HYDRAULIC FRACTURING AND FORCED POOLING LAWS: WHY FRACKING OPERATORS' USE OF DECADES-OLD LAWS TO COMPEL ACCESS TO PROPERTIES MUST BE REEXAMINED

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I. INTRODUCTION

In the past decade, the United States has experienced a "shale revolution."[1] Production of natural gas in the United States has increased

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500 percent between 2007 and 2013, driven largely by hydraulic fracturing (or "fracking"), which has made it possible to extract natural gas out of the fine-grained rock known as shale.[2] Currently, the states producing the largest amounts of shale gas include Texas, Pennsylvania, West Virginia, and Oklahoma.[3] While Michigan has yet to see a boom in natural gas production thus far, some experts believe "it is only a matter of time before Michigan's Antrim Shale gas field reserves—estimated to be the fifteenth largest in the nation—will be tapped."[4]

In Pennsylvania, where the massive Utica and Marcellus Shale formations underlie much of the state, controversy has arisen over the use of forced pooling laws by fracking drillers to drill for shale gas on property without the landowner's consent.[5] This practice has raised concerns about private property rights, as well as what former Pennsylvania Governor Tom Corbett has termed "private eminent domain."[6] The attorneys for the drilling operators apparently agree, writing that forced pooling laws "effectively grant a private power of eminent domain; the state exercises its police power to take an interest in private property for private use."[7] However, the use of hydraulic fracturing technology has been subject to intense debate regarding environmental and health concerns, as exemplified by the controversy over the documentary *Gasland*.[8]

This Note argues that the current use of forced pooling laws by hydraulic fracturing operators is outside the contemplation and intent of the state legislatures that enacted the laws, and also outside the contemplation and intent of the early courts that upheld the constitutionality of such laws decades ago.[9] This is because hydraulic fracturing differs from conventional oil drilling in three fundamental

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1. Mason Inman, *Natural Gas: The Fracking Fallacy,* NATURE (Dec. 3, 2014), http://www.nature.com/news/natural-gas-the-fracking-fallacy-1.16430.

2. *Natural Gas,* U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FGS_mmcf_a.htm (last visited Dec. 10, 2015).

3. *Id.*

4. Jay Greene, *Hydraulic Fracturing in Michigan: Waiting for the Boom,* CRAIN'S DETROIT BUS. (Mar. 24, 2013), http://www.crainsdetroit.com/article/20130324/NEWS/303249962/hydraulic-fracturing-in-michigan-waiting-for-the-boom.

5. Zoë Schlanger, *Your Lawn Need Fracking?,* NEWSWEEK (June 12, 2014), http://www.newsweek.com/2014/06/20/your-lawn-need-fracking-254499.html.

6. *Id.*

7. *Id.*

8. *Id.*; *see also* GASLAND (HBO Documentary Films and International WOW Company 2010), *available at* http://www.gaslandthemovie.com/home.

9. ERLE DONALDSON, et al, HYDRAULIC FRACTURING EXPLAINED: EVALUATION, IMPLEMENTATION, AND CHALLENGES 28 (2013).

aspects: (1) conventional oil and gas resources are migratory, while shale gas resources are non-migratory; (2) unlike vertical drilling of conventional oil and gas resources, horizontal drilling into the land of non-consenting landowners necessarily constitutes physical subsurface trespass that violates private property rights; and (3) hydraulic fracturing has a much more severe impact on the environment and public health and safety than does conventional oil and gas drilling. Finally, this Note examines approaches that states have taken to address the concerns caused by the use of forced pooling laws in the context of hydraulic fracturing, and discusses other potential solutions.

II. BACKGROUND

A. Overview of Hydraulic Fracturing

Hydraulic fracturing is a process that creates fractures in the shale formation to extract natural gas.[10] The hydraulic fracturing wells can be drilled vertically hundreds to thousands of feet below the land surface and can extend thousands of feet horizontally or directionally.[11] "Fractures are created by pumping large quantities of fluids at high pressure down a wellbore and into" the shale layer.[12] "Hydraulic fracturing fluid commonly consists of water," chemicals that dissolve minerals and kill bacteria, and sand to prop open the fractures.[13] "Once the injection process is completed, the internal pressure of the rock formation causes the fluid to return to the surface through the wellbore."[14] "This fluid is known as 'flowback'" and "may contain the injected chemicals plus naturally occurring materials such as brines, metals, radionuclides, and hydrocarbons."[15] The flowback is usually "stored on site in tanks or pits before treatment, disposal or recycling," and in some cases, "it is injected underground for disposal."[16] In areas where underground disposal is not available, the flowback "may be treated and reused or processed by a wastewater treatment facility and then discharged to surface water."[17]

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10. *The Process of Hydraulic Fracturing*, ENVTL. PROTECTION AGENCY, http://www2.epa.gov/hydraulicfracturing/process-hydraulic-fracturing (last updated Jan. 9, 2017).
11. *Id.*
12. *Id.*
13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.*

The fracking cocktail includes acids, poisons, and toxic chemicals that are not regulated by federal laws, but that can pose health concerns if they seep into drinking water.[18] Since the 1990s, fracking "has used greater volumes of cocktail-laden water, injected at higher pressures."[19] Further, "methane gas can escape into the environment out of any gas well, creating the real though remote possibility of dangerous explosions."[20] "Water from all gas wells often returns to the surface containing extremely low but measurable concentrations of radioactive elements and huge concentrations of salt."[21] This brine can be detrimental if not disposed of properly.[22] "Injection of brine into deep wells for disposal has in rare cases triggered small earthquakes."[23]

B. The History and Development of Forced Pooling Laws

1. The Rule of Capture

In the earliest days of oil and gas extraction, the rule of capture governed.[24] This rule stated that the first person to gain control over and extract an oil or gas resource acquires exclusive title to that resource.[25] Thus, landowners gain exclusive ownership over the oil or gas they produce from wells on their property, even if it can be proved that the oil or gas migrated from adjoining lands.[26] The rule of capture originally applied to *ferae naturae*, providing that the first person to capture or kill a wild animal acquires title to it.[27] The early cases applying this rule of capture to oil and gas extraction analogized oil and gas to wild animals, stating that both have a "fugitive and wandering existence within the limits of a particular tract."[28] The court in *Westmoreland & Cambria Natural Gas Company v. De Witt* stated that oil and gas resources belong to the landowner as long as they are under his control, "but when they escape, and go into other land, or come under another's control, the title

18. Susan L. Brantley & Anna Meyendorff, *The Facts on Fracking*, N.Y. TIMES (Mar. 13, 2013), http://www.nytimes.com/2013/03/14/opinion/global/the-facts-on-fracking.html.

19. *Id.*

20. *Id.*

21. *Id.*

22. *Id.*

23. *Id.*

24. RAYMOND M. MYERS, THE LAW OF POOLING AND UNITIZATION 25 (2nd ed. 1967).

25. *Id.* at 27.

26. Bruce Kramer & Owen L. Anderson, *The Rule of Capture—an Oil and Gas Perspective*, 35 ENVTL. L. 899, 900 (2005).

27. Pierson v. Post, 3 Cai. R. 175, 178 (N.Y. Sup. Ct. 1805).

28. MYERS, *supra* note 24, at 26.

of the former owner is gone. Possession of the land, therefore, is not necessarily possession of the gas."[29] The rule of capture meant that landowners who did not extract the mineral resources located in a common reservoir under their land could lose those resources to neighboring landowners who extracted those resources.[30] Thus, the rule of capture resulted in owners who owned adjacent tracts of land over a common oil or gas reservoir racing one another to extract the resources as quickly as possible.[31]

Further, in the early days of oil and gas extraction, the common law contained no restrictions on the number of oil and gas wells that landowners could drill on their property,[32] and thus the result of the race was excessive well density, over-drilling, and waste of oil and gas reserves through the premature depletion and trapping of oil and gas resources.[33] The Spindletop oilfields in Texas, where oil was first struck in 1901, exemplified this problem.[34] Speculators soon followed, and by the end of 1901 there were 440 wells in the 125-acre area.[35] However, to recover the maximum amount of oil or gas from a common reservoir, the reservoir's pressure must be maintained.[36] Thus, when there are too many wells attempting to extract from the same reservoir, as seen in Spindletop, a substantial amount of oil that otherwise could have been recovered is trapped and wasted.[37] Further, this race to extract resulted in large surpluses in the supply of oil and gas, which drove down its price, and finally resulted in oil companies turning to the states for help.[38]

2. Development of Spacing and Compulsory Pooling Laws

In response to the problems associated with over-drilling, beginning in 1919, many states began enacting well spacing laws that limited the number of wells and required them to be a certain distance apart.[39] In some states, these laws granted states the authority to fix drilling units, which were defined as the maximum area that may be economically and

29. Westmoreland & Cambria Nat. Gas Co. v. De Witt, 130 Pa. 235, 249 (1889).
30. MYERS, *supra* note 24, at 27.
31. *Id.*
32. *Id.* at 16.
33. Sharon O. Flanery & Ryan J. Morgan, *Overview of Pooling and Unitization Affecting Appalachian Shale Development*, 32 ENERGY & MIN. L. INST. 13, 19 (2011).
34. *Id.*
35. *Id.*
36. MYERS, *supra* note 24, at 25.
37. *Id.* at 57.
38. *Id.* at 29.
39. *Id.* at 16.

efficiently drained by one well.[40] These well spacing laws were upheld as a reasonable exercise of the state's police power to conserve its natural resources, prevent waste, and prevent the drilling of unnecessary waste.[41] However, these laws posed a particular problem for small tract owners who were barred from drilling a well on their property because their properties were smaller than an established drilling unit.[42] Thus, without a remedy, the well spacing laws confiscated the small-tract owners' property by preventing them from drilling on their land while allowing their neighbors, who owned larger tracts, to extract the oil from the common reservoir.[43]

In response, states then passed forced pooling laws, which sought to protect correlative rights, prevent waste, and prevent inefficiency in oil and gas extraction.[44] Forced pooling laws allow resources to be extracted from underneath a non-consenting landowner's property by requiring the landowner to become part of a drilling unit.[45] Thus, forced pooling laws work in concert with well spacing laws, allowing the small-tract landowner to share in the expenses. In addition, forced pooling laws allow the production and profits of the drilling unit on an equitable basis, protecting the correlative rights of all neighboring landowners.[46] Further, states adopted forced pooling laws to promote the efficient extraction of natural resources. If a "portion of the oil or gas resource cannot be developed, the remainder of the land cannot be drilled in the most efficient manner."[47] Forced pooling orders also serve an anti-holdout purpose by "protecting the right of landowners to exploit their own mineral rights even where their own land is of insufficient acreage to allow for extraction under state law."[48]

3. Current State of Forced Pooling Laws

Currently, thirty-nine states have forced pooling laws.[49] Most statutory pooling statutes contain several major elements.[50] First, the

40. *Id.*
41. *Id.* at 17.
42. *Id.* at 257.
43. *Id.* at 258.
44. *Id.* at 255–56.
45. *Id.* at 258.
46. *Id.*
47. Abby Harder, *Compulsory Pooling Laws: Protecting the Conflicting Rights of Neighboring Landowners*, NAT'L CONF. OF ST. LEGISLATURES (Oct. 24, 2014), http://www.ncsl.org/research/energy/compulsory-pooling-laws-protecting-the-conflicting-rights-of-neighboring-landowners.aspx.
48. *Id.*
49. Schlanger, *supra* note 5.

statutes have provisions that lay out the prerequisites that must be met before forced pooling can be applied.[51] A well operator can apply for a forced pooling order for a spacing unit if he or she owns or leases a certain minimum percentage of acreage in the spacing unit.[52] This percentage varies widely by state. In New York, the well operator must have oil and gas rights for at least sixty percent of the acreage in the proposed drilling unit before the state oil and gas board will consider a driller's petition for compulsory pooling.[53] In Virginia, only twenty-five percent of the land must be leased.[54]

The second major element of forced pooling laws is the establishment of procedures for applying to the state conservation agency or regulatory board for the desired order, as well as procedures for giving notice to the other interested parties in the area of the proposed drilling unit and procedures for holding a hearing on the forced pooling application.[55] Third, the statutes govern the issuance of an administrative order, "which either denies the application or sets out the terms upon which" the forced pooling application is granted.[56] In many states, those terms are established, or at least guided, by statute or rule, but in other states, they are left largely to the discretion of the regulatory board.[57]

Finally, the statutes describe the scheme by which the mineral profits and associated costs are shared. These schemes generally fall into three categories: the "costs-only" approach, the "risk penalty" approach, and the "options given" approach.[58] The most common approach used by most major oil and gas-producing states is the "risk penalty" approach, in which "a non-consenting owner is subject to a 'risk penalty' to reward the extraction company for bearing the risks associated with drilling."[59] Under the "costs-only" approach, "the non-consenting owner is held liable for production costs if the extraction is successful, without bearing any of the risks associated with extraction."[60] Under the "options given" approach, "non-consenting owners can choose an alternative from a list

50. Flanery and Morgan, *supra* note 33, at 21.
51. *Id.*
52. *Id.*
53. N.Y. ENVTL. CONSERV. LAW § 23-0901 (McKinney 2005).
54. VA. CODE ANN. § 45.1-361.21 (West 2006).
55. Flanery and Morgan, *supra* note 33, at 22.
56. *Id.*
57. *Id.* at 25.
58. Harder, *supra* note 47.
59. *Id.*
60. *Id.*

of options that best fits their own specific circumstances upon receiving a mandatory pooling order."[61]

4. Michigan's Forced Pooling Law

A relatively standard example of a forced pooling law is Michigan's forced pooling law.[62] The first Michigan law to regulate oil and gas drilling for the purpose of avoiding the drilling of unnecessary wells was passed in 1929.[63] The Oil and Gas Act, now codified in Part 615 of the Natural Resources and Environmental Protection Act, is a comprehensive law intended to conserve oil and gas, by limiting daily production, regulating minimum distances between wells, and establishing drilling units.[64] Part 615 specifically provides for both voluntary and compulsory pooling of tracts into drilling units.[65]

The Michigan Supreme Court discussed that drilling units and the pooling of tracts work in concert.[66] "If an individual owner's land is smaller than the size of the drilling unit established for the oil or gas pool, the owner will be prohibited from drilling . . . so that the owners of land within a drilling unit can join together to apply for a drilling permit."[67]

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61. *Id.*

62. MICH. COMP. LAWS ANN. § 324.61501 (West 1998).

63. James R. Neal, *Compulsory Pooling Promotes Conservation of Michigan's Oil and Gas Natural Resources*, 78 MICH. B.J. 158, 159 (Feb. 1999).

64. *Id.*

65. MICH. COMP. LAWS ANN. § 324.61513(4) (West 1995). Part 615 states:

> The pooling of properties or parts of properties is permitted, and, if not agreed upon, the supervisor may require pooling of properties or parts of properties in any case when and to the extent that the smallness or shape of a separately owned tract or tracts would, under the enforcement of a uniform spacing plan or proration or drilling unit, otherwise deprive or tend to deprive the owner of such a tract of the opportunity to recover or receive his or her just and equitable share of the oil or gas and gas energy in the pool. The owner of any tract that is smaller than the drilling unit established for the field shall not be deprived of the right to drill on and produce from that tract, if the drilling and production can be done without waste . . . All orders requiring pooling described in this subsection shall be upon terms and conditions that are just and reasonable, and will afford to the owner of each tract in the pooling plan the opportunity to recover or receive his or her just and equitable share of the oil or gas and gas energy in the pool as provided in this subsection, and without unnecessary expense, and will prevent or minimize reasonably avoidable drainage from each developed tract that is not equalized by counter drainage.

Id.

66. Mfrs. Nat'l Bank of Detroit v. Dir. of Dep't of Nat. Res., 362 N.W.2d 572, 574 (Mich. 1984).

67. *Id.*

The rules adopted by the supervisor under Part 615 seek to ensure that the property rights of all involved landowners are respected.[68] Such safeguards include disallowing the drilling of a well on an unleased owner's surface tract and prohibiting facilities, including pipelines, on unleased surface land.[69] With regard to economics, unleased mineral owners are entitled to their proportionate share of production from the drilling unit, and are also responsible for their tract's proportionate share of the cost of drilling, completing, equipping, and operating the well.[70] However, owners of the unleased tracts do not assume any personal responsibility for the costs unless they affirmatively elect, in writing, to assume responsibility for costs.[71]

C. The Constitutionality of Forced Pooling Laws

The constitutionality of forced pooling laws have been upheld both in federal and state courts whenever the question has arisen. In 1900, the Supreme Court in *Ohio Oil Co. v. State of Indiana* upheld a law that prohibited the owner of a gas well on his own property from wasting it, holding that the legislature has the power to pass laws to protect all the collective owners, ensure a just distribution, and prevent waste.[72] In 1929, the Eighth Circuit in *Marrs v. City of New Oxford* upheld the constitutionality of a municipal compulsory pooling ordinance in Kansas

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68. Neal, *supra* note 63, at 162.

69. *Id.*

70. *Id.*

71. *Id.*

> With respect to production and costs, the unleased owner can elect one of two options: assume personal responsibility for payment of costs and pay 100 percent of his or her proportionate share of costs, in advance, and receive both a one-eighth royalty on his or her proportionate share of production, and the entire remaining seven-eighths of his or her proportionate share of production, subject to timely payment of the costs; [or] assume no personal responsibility for payment of costs, pay nothing toward costs, and immediately receive a one-eighth royalty on his or her proportionate share of production, and after his or her share of costs and additional compensation for the risk of the project are recovered by the owner who drills, from the unleased owner's share of production. Under the second option, the unleased owner is never personally responsible for payment of any cost; immediately receives a one-eight royalty on his or her share of production; and receives the remaining seven-eighths share after the owner who drills recovers costs and additional compensation. If the well is dry, the unleased owner never pays, out of pocket, any cost, and is not personally responsible for any costs. All costs are recovered out of production, if any.

Id.

72. Ohio Oil Co. v. State of Ind. 177 U.S. 190, 210 (1900).

and rejected the plaintiff's takings and substantive due process claims.[73] The court held that the ordinance was a valid exercise of police power to conserve oil and gas, to reduce the annoyances and dangers associated with unnecessary drilling of oil wells within the city, and to protect the correlative rights of landowners.[74] In 1938, the Oklahoma Supreme Court in *Patterson v. Stanolind Oil & Gas Co.* upheld the constitutionality of Oklahoma's spacing and forced pooling statute under the state's police power.[75]

However, most of the critical cases upholding the constitutionality of forced pooling laws were decided in the early 1900s, and most of the forced pooling laws were enacted in the early to mid 1900s, when hydraulic fracturing technology did not exist.[76] A major difference between shale gas and conventional oil and gas is that gas is generally non-migratory.[77] Further, horizontal drilling, unlike vertical drilling of conventional oil and gas resources, constitutes physical subsurface trespass that violates private property rights.[78] Finally, hydraulic fracturing creates a much more severe impact on the environment and public health and safety than does conventional oil and gas drilling.[79] These three points make it inappropriate for forced pooling laws to be used for hydraulic fracturing, and each of these points will be discussed in depth.

III. ANALYSIS

The use of forced pooling laws by hydraulic fracturing and horizontal drilling operators to drill for non-migratory shale gas does not comport with the original intent and justifications behind forced pooling laws, due to several differences between hydraulic fracturing and conventional oil drilling.

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73. Marrs v. City of Oxford, 32 F.2d 134, 140 (8th Cir. 1929).

74. *Id.*

75. Patterson v. Stanolind Oil & Gas Co., 77 P.2d 83, 89 (Okla. 1938).

76. MADELON LUBIN FINKEL, THE HUMAN AND ENVIRONMENTAL IMPACT OF FRACKING: HOW FRACTURING SHALE FOR GAS AFFECTS US AND OUR WORLD, xv (2015) (exploring when fracking began).

77. DONALDSON, *supra* note 9.

78. *See* Keith Hall, *Hyrdraulic Fracturing: If Fractures Cross Property Lines, Is There an Actionable Subsurface Trespass?*, 34 NAT. RESOURCES J. 361 (2014).

79. FINKEL, *supra* note 76, at xix.

A. Migratory vs. Non-Migratory

Forced pooling laws originated from the migratory nature of conventional oil and gas and the need to protect the landowner's correlative rights, prevent waste, and reduce inefficiency.[80] The legislative history of Texas's forced pooling law reveals concern that without forced pooling laws, the well spacing laws would confiscate the small-tract owner's property by preventing them from drilling on their land while allowing their neighbors who own larger tracts to extract the oil from the common reservoir.[81] In other words, forced pooling laws, as related to migratory oil and gas, were meant to protect *against* state confiscation of private property. Michigan's forced pooling law also reflects this concern. Part 615 states:

> [T]he supervisor may require pooling of properties or parts of properties in any case when and to the extent that the smallness or shape of a separately owned tract or tracts would, under the enforcement of a uniform spacing plan or proration or drilling unit, *otherwise deprive or tend to deprive the owner of such a tract of the opportunity to recover or receive his or her just and equitable share of the oil or gas and gas energy in the pool. The owner of any tract that is smaller than the drilling unit established for the field shall not be deprived of the right to drill on and produce from that tract* . . . All orders requiring pooling described in this subsection shall be upon terms and conditions that are just and reasonable, and *will afford to the owner of each tract in the pooling plan the opportunity to recover or receive his or her just and equitable share of the oil or gas and gas energy in the pool.*[82]

Further, these factors underlying the enactment of forced pooling laws were also the predominant justifications that the courts utilized in the early cases upholding the constitutionality of forced pooling laws.[83]

1. Ohio Oil Co. v. State of Indiana

Correlative rights and prevention of waste factored heavily into the United States Supreme Court's landmark 1900 decision in *Ohio Oil Co.*

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80. MYERS, *supra* note 24, at 25.
81. *Id.* at 258.
82. MICH. COMP. LAWS ANN. § 324.61513(4) (West 1995) (emphasis added).
83. MYERS, *supra* note 24, at 258.

v. State of Indiana to uphold an Indiana law prohibiting the owner of a gas well on his own property from allowing the flow of gas or oil from the well to escape into the open air.[84] In this case, the state described that its citizens relied on a permanent supply of natural gas for fuel.[85] The state argued that, by allowing natural gas to escape from its wells, Ohio Oil Company seriously diminished the common supply and greatly damaged the entire gas territory by reducing the "back pressure" of the field, which was necessary to prevent salt water from invading displacing the gas supply.[86] Ohio Oil Company argued that it needed to allow the release of natural gas to lift the oil to the surface in the process of producing oil.[87] The Company claimed that this anti-waste state law violated the Fourteenth Amendment.[88]

The Court held that the legislature has the power to pass laws to protect all collective owners, to ensure a just distribution, and to prevent waste.[89] The migratory nature of oil and gas were crucial to the Court's holding.[90] The Court explained that the migratory nature of oil and gas, "substances of peculiar character," should be treated differently than "coal [or] other minerals which have a fixed situs."[91] The traditional common law rule that fee ownership of the surface of the earth carries with it the right to the minerals beneath is inapplicable with oil and gas.[92] Their migratory nature allows one owner to diminish the common source of supply belonging to all owners.[93] The Court said that limitations to one's private property rights are necessary when they encroach upon the public interest or infringe on the property rights of one's neighbor.[94] The Court justified forced pooling against arguments that it would infringe upon private property rights by emphasizing that in the absence of forced pooling, an owner would be able to disregard and damage his neighbor's private property rights, "in the disposition he may make of it [private property] he is subject to two limitations. He must not disregard his

84. *Ohio Oil Co. v. Indiana*, 177 U.S. 190, 212 (1900).
85. *Id.* at 196.
86. *Id.* at 197.
87. *Id.* at 199.
88. *Id.*
89. *Id.* at 210.
90. *Id.* at 203.
91. *Id.*
92. *Id.* at 202.
93. *Id.* The Court recognized that oil and gas differ from other mineral deposits because "they have no fixed situs under a particular portion of the earth's surface within the area where they obtain. They have the power, as it were, of self-transmission." *Id.* at 203.
94. *Id.* at 205.

obligations to the public. He must not disregard his neighbor's rights."[95] Further, the Court based the state's police power in enacting forced pooling laws on its interest in balancing and protecting the competing property rights of neighbors:

> If the use he makes of his own, or its waste, is injurious to the property or the health of others, such use or waste may be restrained, or damages recovered therefor; but, subject to these limitations, his power as an owner is absolute until the legislature shall, in the interest of the public, as consumers, restrict and regulate it by statute.[96]

The Court emphasized the correlative rights component, that waste by one well owner may destroy the property rights of the others.[97] Concluding that the anti-waste law was necessary to protect property rights, not infringe upon it, the Court stated:

> On the other hand, as to gas and oil the surface proprietors within the gas field all have the right to reduce to possession the gas and oil beneath. They could not be absolutely deprived of this right which belongs to them without a taking of private property. But there is a coequal right in them all to take from a common source of supply the two substances which in the nature of things are united, though separate. It follows from the essence of their right . . . that the use by one of his power to seek to convert a part of the common fund to actual possession may result in an undue proportion being attributed to one of the possessors of the right to the detriment of the others, or by waste by one or more to the annihilation of the rights of the remainder.[98]

The Court explicitly linked the migratory nature of oil and gas to the legislative power to protect correlative rights and prevent waste:

> This necessarily implied legislative authority is borne out by the analogy suggested by things *feroe naturoe*, which it is unquestioned the legislature has the authority to forbid all from taking, in order to protect them from undue destruction, so that

95. *Id.* at 204 (quoting *Hague v. Wheeler*, 27 A. 714, 720 (Pa. 1893)).
96. *Id.* at 204–05.
97. *Id.* at 210.
98. *Id.* at 209–10.

> the right of the common owners, the public, to reduce to possession, may be ultimately efficaciously enjoyed.[99]

In rejecting Ohio Oil Company's argument that the state's regulation was an unconstitutional taking of property without just compensation in violation of the Fourteenth Amendment, the Court grounded its reasoning on the property rights of all co-owners of the common reservoir: if the defendants have a property right in the common reservoir, then so do all the owners.[100] Thus, there must be a legislative power to protect that right from destruction due to the indivisible quality of the oil and gas interests; if the defendants do not have such a property right, there is no unconstitutional taking.[101]

Ohio Oil Co. was followed by the Eighth Circuit's ruling in *Marrs v. City of Oxford,* which upheld the constitutionality of a municipal compulsory pooling ordinance in Kansas and rejected the plaintiff's takings and substantive due process claims.[102] The court held that the ordinance was a valid exercise of police power to conserve oil and gas.[103] The court highlighted and elaborated on the correlative rights justification espoused by *Ohio Oil Co.*, reasoning that without forced pooling, one landowner could destroy the rights of other owners to a common pool of oil and gas, and thus forced pooling was a means to protect, not destroy, property rights.[104]

The court viewed the rule of capture as causing destruction of property rights for landowners who lose out in the race to extract oil first:

> Looking to the substance of things, as equity does, what are the rights of plaintiffs that will be encroached upon or denied to them by the enforcement of this ordinance? . . . The obvious purpose was to reach the pool as quickly as possible and take all of the oil and gas obtainable before others could get it, thus seriously encroaching upon and probably destroying the same rights of adjoining lot owners.[105]

The Eighth Circuit also viewed forced pooling as protecting property rights:

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99. *Id.* at 210.
100. *Id.* at 202.
101. *Id.*
102. Marrs v. City of Oxford, 32 F.2d 134, 140 (8th Cir. 1929).
103. *Id.*
104. *Id.*
105. *Id.*

> If a lot owner has not given a lease he is protected by the asking in a fair proportion of the mineral produced by a permittee. *The regulations make every effort to protect, rather than to destroy rights. They extend equal opportunity to all who have an interest and eliminate the race between those having equal rights in a common source of wealth, so that some may not take all and leave others with nothing.*[106]

2. State Supreme Court Cases

Correlative rights and prevention of waste were also predominant factors in the early state Supreme Court decisions upholding forced pooling laws. In 1938, the Oklahoma Supreme Court in *Patterson v. Stanolind Oil & Gas Co.* upheld the constitutionality of a spacing and forced pooling statute in Oklahoma as within the state's police power to protect the correlative rights of owners to a common source of supply.[107] In affirming the validity of the state's exercise of police power, the court reiterated the importance of correlative rights, finding, "[i]t is well established that the police power of the state extends to protecting the correlative rights of owners in a common source of oil and gas supply."[108] The court emphasized that forced pooling laws allow owners of a common mineral supply to receive a just distribution, reasoning that "[t]his power may be lawfully exercised by regulating the drilling of wells into said common source of supply and distributing the production thereof among the owners of mineral rights in land overlying said common source of supply."[109]

In 1942, the Louisiana Supreme Court in *Hunter Company Inc. v. McHugh* echoed the reasoning of the *Patterson* court by upholding the constitutionality of the state's forced pooling law as necessary to protect correlative rights.[110] The court also viewed the *Ohio Oil Co.* decision as based on the need to protect correlative rights.[111] In *Hunter*, the court stated:

> In that case the owner, in tapping the stratum of oil and gas, and using the gas for bringing up the oil, was but exercising a right clearly and admittedly incident to his ownership, and yet he was

106. *Id.* (emphasis added).
107. Patterson v. Stanolind Oil & Gas Co., 77 P.2d 83, 88 (Okla. 1938).
108. *Id.*
109. *Id.*
110. Hunter Co. v. McHugh, 11 So.2d 495 (Okla. 1942).
111. *Id.* at 505.

> restrained because his act was injurious to the other owners in the same oil and gas field. *The rights of the several owners of the gas field are coequal; one owner cannot exercise his own right so as to preclude his neighbor from exercising his, or so as to interfere with the neighbor.*[112]

The court also discussed the importance of the forced pooling law in preventing waste of natural resources, as excessive oil wells decrease the pressure inside the reservoir and thus keep the oil trapped and wasted.[113] The court stated:

> It goes without saying that the drilling of more wells than are necessary to drain a gas field efficiently and economically causes waste; it is a waste of valuable material and skill and labor; a waste of gas for fuel in the drilling of the unnecessary wells; and a waste of gas in the allowing of the unnecessary wells to clean themselves out before being placed on production . . . where gas wells are spaced close together they are abandoned at a higher bottom-hole pressure than they would be if spaced further apart. When a gas well is abandoned at a high bottom-hole pressure there is a waste of the gas that is left in the ground.[114]

The Mississippi Supreme Court also upheld the constitutionality of its state's forced pooling laws, echoing the justifications of preserving landowner's correlative rights and prevention of waste used by other state supreme courts. In *Superior Oil Co. v. Foote*, the court explicitly discussed the need to protect all the correlative rights of all owners over a common source of supply.[115] Likewise, in *Superior Oil Co. v. Beery*, the court explicitly reiterated that without forced pooling, correlative rights could not be protected.[116]

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112. *Id.* (emphasis in original).

113. *Id.* at 508.

114. *Id.*

115. Superior Oil Co. v. Foote, 59 So.2d 85, 93 (Miss. 1952). The court stated:

> [T]he courts have consistently held that the state may enact regulatory laws for and prescribe methods of extracting oil and gas for the purposes of conservation, the efficient utilization of reservoir energy, and the protection of the correlative rights of all owners in a common source of supply . . . the state must consider the relation of the various rights of citizens and must accommodate their coexistence, and in the interest of the entire community may limit one right so that others may be enjoyed.

Id.

116. Superior Oil Co. v. Beery, 63 So.2d 115, 124 (Miss. 1953). The court stated:

However, because shale gas is non-migratory, correlative rights and waste justifications that underlie these early court decisions upholding the constitutionality of the original forced pooling laws do not apply to hydraulic fracturing and horizontal drilling of shale gas to any significant degree. Shale gas is non-migratory because unlike conventional oil and gas, it does not exist in a large reservoir or permeable rock formations.[117] Shale gas formations consist of very small pore sizes with extremely low matrix permeabilities, even at high pressure gradients.[118] In the hydraulic fracturing process, minimal drainage of gas from the shale rock of adjoining, non-consenting property owners occurs because the fractures created by horizontal drilling are normally vertical (perpendicular to the horizontal well). This results because a "horizontal fracture would have to lift the whole weight of the several thousand feet of rock above it . . . whereas a vertical fracture just has to push the rock aside slightly."[119] Further, computers carefully control and customize the fracking process, including fracture length, to the specific geographic properties of the drilling area.[120] In addition, the process of hydraulic fracturing through a 5,000-foot well proceeds in many sequences and not entirely at once.[121] Therefore, the drilling operator can minimize the risk that fractures will extend into neighboring property.

The non-migratory nature of shale gas and the minimal risk of drainage from under the land of a nonconsenting property owner indicate

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> It will be seen that the correlative rights of the British-American Oil Producing Company and R. J. St. Germain, as lessees of other tracts in the unit, and those of the appellant as the lessee of the 50-acre tract, and the royalty rights of all mineral owners, other than appellee, could not otherwise be protected and enforced.

Id.

117. DONALDSON, *supra* note 9.

118. *Id.* ("This gas will not move when subjected to a pressure gradient and thus is not available for production. Until the advent of controlled horizontal drilling and sequenced multi-stage fracture technologies, shale beds were by-passed and considered useful only as upper and lower seals for gas and liquid hydrocarbon reservoirs."); *see also* John Pucknell, *Guide to The Different Ways in Which Rocks Are Fractured in Oil and Gas Field Operations, a Briefing Paper,* UNIV. OF PORTSMOUTH (2013), https://researchportal.port.ac.uk/portal/files/241578/Guide_to_Fracturing_r1.pdf.

119. *Id.*

120. DONALDSON, *supra* note 9, at 32.

121. *Id.*

> The long (>5,000 feet) horizontal wells that are distributed within the gas-shale formation cannot be fractured through its entire length because the amount of fluid and pumping rates required are too great for that type of operation. Therefore, the fractures are implemented at sequentially staged intervals along the length of the horizontal well using several innovative techniques (or technologies) to accomplish the task with efficiency and minimum costs.

Id.

that the use of forced pooling for hydraulic fracturing does not comport with the original intent of forced pooling laws and the bases on which they were enacted and upheld. Unless a horizontal well bore trespasses into the property of a nonconsenting landowner, there is minimal risk of drainage, and so the correlative rights concern is not significantly present with shale gas. One can drill for shale gas under his or her own land without significantly affecting the rights of other adjoining landowners. Further, the early courts discussed the waste of oil and trapping of oil without forced pooling. But if a hydraulic operator is not allowed to force pool a drilling unit, there would be no waste of shale gas and it would still exist underground, because shale gas is non-migratory; thus there would be no "race" to acquire shale gas under the rule of capture. Hydraulic operators and landowners could still enter into voluntary pooling agreements.

B. Vertical Drilling vs. Horizontal Drilling

Unlike conventional vertical drilling of oil and gas, horizontal drilling of shale gas necessarily involves physical subsurface trespass into the adjacent properties of non-consenting owners and thus violates private property rights. Through the 1970s, oil and gas wells were drilled vertically.[122] It was not until 1997 that Mitchell Energy developed the presently utilized hydraulic fracturing technique, "slickwater fracturing," that made horizontal drilling for shale gas economical.[123] However, horizontal drilling, unlike vertical drilling, necessarily involves physical trespass of the wellbore and drilling equipment into the adjacent properties of non-consenting landowners.[124] Thus, horizontal drilling does not infringe upon private property rights in the manner contemplated by the states that enacted forced pooling laws and by courts that upheld them in an environment of conventional vertical drilling.[125]

1. The Right to Exclude is the Most Fundamental Property Interest

Blackstone once defined the right of property to be "that sole and despotic dominion . . . exercise[d] over the external things . . . in total *exclusion* of the right of the other."[126] The United States Supreme Court

122. FINKEL, *supra* note 76, at xv.

123. *Id.*

124. Hall, *supra* note 78, at 362.

125. *Id.*

126. Shyamkrishna Balganesh, *Demystifying the Right to Exclude: Of Property, Inviolability, and Automatic Injunctions*, 31 HARV. J.L. & PUB. POL'Y 593, 596 (2008).

has described the owner's right to exclude others from entering and using her property as "perhaps the most fundamental of all property interests."[127]

The Restatement Second of Torts states:

> One is subject to liability to another for trespass, irrespective of whether he thereby causes harm to any legally protected interest of the other, if he intentionally, (a) enters land in the possession of the other, or causes a thing or a third person to do so, or (b) remains on the land, or (c) fails to remove from the land a thing which he is under a duty to remove.[128]

The Restatement also states, "[e]xcept as stated in Subsection (2) [which addresses flight by aircraft airspace], a trespass may be committed on, beneath, or above the surface of the earth."[129] Further, for these Restatement rules to apply, actual harm from the trespass need not be shown, although actual damages would make a trespass claim stronger.[130] A trespass does not occur when such an intrusion is privileged by consent of the owner or by law.[131]

The Kentucky Court of Appeals in *Edwards v. Sims* reaffirmed the traditional common law *ad coelum* doctrine, which states that land ownership extends from the core of the earth to the sky.[132] In *Edwards v. Sims*, a landowner, Mr. Lee, suspected that part of an underground cave was located under his land.[133] His neighbor, Mr. Edwards, was showing the underground cave to the public.[134] The court applied the *ad coelum* doctrine and reiterated that a court of equity can "compel a mine owner to permit an inspection of his works at the suit of a party who can show reasonable suspicion that his lands are being trespassed upon."[135]

Outside the use of aircraft, courts have adhered to a somewhat strict view of trespass.[136] Courts have applied this *ad coelum* doctrine to find trespass to land in the shooting of ducks across someone else's land; holding an arm over a boundary fence; a horse sticking its head over a

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127. Lingle v. Chevron U.S.A. Inc., 544 U.S. 528, 539 (2005).

128. RESTATEMENT (SECOND) OF TORTS §158 (AM. LAW INST.1965).

129. *Id.*; § 159.

130. Owen L. Anderson, *Lord Coke, the Restatement, and Modern Subsurface Trespass Law*, 6 TEX. J. OIL GAS & ENERGY L. 203, 205 (2011).

131. RESTATEMENT § 158 cmt. c.

132. Edwards v. Sims, 232 S.W.2d 619, 620 (Ky. 1929).

133. *Id.* at 619.

134. *Id.*

135. *Id.* at 620.

136. Anderson, *supra* note 130, at 213.

fence; erecting telephone poles close to boundaries; the stringing of telephone wires thirty feet in the air across property; the projection of building eaves over the boundary line; and the placing of a board on a divisional wall that extends an inch over the boundary line.[137]

In the context of static or "hard" minerals, the *ad coelum* doctrine easily applies, so under the common law with regard to static minerals, unlawful entry or unlawful assertion, either directly or through another, of dominion over another's mining property constitutes trespass.[138] The wrongful extraction or removal of coal or other minerals from the land of another is actionable trespass.[139] The rule of capture, and eventually compulsory pooling statutes, have applied specifically to oil and gas because of their fluid and migratory nature within the common reservoir, and not to hard minerals.[140] Compulsory pooling statutes have modified traditional trespass actions in the context of migratory minerals.[141] Because shale rock is relatively impermeable and the natural gas trapped within shale rock is essentially non-migratory,[142] horizontal drilling of shale rock should be considered more akin to the mining of hard minerals.

2. Trespass in the Context of Compulsorily Pooled Drilling Units for Conventional Drilling

In the context of conventional oil and gas drilling, the Oklahoma Supreme Court held in *Nunez v. Wainoco Oil & Gas Co.* that slant wells which extend beneath neighboring property that has been compulsorily pooled into a drilling unit does not constitute trespass.[143] In *Nunez,* the defendant's vertical well bore, over 10,000 feet deep, ultimately bottomed four or five feet into the deep subsurface of the neighboring property, which was part of a drilling unit created by compulsory pooling.[144] The court held this was not a trespass, reiterating that the state had the police power to enact forced pooling laws to protect correlative rights and prevent waste of oil and gas resources.[145] The court then stated, "[t]he concept of unitization, embodying the principle of ownership in minerals produced from a common source of supply, co-

137. *Trespass by Acts Above Surface*, 42 A.L.R. 945 (1926).
138. 58 C.J.S. *Mines and Minerals* § 178 (2017).
139. *Id.*
140. Flanery & Morgan, *supra* note 33, at 459.
141. *See, e.g.*, Nunez v. Wainoco Oil & Gas Co., 488 So. 2d 955, 963 (La. 1986).
142. DONALDSON, *supra* note 9.
143. *Nunez,* 488 So. 2d at 964.
144. *Id.* at 956–57.
145. *Id.* at 963–64.

extensive with the individual ownership of the overlying land, is a departure from the traditional notions of private property."[146] The court explained that traditional concepts of ownership of private property had been changed "in recognition of the traits of subsurface minerals in liquid and gaseous form."[147] The court reasoned that since traditional principles of private ownership were inadequate to deal with fugacious minerals, then other concepts of private ownership, such as trespass, do not need apply to compulsory pooled units.[148] The state's forced pooling law declared that landowners have a common interest in the reservoir of natural resources below adjacent property, prohibited individual property owners from drilling on their own tracts, and forced owners to share in the production.[149] The court determined that the forced pooling law infringed on the usual rights of ownership.[150] Therefore, the state's forced pooling laws declare that landowners have a common interest in the reservoir of natural resources. Therefore, the state's forced pooling laws supersede the state's general concept of private ownership of the subsurface.[151]

3. Trespass in the Context of Compulsorily Pooled Units for Horizontal Drilling

Courts that have addressed this issue also have held that horizontal drilling into the subsurface of units that have been compulsorily pooled for that purpose does not constitute trespass.[152] In *Continental Resources, Inc. v. Farrar Oil Co.*, the Supreme Court of North Dakota held that the driller did not commit subsurface trespass when he drilled a horizontal well through the landowner's subsurface formation.[153] The defendant had been authorized to drill the well under the Industrial Commission's forced pooling order.[154] The court reiterated the reasoning of *Nunez*, that traditional property law principles were inadequate to address waste in oil and gas development, and that forced pooling laws were needed to

146. *Id.* at 962.

147. *Id.* (citing H. DAGGET, MINERAL RIGHTS IN LOUISIANA 487 (1949)). The court specifically referred to the state's Mineral Code, which stated: "Ownership of land does *not* include ownership of oil, gas, and other minerals *occurring naturally in liquid or gaseous form*, or of any elements or compounds in solution, emulsion, or association with such minerals." *Id.* (emphasis added).

148. *Id.* at 963.

149. *Id.* at 964.

150. *Id.*

151. *Id.* at 963–65.

152. *See* Cont'l Res., Inc. v. Farrar Oil Co., 559 N.W.2d 841, 846 (N.D. 1997).

153. *Id.* at 844.

154. *Id.*

protect correlative rights and prevent waste.[155] The court reasoned that property rights are not absolute, and that "[t]here may be interference [with private property rights] whenever the public interests demand it; and in this particular a large discretion is necessarily vested in the legislature, to determine not only what the interests of the public require, but what measures are necessary for the protection of such interests."[156] The court deemed the state's forced pooling laws to be a proper exercise of police powers, and thus the state's forced pooling laws superseded traditional private property law.[157]

A recent case dealing with horizontal drilling is *Coastal Oil & Gas Co. v. Garza Energy Trust*.[158] While this case did not involve trespass claims arising from compulsorily pooled units, it is nonetheless relevant because the Supreme Court of Texas was faced with the issue of whether a horizontal well that extends into another's property is trespass.[159] The court declined to address this question directly, instead narrowly holding that the rule of capture prevented the plaintiff, a royalty interest owner of a natural gas lease, from recovering damages against a well operator on a trespass claim.[160] The court stated that the rule of capture precludes plaintiffs from recovering for potential drainage because owners could either drill an offset well themselves, and if that is inadequate, the owners could "apply to the Railroad Commission for forced pooling."[161] The court stated that a minerals owner is entitled "not to the molecules actually residing below the surface, but to 'a fair chance to recover the oil and gas in or under his land, *or* their equivalents in kind.'"[162] Further, the court expressed concern that allowing recovery for the value of gas drained by hydraulic fracturing would usurp the Railroad Commission's authority to regulate gas and oil production and give it to courts and juries.[163] The court specifically pointed to the Commission's role in forced pooling to issue "rules governing the spacing, density, and

155. *Id.* at 845. The court stated:

> Like other states, the North Dakota legislature recognized that traditional property law principles contributed to inefficiency and waste in oil and gas development, and so enacted an Act for the Control of Gas and Oil Resources in 1953 . . . the Commission is empowered to fix spacing units for a pool "[w]hen necessary to prevent waste, to avoid the drilling of unnecessary wells, or to protect correlative rights." *Id.* (citations omitted).

156. *Id.* at 845–46.
157. *Id.* at 846.
158. Coastal Oil & Gas Corp. v. Garza Energy Trust, 268 S.W.3d 1 (Tex. 2008).
159. *Id.* at 4.
160. *Id.* at 14.
161. *Id.*
162. *Id.* at 15 (internal citations omitted).
163. *Id.*

allowables of wells, to protect correlative rights of owners with interests in the same mineral deposits while securing 'the state's goals of preventing waste and conserving natural resources.'"[164]

4. The Logic of Nunez is Unsuitable for Compulsorily Pooled Units for Horizontal Drilling

The logic of *Nunez* is unsuitable for compulsorily pooled units for horizontal drilling, and the law should not privilege trespass in this context unless state legislatures demonstrate such an intent. The *Continental Resources* court erroneously reiterated the *Nunez* court's reasoning, without addressing the fundamental difference between the two cases. *Nunez* involved conventional vertical drilling of migratory minerals that was envisioned by state legislatures at the time that forced pooling laws were enacted,[165] whereas *Continental Resources* involved horizontal drilling of non-migratory minerals that was not envisioned at the time.[166] The *Continental Resources* court reasoned that private property interests may be trumped by the legislature's use of the state's police powers to protect the public interest, since the state's forced pooling law is a valid use of the state's police powers, thus horizontal drilling into property that is compulsorily pooled is not trespass.[167] However, the court did not consider the fundamental question: "[h]ave state legislatures decided that it is in the public interest for forced pooling laws to be used for horizontal drilling?"

The *Continental Resources* court did not consider that the forced pooling law in North Dakota was enacted in 1953, long before the technology of horizontal drilling came into existence. In fact, it was not until 1997 that technological advances made horizontal drilling of shale gas economically viable.[168] The large increase in the use of hydraulic fracturing has mainly occurred within the past decade, and therefore the political debate over the benefits and drawbacks of hydraulic fracturing has only recently come to the forefront. Further, there has been little to no political debate specifically on the use of forced pooling laws for horizontal drilling, which remains a rather obscure political topic. Thus, it cannot be said that using the forced pooling law for horizontal drilling is a valid use of the state's police power.

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164. *Id.*
165. Nunez v. Wainoco Oil & Gas Co., 488 So. 2d 955, 955 (La. 1986).
166. Cont'l Res., Inc. v. Farrar Oil Co., 559 N.W.2d 841, 846 (N.D. 1997).
167. *Id.*
168. FINKEL, *supra* note 76, at xv.

The *Nunez* court specifically stated that forced pooling laws were necessary because traditional principles of private ownership were inadequate to deal with *fugacious* minerals, and that traditional concepts of ownership of private property had been changed "in recognition of the traits of subsurface minerals in liquid and gaseous form."[169] Further, the *Nunez* court discussed that the theory underlying forced pooling, that there is common ownership over resources in a common supply, necessarily alters traditional private property rights.[170] However, this reasoning does not apply neatly to horizontal drilling of shale gas.

The *Garza* court's discussion of the rule of capture and of the availability of forced pooling to remedy drainage from trespass is flawed in the same way as *Continental Resources*. In order to dismiss trespass claims, the court assumes without justification that forced pooling laws can, and should, be used for horizontal drilling.[171] The *Garza* court stated that the minerals owner is entitled "not to the molecules actually residing below the surface, but to 'a fair chance to recover the oil and gas in or under his land, *or* their equivalents in kind,'" but ignored that this concept reflects the "common ownership of a common reservoir" theory of migratory oil and gas, not non-migratory resources.[172]

Further, the *Garza* court's concern about courts potentially usurping the Railroad Commission's role in regulating oil and gas production through forced pooling also assumes, like the *Continental Resources* court did, that forced pooling can and should be used for horizontal drilling. The *Garza* court stated that the legislature has conferred "open-ended authority" to the Railroad Commission to "adopt all necessary rules for governing and regulating persons and their operations within the Commission's jurisdiction."[173] But, the *Garza* court merely pointed to the existence of the forced pooling law as support for this claim, without considering that the forced pooling law was enacted long before hydraulic fracturing technology even existed. The *Garza* court cited Texas's forced pooling law, which states that the Commission has the authority to adopt rules to "protect correlative rights" and "require wells to be drilled and operated in a manner that protects injury to adjoining property."[174] The court, however, does not consider that trespass via horizontal drilling neither protects correlative rights nor protects injury to adjoining property.

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169. *Nunez*, 488 So. 2d at 963; *see also supra* note 155.
170. *Nunez*, 488 So. 2d at 963.
171. *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.23d 1, 29 (Tex. 2008).
172. *Id.* at 15.
173. *Id.* at 38.
174. *Id.* at 38–39.

C. Hydraulic Fracturing Has More Severe Environmental Impacts

The environmental effects of hydraulic fracturing and horizontal drilling are much more severe than those of conventional vertical drilling.[175] Conventional drilling involves extraction of oil and gas using the natural pressure of the wells or by pumping operations.[176] However, hydraulic fracturing involves underground injection of large volumes of toxic chemicals at high pressures through horizontal wells that run under neighboring properties, and there is serious concern among the public about the possibility of water contamination.[177] The EPA's report on this subject reiterated that millions of people live in areas where their drinking water resources are located near hydraulically fractured wells.[178] The report found that 21,900 hydraulically fractured wells "were within one mile of at least one PWS [public water system] source (e.g., infiltration galleries, intakes, reservoirs, springs and ground water wells),"[179] which serve over 8.6 million people annually.[180]

Further, the report stated, "[w]e found specific instances where one or more mechanisms led to impacts on drinking water resources, including contamination of drinking water wells."[181] In addition, scientific studies have detected fracking chemicals in public and private water sources in Texas and Pennsylvania.[182] It should be noted that long horizontal wells do generally reduce surface disturbance compared to conventional vertical drilling.[183] However, overall, the environmental impacts of hydraulic fracturing and use of forced pooling laws for hydraulic fracturing should be examined by state legislatures.

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175. FINKEL, *supra* note 76, at xvi.

176. *Id.* at xv.

177. Brantley & Meyendorff, *supra* note 18.

178. OFFICE OF RESEARCH & DEV., U.S. ENVTL. PROT. AGENCY, ASSESSMENT OF THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING FOR OIL AND GAS ON DRINKING WATER RESOURCES (EXTERNAL REVIEW DRAFT) ES-6 (June 5, 2015), http://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651.

179. *Id.*

180. *Id.*

181. *Id.*

182. Kristin Sullivan, *New Study of Barnett Shale Area Well Water Finds Elevated Levels of Water Contaminants*, PHYS.ORG (June 17, 2015), http://m.phys.org/news/2015-06-barnett-shale-area-elevated-contaminants.html; *see also* Nicholas St. Fleur, *Fracking Chemicals Detected in Pennsylvania Drinking Water*, N.Y. TIMES (May 4, 2015), http://www.nytimes.com/2015/05/05/science/earth/fracking-chemicals-detected-in-pennsylvania-drinking-water.html?_r=0.

183. *Id.*

D. State Reactions and Potential Solutions

It is necessary for states to specifically address how forced pooling laws apply to hydraulic fracturing given the differences between fracking and conventional drilling. States must balance competing policy considerations of efficiently developing shale gas, while protecting the property rights of non-consenting owners, and preserving the water and environment. The easiest approach would be for legislatures and state courts to presume that forced pooling laws do not apply to hydraulic fracturing, and then develop new legislation dealing specifically with hydraulic fracturing.

Hilcorp, the hydraulic fracturing operator which attempted to use Pennsylvania's forced pooling law in 2014, ultimately withdrew its application, leaving many crucial questions about the application of forced pooling laws to hydraulic fracturing unresolved.[184] Pennsylvania's Department of Environmental Protection ("DEP") officials have called for the legislature to settle the question of whether a drilling unit should be defined by the maximum area that one well can efficiently and economically drain, as Pennsylvania's forced pooling law states, or by one well pad, where shale operators drill multiple wells that travel through the shale in different directions.[185] Another question posed by the state's DEP officials is how, under the forced pooling law, one should define a pool in an impermeable shale layer that extends geographically for thousands of square miles.[186]

In 2015, the West Virginia House of Delegates attempted to amend the state's forced pooling law to expressly include horizontal drilling, while also adding some protections for property owners.[187] One of these proposed element included expanding the state's Oil and Gas Conservation Commission, which is responsible for issuing forced pooling orders, to include a state geologist, someone in the state who is a mineral owner but not affiliated with an operator of oil or gas wells, and someone with experience in the state's agricultural and farming industry.[188] In addition, the proposed amendment required drillers to

184. Laura Legere, *Forced Pooling Policies Remain Unclear in Pennsylvania's Shale Plays*, PITTSBURGH POST-GAZETTE (Jan. 6, 2015), http://powersource.post-gazette.com/powersource/policy-powersource/2015/01/06/Forced-pooling-policies-remain-unclear-in-Pennsylvania-s-shale-plays/stories/201412300017.

185. *Id.*

186. *Id.*

187. Sarah Tincher, *Stakeholders Work to Revive 'Forced Pooling' Bill in WV*, THE ST. J. (Sept. 2, 2015), http://www.statejournal.com/story/29945792/stakeholders-work-to-revive-forced-pooling-bill-in-wv.

188. *Id.*

obtain consent from at least eighty percent of rights-holders before they can apply for forced pooling for horizontal drilling.[189] This is a requirement not present in the existing forced pooling law for conventional drilling.[190] Further, the amendment stated that mineral owners that unitized without consent would not be liable for any of the expenses of drilling or have deductions taken from their royalty check.[191]

Since 2010, the Ohio General Assembly enacted two laws revising its forced pooling law.[192] Notably, the 2010 revision changed the language of Ohio's forced pooling law to make protection of correlative rights a mandatory component to a forced pooling order, whereas in the past, protection of correlative rights was not a necessary component.[193] By emphasizing that protection of correlative rights is necessary to a forced pooling order, the Ohio legislature appears to have recognized the fundamental importance of correlative rights underlying the validity of forced pooling laws. Further, the 2010 amendments increased the burden on the application process and limited the number of forced pooling applications that may be filed in a single year in an attempt to incentivize operators to form voluntary pooling agreements instead.[194] The 2010 revision added the requirement that mandatory pooling order applicants must actually own the mineral interests in the land.[195] The original law did not require mandatory pooling order applicants to own the right to mineral interests and they needed only to have the right to drill on the land.[196]

In addition to these proposals, states could also impose strict liability on horizontal drilling operators when fracking chemicals are detected in the water sources that those operators have force-pooled. Strict liability for fracking chemicals in areas that have been force pooled would

189. Hoppy Kercheval, *House Passes Forced Pooling Natural Gas Drilling Bill*, W.V. METRO NEWS (Mar. 4, 2015), http://wvmetronews.com/2015/03/04/house-passes-forced-pooling-natural-gas-drilling-bill.

190. W. VA. CODE ANN. § 22c-9 (West 1998).

191. Kercheval, *supra* note 189.

192. Lucas P. Baker, *Forced into Fracking: Mandatory Pooling in Ohio*, 42 CAP. U. L. REV. 215, 227–28 (2014).

193. *Id.* at 228. Ohio's original forced pooling law allowed forced pooling permits to be issued if Ohio's division of mineral resources management found that forced pooling "is necessary to protect correlative rights *or* provide effective development, use, or conservation of oil and gas." OHIO REV. CODE ANN. § 1509.27 (West 2010) (emphasis added). However, the amended language says that the division must be satisfied that the forced pooling "is necessary to protect correlative rights *and* to provide effective development, use, *and* conservation of oil and gas." OHIO REV. CODE ANN. § 1509.27 (West 2015) (emphasis added).

194. Baker, *supra* note 192, at 228.

195. *Id.*

196. *Id.* at 229.

incentivize drilling operators to either enhance procedures to prevent water contamination or pursue voluntary pooling agreements instead. To make detection of such chemicals possible, the federal government should require hydraulic fracturing operators to disclose all the chemicals that compose their fracking solutions.[197]

IV. CONCLUSION

The current use of forced pooling laws by hydraulic fracturing operators is outside the contemplation and intent of the state legislatures that enacted these laws decades ago. It is also outside the contemplation and intent of the early courts that upheld the constitutionality of these laws decades ago. Hydraulic fracturing differs from conventional oil drilling in three fundamental aspects. Conventional oil and gas resources are migratory, while shale gas resources are non-migratory. Unlike vertical drilling of conventional oil and gas resources, horizontal drilling into the land of non-consenting landowners necessarily constitutes physical subsurface trespass that violates private property rights. Finally, hydraulic fracturing has a much more severe impact on the environment and public health and safety than does conventional oil and gas drilling. The issue of forced pooling laws being used by hydraulic fracturing operators should be brought to the forefront of the political debate, so that state legislatures can affirmatively decide this question. Many states have already begun to reexamine how best to balance the competing interests involved in this issue, and provide examples of approaches other states may take.

197. Currently, hydraulic fracturing is exempt from the many of the requirements of the federal Safe Drinking Water Act. *See* Angela C. Cupas, *The Not-So-Safe Drinking Water Act: Why We Must Regulate Hydraulic Fracturing at the Federal Level*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 605, 616 (2009).