon dioxide, even after storage.<sup>190</sup> Louisiana courts will not have to consider problems regarding ownership of the substance—as in the context of natural gas storage. Additionally, the statement that conducting a carbon sequestration project “is in the public interest and for a public purpose” guides the Louisiana courts’ analysis on the trespass claims.<sup>191</sup> When faced with an ambiguous decision, courts can find clarity in section 22’s policy statements and resolve the issue in a way that best aligns with the idea that carbon sequestration is in the public’s interest.

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184. LA. REV. STAT. § 30:22 (2022).

185. *Id.*

186. *Id.*

187. *Id.* § 30:22(C)(2) (2022).

188. *Id.* § 30:22(E) (2022).

189. *Id.* § 30:22(B)(3) (2022).

190. *Id.* § 30:22(E) (2022).

191. *Id.* § 30:22 (2022).

### 3. Louisiana Revised Statute 30:1108

Lastly, section 1108, titled “Eminent domain, expropriation,” grants a storage operator the power of eminent domain to acquire the needed property rights for the operator’s storage facility.<sup>192</sup> Section 1108 allows CCS project operators to take and use private property to benefit the public through carbon sequestration. Section 1108 directly relates to the analysis of carbon dioxide subsurface trespass, since the statute authorizes the operator to use the private property of surface owners. While section 1108 details a long list specifying the purposes for which the private property may be used, the language is unclear on whether eminent domain accounts for the migration of the injected carbon dioxide. For example, section 1108 states that private property can be acquired for the purpose of “constructing, operating, or modifying a storage facility and the necessary infrastructure including the laying, maintaining, and operating pipelines for the transportation of carbon dioxide to a storage facility.”<sup>193</sup> Thus, section 1108 seems more concerned with the construction and operation of the storage well, rather than accounting for the injected carbon dioxide once it is underground. However, if section 1108 does include the use of eminent domain for purposes of carbon dioxide migration, then storage operators will not be liable for a trespass if the operators obtain the right under this section. Nevertheless, the concern of a subsurface trespass exists for other areas not obtained through eminent domain.

#### *B. Analysis of Nunez v. Wainoco Oil & Gas Co.*

One key Louisiana Supreme Court case, *Nunez v. Wainoco Oil & Gas Co.*, represents a good application of Louisiana statutes and code articles to a subsurface issue.<sup>194</sup> In *Nunez*, the court determined whether the intrusion of a well two miles in the subsurface constituted a trespass on a surface owner’s property that was included in a drilling unit created by the state Commissioner of Conservation.<sup>195</sup> The plaintiff filed a trespass claim seeking an order for the defendant to remove a deviated well that bottomed four-to-five feet into the plaintiff’s property at a two-mile subsurface

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192. *Id.* § 30:1108 (2022).

193. *Id.*

194. *Nunez v. Wainoco Oil & Gas Co.*, 488 So. 2d 955 (La. 1986).

195. *Id.* at 956, 959 (“[W]hether the formation of a compulsory unit, as permitted in La.Rev.Stat. Ann. § 30:10, affects the generally applicable principles concerning ownership of property and/or alters the concept of trespass beneath the surface owner’s tract.”).

depth.<sup>196</sup> Ultimately, the court found the *Nunez* defendant not liable for a trespass, since Louisiana's Conservation Law superseded the private property interest in a trespass claim when it involves a unit agreement.<sup>197</sup> Due to the enactment of the unitization statute, the *Nunez* court held that a landowner cannot rely on the absolute exclusion rules of Civil Code article 490.<sup>198</sup>

In its discussion of past law, the *Nunez* court noted that "subsurface trespass . . . has in jurisprudence generally been accompanied by removal of minerals, with the attendant damages consisting of the value of the extracted minerals."<sup>199</sup> Examining the statutory provisions, the *Nunez* court recognized that the Commissioner of Conservation holds the power to establish necessary rules and regulations for enforcement, including compulsory unitization.<sup>200</sup> The court also acknowledged that the law of exclusive authority in Louisiana Civil Code article 490 applies to the subsurface.<sup>201</sup>

To reconcile the two applicable laws, articles, such as article 490, have been modified to conform to the unique nature of subsurface minerals in both their liquid and gas forms.<sup>202</sup> The majority supported this shift based on the addition of the phrase "unless otherwise provided by law" in article 490.<sup>203</sup> The *Nunez* court noted that even the provisions in the Mineral Code are qualified by some duty to others in the reservoir, especially in a unit.<sup>204</sup> As stated in the opinion, the principles of the ad coelum doctrine appear "inadequate to solve the problems of a substance under the earth, which would migrate to points of lower pressure caused by punctures of the reservoir by drilling."<sup>205</sup> Thus, the *Nunez* court held that "when the Commissioner of Conservation has declared that landowners share a common interest in a reservoir of natural resources beneath their adjacent

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196. *Id.* at 957–58.

197. *Id.* at 964 ("Since established private property law concepts, such as trespass, have been superseded in part by Louisiana's Conservation Law when a unit has been created by order of the Commissioner, we do not find that a legally actionable trespass has occurred in this instance.").

198. *Id.*

199. *Id.* at 959.

200. *Id.* at 961–62.

201. *Id.* at 962.

202. *Id.*

203. *Id.*

204. *Id.* ("And, even the 'exclusive right to explore' is qualified by the imposition of duties with regard to others who have rights in the common reservoir.").

205. *Id.*

tracts, such common interest does not permit one participant to rely on a concept of individual ownership to thwart the common right to the resource.”<sup>206</sup> When party to the unit agreement, landowners cannot avail themselves of the private property concepts contained in article 490 to claim a trespass.<sup>207</sup>

*Nunez* represents a great example of the Louisiana Supreme Court limiting the absolute ownership theory in Louisiana Civil Code article 490 to account for industrial processes. The court recognized that the ad coelum doctrine, while profound, does not work in modern society. Limiting article 490 to property rights corresponds with the United States Supreme Court’s view of the ad coelum doctrine as well.<sup>208</sup> The reasoning in *Nunez* could justify a similar view of article 490 in Louisiana courts’ analysis of injected carbon dioxide.

## V. SOLUTION

Since no clear precedent or statute dictates whether a trespass occurs when carbon dioxide migrates across property boundaries, Louisiana courts should consider the interests of the surface owner, the CCS operator, and the public to solve this issue of subsurface trespass. After understanding each party’s interest, courts should determine whether the surface owner’s interest in their property rights outweighs the CCS operator’s and the public’s interest.

### A. *Balancing Interests*

#### 1. *Public Interest and CCS Operator*

The United States and Louisiana are urgently searching for ways to mitigate the damages of climate change through recent legislative and administrative action. Even so, fossil-fuel powered facilities will likely remain in use for a few more decades. Thus, carbon capture and sequestration are the only feasible and efficient methods of reducing carbon dioxide emissions without completely eliminating fossil fuels. In Louisiana, Governor Edwards, through his Climate Initiative Task Force,

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206. *Id.* at 964 (The court stated that this case involved “the intrusion of a well bore two miles beneath the surface of plaintiff’s land, land which had already been included in a drilling unit.”).

207. *Id.*

208. *See* *United States v. Causby*, 328 U.S. 256, 261 (1946).



suggested that CCS projects are the best public policy for mitigating climate change.<sup>209</sup>

Additionally, the prominence of the oil and gas industry in Louisiana has increased the public's interest in these projects. Since CCS projects aim to make oil and gas industries carbon neutral, Louisiana's economy can only benefit from CCS projects. Prompting the oil and gas industry to go carbon neutral will keep the industry strong for the coming decades. The current employees of the oil and gas industry will also benefit from the continued strength of the industry, since they will remain employed.<sup>210</sup> While the economics of encouraging CCS projects and retaining the oil and gas industry only directly concern the parties involved, CCS technology will continue to benefit the greater good by preventing the disastrous effects of climate change.

Since the public needs carbon sequestration projects, encouraging these projects is in the best interest of the public. One key factor that might deter companies and organizations from development is the rising costs. For instance, potential operators will likely consider litigation costs before they begin construction on any CCS project. Concern that potential subsurface trespass lawsuits could be filed for a subsurface trespass would further raise CCS production costs. Costs could also increase by having to contractually agree with every potential surface owner to allow the injected carbon dioxide to migrate underneath the surface. Moreover, operators will raise costs in anticipation of holdouts or future lawsuits from surface owners that did not consent. Increased costs due to legal issues will likely stagnate the development of CCS projects. Thus, both the CCS operator and the public have an interest in keeping litigation costs down by not having an actionable trespass.

## *2. Interest of Private Landowner*

It is human nature for private property owners to want to protect their property from harm and intruders. Louisiana surface owners rely on the ad coelum doctrine and Civil Code article 490 to believe that they have an interest in excluding unwanted substances from beneath their surface. Property owners also have an interest in using their land however the surface owner desires. Surface owners believe that allowing carbon dioxide to travel beneath their surface without consent violates the surface owner's absolute right of exclusion. Additionally, carbon dioxide migration in the pore space has the potential to eliminate any future

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209. See generally *Climate Initiatives Task Force*, *supra* note 12.

210. See generally *Economic Impact*, *supra* note 16.

production or extraction opportunity in the subsurface. This migration takes away the surface owner's right to use that land in accordance with their wishes. Therefore, private surface owners have an interest in excluding unwanted substances from the pore spaces beneath their land.

*B. "Actual or Reasonably Foreseeable Harm" Test*

Balancing the relevant interests, Louisiana courts should find that the public policy concerns substantially outweigh the surface owner's interest in the pore space beneath their land. Therefore, the courts should not find an actionable trespass when injected carbon dioxide migrates in the subsurface.

Surface owners have a lesser interest in protecting the area thousands of feet below their surface. Conversely, property owners have a strong interest in protecting their property's surface from unwanted people and substances. If the trespass claim at issue concerned activity on the surface, courts would find in favor of a trespass due to the nature of protections given to the actual surface. However, private property interest weakens underground, resulting in less protection in the subsurface. Louisiana courts should analogize deep subsurface activity to high altitude airspace activity as discussed in *Causby*. Through this analogy, Louisiana courts would recognize that the *ad coelum* doctrine did not consider actions occurring miles beneath the surface. While the *ad coelum* doctrine sounds absolute, it does not accurately illustrate surface owners' interest miles above or below their surface.

Given the low property interest involved deep in the subsurface, the surface owner's interest does not outweigh the public's interest in mitigating climate change. The public has a greater interest in protecting the environment than a surface owner has in excluding carbon dioxide thousands of feet below their surface. Therefore, Louisiana courts should adapt the private property interest to the nature of the property, which requires the courts to view the surface differently than the deep subsurface pore space.

By viewing the surface and subsurface differently, Louisiana courts should adopt a similar test that the courts enacted in other subsurface areas to determine whether a subsurface trespass occurred. A proper test would require the surface owner to prove that the injected carbon dioxide caused actual or reasonably foreseeable harm when the carbon migrated in the subsurface. Requiring a showing of harm protects the public interest by creating predictability for potential lawsuits regarding CCS projects. Since future litigation costs will not discourage carbon storage projects, CCS operators will continue to develop the necessary technology to reduce

carbon emissions. Additionally, this test considers private property interests since a surface owner would recover if actual harm occurred due to the migration. The “reasonably foreseeable” language also contemplates a surface owner’s right to compensation if the migrated carbon dioxide eliminates reasonably foreseeable future uses of the subsurface by the landowner. Nevertheless, requiring foreseeable harm strikes a balance between the public interest and the private surface owner; in order to recover for loss of a future opportunity, the harm must be reasonably foreseeable that the surface owner was going to conduct a subsurface activity. Using this approach, Louisiana courts could achieve a just and equitable result for all parties involved.

One concern for the implementation of the “actual or reasonably foreseeable harm” test comes from Louisiana Civil Code article 490, which codifies the ad coelum doctrine. Consequently, requiring a showing of actual harm for an actionable trespass violates the absolute exclusion rights of the private surface owners. However, the Louisiana Supreme Court already noted the inapplicability of the ad coelum doctrine in *Nunez*.<sup>211</sup> Moreover, other jurisdictions limited the surface owner’s rights in various subsurface areas as well. Thus, Louisiana courts have a plethora of persuasive authority to support the “actual or reasonably foreseeable harm” test.

### *C. Pore Space Ownership Legislation*

In order to clarify subsurface property rights, the Louisiana legislature should amend Title 30 of the Louisiana Revised Statutes and declare the subsurface pore space that will be used for carbon sequestration projects as public property. Once an operator obtains a Class VI injection well permit, the scientific data from the permit application should help declare that the pore space is public property. A declaration of public property would achieve the same result as the “actual or reasonably foreseeable harm” test and statutorily solve the issue of migrating carbon dioxide.

Louisiana courts already provide less protections for pore spaces, since the Louisiana Supreme Court acknowledged the limited applicability of the ad coelum to the subsurface areas in *Nunez*. According to the Restatement, someone commits a trespass “irrespective of whether he thereby causes harm to any legally protected interest of the other” if they enter the land of another.<sup>212</sup> Any limitation or modification of a surface owner’s property rights undermines the owner’s ability to sue for a

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211. See generally *Nunez*, 488 So. 2d at 962.

212. RESTATEMENT (SECOND) OF TORTS § 158 (AM. L. INST. 1965).

trespass claim. Therefore, declaring the pore space to be public property does not diminish a surface owner's right any more than requiring an actual or reasonably foreseeable harm test. Additionally, the declaration of public property does not prevent the surface owner from suing if actual harm does exist. Any actual harm from migrated carbon dioxide likely affects the surface owner's other property interests such as their use and enjoyment of property, interference with other subsurface activity, or environmental safety concerns. Thus, the same result from the "actual or reasonably foreseeable harm" test can be achieved through a clear statute that declares pore space as public property.

#### CONCLUSION

To keep CCS projects viable, Louisiana should pass new legislation declaring any pore space used for carbon sequestration projects as public property. The legislation would clarify subsurface property rights and encourage the continued development of carbon sequestration projects within the state. In the meantime, Louisiana courts should rule that no subsurface trespass occurs when carbon dioxide migrates through the pores, especially when the landowner endures no actual damages. Other states provide solutions to this issue through their statutory schemes and jurisprudence that limit the surface owner's rights in the subsurface. Therefore, Louisiana courts should adopt the view expressed in similar subsurface areas that simple migration without actual or reasonably foreseeable harm does not result in an actionable trespass. The courts should find support in this test by balancing the interests of landowners, operators, and the public. Similar to the surface owners' rights in the airspace, individuals' subsurface property rights should continue to be limited. Carbon sequestration is necessary to mitigate the damages of climate change and outweighs any negative impacts on the landowners without a trespass remedy.