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Cover Page Footnote

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Fracturing the Rule of Capture: The Improper Application of the Rule of Capture to Subsurface Intrusions Resulting from Hydraulic Fracturing

Alexis K. Désiré*

I. INTRODUCTION

Imagine that during the course of hydraulically fracturing a tract of land—a process used to extract gas from low-permeability rock formations—a drilling company causes fractures, as well as some of the materials necessary to the fracturing process, to cross the boundary of its property line and enter an adjoining property—that is, it makes a subsurface intrusion onto a neighbor’s property.¹ Assume further that, because the company’s fractures have extended into the neighbor’s property, oil and gas from the neighboring land travel to the company’s wellbore, causing the neighbor to bring a tort action against the company for harms related to the draining of its minerals. Should a court find that the company’s actions constitute an actionable subsurface trespass?

Instead of focusing on this question, courts that have confronted the issue to date have instead focused on whether the rule of capture precludes liability rather than on whether a subsurface intrusion resulting from hydraulic fracturing constitutes subsurface trespass.² In Texas, the trespass issue was neglected altogether, while in Pennsylvania, the finding of a trespass lacked analysis and was based on the long-rejected doctrine of *ad coelum*, which means that landowners own everything above and below their land, up to the sky and down to the core of the Earth.³ Given the extensive use of hydraulic fracturing across the country, the question of whether a subsurface trespass has occurred will likely appear repeatedly until the law is settled in this area.

* J.D., University of Pennsylvania Law School. Sincere thanks to Professor Cary Coglianese for his feedback and support. I would also like to thank Kristen DeWilde for her helpful suggestions, and the editors of the *Seattle Journal of Technology, Environmental & Innovation Law*, particularly Ayesha Falaknaz, for their dedicated editorial assistance and patience.

¹ Ground Water Protection Council & ALL Consulting, *Modern Shale Gas Development in the United States: A Primer*, 8 (Apr. 2009) [hereinafter *Ground Water Protection Council*].

² The Texas Supreme Court in *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1 (Tex. 2008); the United States District Court for the Northern District of West Virginia in *Stone v. Chesapeake Appalachia, LLC*, 2013 WL 2097397; and the Superior Court of Pennsylvania in *Briggs v. Southwestern Energy Production Company*, 184 A.3d 153 (2018).

³ *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1 (Tex. 2008). *Briggs v. Southwestern Energy Prod. Co.*, 184 A.3d 153 (2018). The Pennsylvania Supreme Court is currently deciding an appeal of this decision.

To present an answer to the issue, I first address the doctrine that has taken up most of the discussion: the rule of capture. The main purpose of this Comment is to argue that the rule of capture should not apply to hydraulic fracturing cases, a question that has not been thoroughly explored to date by scholarship or courts. In Part I of this Comment, I provide background on hydraulic fracturing and discuss the justifications for the rule of capture. I then proceed to discuss limitations on the rule of capture. Part I ends with an exploration of how subsurface trespass has been handled in analogous situations. In Part II, I explain why the rule of capture should not apply to hydraulic fracturing. Not only do the doctrine's rationales not apply to hydraulic fracturing, but judicially imposed limitations on the rule confirm the doctrine's inapplicability to the issue of subsurface trespass. In this part, I argue that subsurface trespasses resulting from hydraulic fracturing should only be actionable when the plaintiff can prove harm and when the defendant's actions are intentional. Finally, in Part III, I show that subsurface intrusion resulting from hydraulic fracturing is actionable under trespass. I first assess the policy considerations driving the arguments behind two leading court cases confronted with the issue. I then analyze a solution to the problem from a leading scholar—that an intentional trespass doctrine can be used instead of the rule of capture.

II. THE BASICS: HYDRAULIC FRACTURING, RULE OF CAPTURE, AND TRESPASS

“Drainage! Drainage, Eli, you boy. Drained dry. I’m so sorry. Here, if you have a milkshake, and I have a milkshake, and I have a straw. There it is, that’s a straw, you see? You watching? And my straw reaches across the room, and starts to drink your milkshake... I... drink... your... milkshake! I drink it up!”—There Will Be Blood

The issue of subsurface trespass resulting from hydraulic fracturing implicates two distinct but interrelated theories of law: the rule of capture and trespass. This Part offers an overview of these theories of law after discussing the process of hydraulic fracturing.

A. Hydraulic Fracturing: Purpose and Process

Hydraulic fracturing, which is commonly referred to as “fracking,” is the process by which oil and gas are released from low-permeability rocks, such as shale.⁴ Although fracking has been used to increase the production of oil and gas from conventional wells since the 1940s, its ability to produce unconventional natural gas from tight shale formations has caused it to become one of today’s fastest-growing trends in onshore domestic oil and gas production.⁵

⁴ Ground Water Protection Council, *supra* note 1.

⁵ Charles G. Groat & Thomas W. Grimshaw, *Fact-Based Regulation for Environmental Protection in Shale Gas Development* 7 (The Energy Inst. at The University of Texas at Austin, 2012). Natural gas is a mixture of light-end, flammable hydrocarbons composed primarily of methane. A.L.

1. The Purpose of Hydraulic Fracturing

Although oil and gas have historically been described as percolating and fugacious, naturally flowing and pooling underground, the majority of today's accessible oil and gas is trapped in the micropores of tight rock formations.⁶ The permeability of those formations, which is measured by the ease with which fluids flow through a rock via interconnections between pores, is extremely limited, making it nearly impossible for oil and gas to flow naturally.⁷ One of the most important rock types accessed for natural gas production is shale.⁸ The United States has a wide distribution of shale formations throughout the country,⁹ but significant shale plays can be found in various states, including Texas, Pennsylvania, Arkansas, Louisiana, and Michigan.¹⁰ Because shale's permeability is low, oil and gas cannot move easily through the rock, and because traditional drilling requires at least fair permeability to be productive and profitable, it is not a viable option for accessing gas trapped in shale formations.¹¹ Fracking, on the other hand, has proven to be effective at permitting trapped gas to move throughout the formation at a cost-effective price.¹² Fracking allows trapped gas that was previously considered inaccessible to move through low-permeability rocks, which allows the gas to be developed and recovered by drilling operators.¹³ This process adds 9 billion barrels of oil and more than 700 trillion standard cubic feet of gas to U.S. reserves and has increased recoverable oil reserves by thirty percent and recoverable gas reserves by ninety percent.¹⁴ With shale gas being estimated to constitute almost half of U.S. natural gas production by 2035, the importance of hydraulic fracturing for the future of energy consumption is huge.¹⁵

Lapidus, A.Y. Krylova, B.P. Tonkonogov, *Gas Chemistry: Status and Prospects for Development*, 36 CHEMISTRY & TECH. FUELS & OILS 82, 82 (2000). J. Daniel Arthur, et. al., An Overview of Modern Shale Gas Development in the United States, ALL CONSULTING 1, 1 (2008).

⁶ See *Dark v. Johnston*, 55 Pa. 164, 168 (1867) ("Oil is a fluid, like water..."); *Wood Cty. Petroleum Co. v. W. Va. Transp. Co.*, 28 W.Va. 210, 217 (1886) (using both the percolating waters and *ferae naturae* analogies to describe water's character). See *Ground Water Protection Council*, *supra*, note 1, at 15 (noting that natural gas production from unconventional sources increased almost sixty-five percent in 2007).

⁷ Laura H. Burney, *Hydraulic Fracturing: Stimulating Your Well or Trespassing?*, 44 Rocky Mtn. Min. L. Inst. 19-1, 19-02 (1998). *Ground Water Protection Council*, *supra* note 1, at 14.

⁸ See Qiang Wang et al., *Natural gas from shale formation – The evolution, evidences and challenges of shale gas revolution in United States*, 30 RENEWABLE AND SUSTAINABLE ENERGY R. 1, 2 (2014).

⁹ *Ground Water Protection Council*, *supra* note 1, at ES-1.

¹⁰ *Ground Water Protection Council*, *supra* note 1, at 16.

¹¹ Typical unfractured shales have matrix permeabilities on the order of 0.01 to 0.00001 millidarcies. Permeability is considered "good" when it is in the range of ten to one hundred millidarcies and fair when it is in the range of one to ten millidarcies. *Ground Water Protection Council*, *supra* note 1, at 14. Caleb Madere, *Covert Capture: Hydraulic Fracturing and Subsurface Trespass in Louisiana*, 75 LA. L. REV. 865, 869 (2015).

¹² *Ground Water Protection Council*, *supra* note 1, at ES-3.

¹³ Madere, *supra* note 11, at 869. See Carl T. Montgomery & Michael B. Smith, *Hydraulic Fracturing: History of an Enduring Technology*, 62 J. PETROLEUM TECH. 26, 27 (2010) ("The object of [fracking] was to break up, or rubblize, the oil-bearing formation to increase both initial flow and ultimate recover of oil.").

¹⁴ *Id.* at 27-8.

¹⁵ Today in Energy, *Shale Gas is a Global Phenomenon*, U.S. ENERGY INFORMATION ADMINISTRATION (Apr. 5, 2011), <https://www.eia.gov/todayinenergy/detail.php?id=811>.

2. The Process of Hydraulic Fracturing

Hydraulic fracturing is a complex process that occurs in three stages. Before the fracking process can begin, the operator must first drill a well like those used in traditional drilling operations. This process requires the operator to “[obtain] the required land use approvals, leasing rights, and a permit to drill.”¹⁶ Next, a rig drills a vertical borehole until it reaches the shale level, which can be anywhere from 4,000 to 8,000 feet underground.¹⁷ The drill bit will then be horizontally deviated and drilled 3,000 to 5,000 feet through the rock formation from the original vertical bore.¹⁸ Once the wellbore has been drilled and cased, the fracking process can begin. During the first stage, a pad of fracking fluid is pumped into the well at a high pressure to create vertical fractures in the shale.¹⁹ Fracking fluid, which is most commonly made up of a water-polymer solution and should have a moderately high viscosity, must be capable of opening and extending fractures into the rock.²⁰ Next, both fracking fluid and proppants – granular material such as sand – are pumped into the well to extend the fractures and hold them open.²¹ In the last stage, the fracking fluid is pumped out of the well, “creat[ing] channels for the oil and gas to flow through the reservoir into the well.”²²

The vertical fractures created by the fracking process are “paper-thin,” but their volume is “directly proportional to the volume of the frac[king] fluid.”²³ Furthermore, fracture length is “inversely related to the height of the fracture,” with “lower fracture heights correspond[ing] to longer fractures with the same volume of frac[king] fluid pumped.”²⁴ Although fracture length and height are more difficult to determine than fracture width, they can be estimated with some equations.²⁵ Fractures will generally range from a few feet to 3,000 feet in length. Because the desired length of fractures is “inversely related to the permeability of the reservoir rock...lower permeability reservoirs require longer induced fractures.”²⁶ Longer fractures, which result in “greater production rates and ultimate

¹⁶ Hannah Wiseman, *Regulatory Adaptation in Fractured Appalachia*, 21 VILL. ENVTL. L.J. 229, 236 (2010).

¹⁷ William Yukstas, *Managing Fractions: The Role of Local Government in Regulating Unconventional Natural Gas Resources – Recommendations for New York*, 11 CARDOZO PUB. L. POL’Y & ETHICS J. 563, 569 (2013).

¹⁸ *Id.* Wiseman, *supra* note 16, at 237.

¹⁹ Burney, *supra* note 7, at 19-02.

²⁰ Fracking fluid typically consists of ninety percent water, on-half percent of chemical additives, and nine and one-half percent of sand. Chemical additives include table salt, laundry detergent, cosmetics thickener, washing soda or soap, deodorant, and food additives. American Petroleum Institute, *Hydraulic Fracturing: Unlocking America’s Natural Gas Resources*, API (Aug. 2017), <https://www.api.org/~media/Files/Oil-and-Natural-Gas/Hydraulic-Fracturing-primer/Hydraulic-Fracturing-Primer.pdf>. Burney, *supra* note 7, at 19-02.

²¹ John A. Harper, *The Marcellus Shale – An Old “New” Gas Reservoir in Pennsylvania*, 38 PA. GEOLOGY 2, 10 (2008). Burney, *supra* note 7, at 19-02.

²² Burney, *supra* note 7, at 19-02.

²³ William Kappel, U.S. Geological Survey, Remarks at the Cornell Law School 2011 Energy Conference: Gas Drilling, Sustainability & Energy Policy (Apr. 2, 2011). Burney, *supra* note 7, at 19-02.

²⁴ Burney, *supra* note 7, at 19-02.

²⁵ *Id.*

²⁶ *Id.*

production,” can surpass the operator’s lease boundary, causing trespass on another lease.²⁷

B. Rule of Capture

The rule of capture is a state common law doctrine applicable to oil and gas extraction. Under the rule of capture, “[t]he owner of a tract of land acquires title to the oil and gas which he produces from wells drilled thereon, though it may be proved that part of such oil or gas migrated from adjoining lands.”²⁸ This doctrine was developed by American courts “in a time of relative ignorance about oil and gas production, through analogy to the law of wild animals” and percolating groundwater.²⁹ Courts confronted with the issue of oil and gas ownership used these two analogies to develop and rationalize the rule of capture’s application to oil and gas.³⁰ For example, in *Westmoreland & Cambria Natural Gas Co. v. De Witt*, the court stated:

Gas, it is true, is a mineral; but it is a mineral with peculiar attributes, which require the application of precedents arising out of ordinary mineral rights, with much more careful consideration of the principles involved than of the mere decisions. Water also is a mineral; but the decisions in ordinary cases of mining rights, etc. [*sic*] have never been held as unqualified precedents in regard to flowing, or even to percolating, waters. Water and oil, and still more strongly gas, may be classed by themselves, if the analogy be not too fanciful, as minerals [*ferae naturae*]. In common with animals, and unlike other minerals, they have the power and the tendency to escape without the volition of the owner. Their ‘fugitive and wandering existence within the limits of a particular tract [is] uncertain,’ ...³¹

Shortly after the *De Witt* case, the U.S. Supreme Court recognized the rule of capture in *Brown v. Spilman*:

[Petroleum oil and gas] belong to the owner of the land, and are part of it, so long as they are on it or in it subject to his control; but when they escape and go into other land, or come under another's control, the title of the former owner is gone. If an adjoining owner drills his own land, and taps a deposit of oil or gas, extending under his neighbor's field, so that it comes into his well, it becomes his property.³²

²⁷ *Id.*

²⁸ Howard R. Williams and Charles J. Meyers, WILLIAMS & MEYERS OIL AND GAS LAW § 204.4 (Patrick H. Martin and Bruce M. Kramer, 5th ed. authors 2013).

²⁹ Burney, *supra* note 7, at 19-03. Bruce M. Kramer & Owen L. Anderson, *The Rule of Capture – An Oil and Gas Perspective*, 35 ENV’T. L. 899, 904 (2005).

³⁰ *Id.* at 905.

³¹ *Westmoreland & Cambria Natural Gas Co. v. De Witt*, 18 A. 724, 725 (Pa. 1889).

³² *Brown v. Spilman* 155 U.S. 670 (1895).

This rationale assumes that oil and gas, like water and wild animals, are of a wild and “fugitive” nature and move freely throughout rock formations without respect for property lines. Because the landowner is believed not to have any real or lasting possession over the substances, courts limited an owner’s liability for “capturing” oil and gas originating from another person’s property. Courts also rationalized the rule of capture by an inability to “determine the ownership of natural gas or oil located in an underground pool.”³³ Because courts generally could not identify where captured oil and gas originated or to trace its path of migration, the rule of capture seemed like “an obvious answer to the problem.”³⁴

When the rule of capture is applied to cases where a property owner uses wells on their own property to draw natural gas from under an adjoining property, the doctrine limits the owner’s liability to the adjoining property owner.³⁵ In its infancy, the only restriction on the doctrine was that property owners capture oil and gas legally.³⁶ Initially, the only remedy available to the owner of the adjoining property was to “go and do likewise.”³⁷ By limiting trespass liability, the doctrine worked to “encourage the development and exploitation of natural resources in the U.S.”³⁸ This encouragement, however, has led at times to excessive drilling, which creates inefficiency and waste due to low pressure in the reservoir.³⁹ For example, because drilling depends on the pressure inside a reservoir to naturally push oil and gas to the surface, over-drilling can prematurely lower the reservoir’s pressure, creating nonproductive wells and wasting the oil and gas that could have been accessed had the pressure been higher.⁴⁰ Given that the early or pure form of the rule of capture showed a “lack of concern for the rights of other owners over a common source of supply,” courts in later cases developed correlative rights that limit the doctrine.⁴¹

Correlative rights are “limits to, or modifications of, the pure form of the rule of capture, be they imposed by courts or by legislative bodies.”⁴² The doctrine of correlative rights was initially discussed in a series of decisions handed down by both the Indiana Supreme Court and the U.S. Supreme Court.⁴³ These decisions validated the idea that states can limit mineral owners’ rights to produce under the rule of capture to prevent waste.⁴⁴

In *Townsend v. State*, the appellant challenged the validity of an 1894 Indiana state statute providing that it was wasteful and unlawful for

³³ *Briggs v. Southwestern Energy Prod. Co.*, 184 A.3d 153 (2018).

³⁴ Eugene Kuntz, *The Law of Capture*, 10 OKLA. L. REV. 406, 406 (1957).

³⁵ Danielle Quinn, *A Fracking Fragile Issue: Courts Continue to Tiptoe around Subsurface Trespass Claims*, 27 VILL. ENVTL. L.J. 1, 9 (2016).

³⁶ Kramer, *supra* note 29, at 910-11.

³⁷ *Barnard v. Monongahela Natural Gas Co.*, 65 A. 801, 802 (Pa. 1907).

³⁸ Aaron Stemplewicz, *The Known “Unknowns” of Hydraulic Fracturing: A Case for a Traditional Subsurface Trespass Regime in Pennsylvania*, 13 DUQ. BUS. L.J. 219, 226 (2011).

³⁹ *In re W. Land Servs. Inc., v. Dep’t. of Env’t. Conservation*, 26 A.D.3d 15, 17 (N.Y. App. Div. 3d Dep’t. 2005).

⁴⁰ Quinn, *supra* note 35, at 2.

⁴¹ Kramer, *supra* note 29, at 910.

⁴² *Id.* at 912.

⁴³ *Id.* at 911-12.

⁴⁴ *Id.*

any company, corporation, or person to use natural gas for the purpose of lighting flambeau lights.⁴⁵ The Indiana State Court held that preventing owners from “wasting the gas to the injury of others or to...the public” was within the scope of the state’s police power.⁴⁶ In this and later cases, the Court clearly concluded that waste of gas from common reservoirs would constitute an injury to the public that could be regulated. The Court based its holding on *People’s Gas Co. v. Tyner*, in which the Indiana Supreme Court had previously stated that property owners must practice “due regard” for the rights of others in exercising their property rights.⁴⁷ However, the *Townsend* court held that the “due regard” property owners owe to others is to not create a public nuisance.⁴⁸

Three years later, in *Ohio Oil Co. v. Indiana*, however, the U.S. Supreme Court held that “due regard” prevented property owners from doing more than just creating a public nuisance—it also prevented property owners from wasting oil and gas.⁴⁹ The Supreme Court held that Indiana could enjoin the Ohio Oil Company from “wasting natural gas by allowing it to escape into the air in violation of the conservation statute.”⁵⁰ Although the rule of capture would typically have prevented the State from limiting the property rights of Ohio Oil, since property owners were previously free to use captured oil and gas however they pleased as long they did not create a public nuisance, the Court reasoned that wasting the oil and gas represented an “annihilation of the right of the [other property owners.]”⁵¹ Because the Indiana state legislature has the power to protect all the collective owners and secure just distribution of oil and gas, the Court found that the state legislature could legally prevent waste of oil and gas in order to meet that end.⁵² And because the Court held that only the State has the ability to modify property rights secured by the rule of capture, this case is often read as merely “the starting point for those who assert that the rule of capture includes a correlative rights component.”⁵³

Correlative rights were firmly and indisputably established by the Indiana Supreme Court in *Manufacturers’ Gas and Oil Co. v. Indiana Natural Gas & Oil Co.*⁵⁴ There, a mineral owner attempted to enjoin an adjacent neighbor from using artificial pumping devices to capture a disproportionate amount of natural gas from the common source of supply.⁵⁵ The Court held that the right to prevent property owners from capturing an unequal amount of oil and gas from a common reservoir, thereby destroying their neighbor’s right to also obtain oil and gas from the reservoir, lies with other property owners as well as the State.⁵⁶ The holding created, “conclusively, a correlative rights component to the

⁴⁵ 47 N.E. 19, 20 (Ind. 1897).

⁴⁶ *Townsend*, 47 N.E. at 21.

⁴⁷ 31 N.E. 59 (Ind. 1892).

⁴⁸ *Townsend*, 47 N.E. at 21 (quoting *People’s Gas Co. v. Tyner*, 31 N.E. 59 (Ind. 1892)).

⁴⁹ 177 U.S. 190 (1900).

⁵⁰ *Kramer*, *supra* note 29, at 913.

⁵¹ *Ohio Oil Co. v. Ind.*, 177 U.S. 190, 209-10 (1900).

⁵² *Id.* at 210.

⁵³ *Kramer*, *supra* note 29, at 915.

⁵⁴ 57 N.E. 912 (Ind. 1900).

⁵⁵ *Id.* at 912-3.

⁵⁶ *Id.* at 916.

ownership of natural gas.”⁵⁷ In order to define the scope of ownership rights, the Court laid out the following factors:

Natural gas in the ground is so far the subject of property rights in the owners of the superincumbent lands, that while each of them has the right to bore or mine for it on his own land, and to use such portion of it as, when left to the natural laws of flowage, may rise in the wells of such owner and into his pipes, no one of the owners of such lands has the right, without the consent of all the other owners, to induce an unnatural flow into or through his own wells, or to do any act with reference to the common reservoir, and the body of gas therein, injurious to, or calculated to destroy, it....But the limitation is upon the manner of taking. So in the case of natural gas, the manner of taking must be reasonable, and not injurious to, or destructive of the common source from which the gas is drawn.⁵⁸

The *Manufacturers’ Gas and Oil Co.* case established three limitations, or correlative rights, on the rule of capture: (1) owners can only capture natural gas flow; (2) owners cannot injure the common source of supply; and (3) owners cannot destroy the common source of supply.⁵⁹

Courts have also limited the rule of capture by preventing production in a manner that is either reckless or illegal. In *Elliff v. Texon Drilling Co.*, the defendant acted negligently in allowing one of its wells to blow out and burn.⁶⁰ The well was located on a property adjacent to the plaintiff’s and produced from a common source.⁶¹ When the well blew out, oil drained from the shared reservoir, and the well cratered, creating a hole that eventually enveloped and destroyed the plaintiff’s well.⁶² The *Elliff* court held that the rule did not protect Texon Drilling Co. from liability because the company acted negligently and recklessly in their operations, preventing the plaintiffs from recovering their portion of the oil and gas.⁶³ This case confirmed that negligent and reckless behavior limited the rule of capture’s protection.

Courts have further held that the rule of capture does not shield defendants from liability for illegal actions. For example, in *People’s Gas*

⁵⁷ Kramer, *supra* note 29, at 916.

⁵⁸ *Manufacturers’ Gas*, 57 N.E. at 915.

⁵⁹ This limitation is not uniform throughout state courts. Pennsylvania and Kentucky, for instance, do not. In Pennsylvania, the Supreme Court held in *Jones v. Forest Oil Co.*, 44 A. 1074 (Pa. 1900) that oil and gas operators could use any appliances known to the trade to make well production as large as possible. In Kentucky, the plaintiff drilled wells in the same field as the defendant, who then installed compressors to increase the defendant’s production and decrease the plaintiff’s production. The court held that the plaintiff’s only remedy was the offset drilling rule. *United Carbon Co. v. Campbellsville*, 18 S.W.2d 1110 (Ky. App. 1929). The leading treatise on oil and gas law at the time, *The Law of Oil and Gas*, did make a distinction between the two substances, noting that rule of capture should allow artificial production techniques to be used in oil production, but not in the production of natural gas. § 32 (3rd ed. 1918). *Manufacturers’ Gas*, 57 N.E. at 915; Kramer, *supra* note 29, at 916.

⁶⁰ 210 S.W.2d 558, 559 (Tex. 1948).

⁶¹ *Id.*

⁶² *Id.*

⁶³ *Id.* at 562.

Co. v. Tyner, the defendant sought to enjoin the plaintiff from shooting nitroglycerine down a well to increase natural gas production. The Indiana Supreme Court held that the rule of capture did not protect the plaintiff from liability because the plaintiff's shooting of nitroglycerine constituted a public nuisance.⁶⁴ With the Court basing its holding on the illegality of the plaintiff's actions, *Tyner* suggests that illegal actions are not protected by the rule of capture.⁶⁵ This proposition has been confirmed by later cases.⁶⁶ Because the rule of capture does not protect illegal actions, operators are liable for surface and subsurface trespass. Therefore, the rule of capture applies only when the operator's drilling occurs on and under the land where the operator has a property right.⁶⁷

Although the rule of capture allows landowners to capture oil and gas through wells on their own property—even if they escaped from neighboring property—courts have clearly limited the scope of the rule of capture. Every owner must have a fair opportunity to produce from a common reservoir. Furthermore, many states have enacted waste conservation statutes to prevent the “inefficient use of oil and gas resources by their lawful owner or producer.”⁶⁸ These statutes range from regulation of plugging abandoned wells and drilling operations to spacing and pooling requirements.⁶⁹

C. Subsurface Trespass

The concept of property ownership implicitly includes the right to exclude physical and unauthorized breaches of property by others.⁷⁰ Trespass is defined as “an unauthorized intrusion or invasion of private premises of another” that must be physical in nature.⁷¹ The Restatement (Second) of Torts states that “[o]ne is subject to liability to another for trespass [when]...he *intentionally* enters land in the possession of the other, *or causes a thing or a third person to do so*.”⁷² Although trespass is most commonly the result of surface intrusions, subsurface intrusions do occur. Neither the courts nor a legislature has settled what constitutes a subsurface trespass yet. The law does, in some instances, “recognize[] both airspace and subsurface intrusions” as actionable torts, but that recognition is not consistent.⁷³ Unlike the rule of capture, which allows landowners to

⁶⁴ 31 N.E. 59 (Ind. 1892).

⁶⁵ *Id.* at 60.

⁶⁶ See *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558, 562 (Tex. 1948) (“No owner should be permitted to carry on his operations in...lawless irresponsibility...”).

⁶⁷ See *Quinn*, *supra* note 35, at 15.

⁶⁸ See W.L. Summers, *THE LAW OF OIL AND GAS WITH FORMS VOL. 1 SECTIONS 1.1 TO 6.45* 159-468 (Thompson West, 3rd ed. 2004) (discussing legislative regulation of waste prevention from different states by giving an overview of each state's regulation, as well as detailing different spacing and pooling statutes in many states).

⁶⁹ *Id.* at 159-468.

⁷⁰ *Kaiser Aetna v. United States*, 444 U.S. 164, 176 (1979).

⁷¹ Patrick H. Martin & Bruce M. Kramer, *WILLIAMS & MEYERS MANUAL OF OIL AND GAS TERMS* 1175 (LEXISNEXIS 17th ed. 2018). Colleen E. Lamarre, *Owning the Center of the Earth: Hydraulic Fracturing and Subsurface Trespass in the Marcellus Shale Region*, 21 *CORNELL J.L. & PUB. POL'Y* 457, 470 (2011).

⁷² Restatement (Second) of Torts § 158 (Am. Law Inst. 1965).

⁷³ *Quinn*, *supra* note 35, at 13 (noting that *Hannabalsen v. Sessions*, 90 N.W. 93 (Iowa 1902) recognized airspace trespass, while *Hastings Oil Co. v. Texas Co.*, 234 S.W.2d 389 (Tex. 1950) recognized subsurface trespass). See *U.S. v. Causby*, 328 U.S. 256 (1946).

capture oil and gas from a neighboring property without intruding onto the neighboring property, subsurface trespass involves an improper physical intrusion by landowners onto a neighboring property.

The *ad coelum* doctrine gets its name from the Latin phrase *cujus est solum ejus est usque ad coelum et ad inferos*, which means that landowners own everything above and beneath the soil.⁷⁴ This doctrine recognized airspace and subsurface intrusions as actionable. For example, the New York Supreme Court's ruling in *Butler v. Frontier Telephone Company* demonstrates the power the doctrine once had in protecting a property owner's air space.⁷⁵ In this case, the plaintiff brought an ejectment suit against a telephone company for the placement of a telephone wire above its property.⁷⁶ In holding that the property owner had an action in ejectment, the court relied on the *ad coelum* doctrine:

What is "real property?" What does the term include so far as the action of ejectment is concerned? The answer to these questions is found in the ancient principle of law: *Cujus est solum, ejus est usque ad coelum et ad inferos*. . . "Usque ad coelum" is the upper boundary, and while this may not be taken too literally, there is no limitation within the bounds of any structure yet erected by man. So far as the case before us is concerned, *the plaintiff as the owner of the soil owned upward to an indefinite extent*. He owned the space occupied by the wire and had the right to the exclusive possession of that space which was not personal property, but a part of his land. According to fundamental principles and within the limitation mentioned[,] space above land is real estate the same as the land itself. The law regards the empty space as if it were a solid, inseparable from the soil, and protects it from hostile occupation accordingly.⁷⁷

The *ad coelum* doctrine was historically interpreted in an almost literal manner by the law, allowing property owners to succeed on trespass, nuisance, and ejectment cases after an intrusion of their airspace and subsurface land.⁷⁸ Nonetheless, the development of both the oil and gas and the airline industries limited its reach, with courts finding that the doctrine had no place in the modern world.

However, because landowners "must have ownership rights and control with respect to some distance above and below the surface" in order to have the right to use and enjoy their property, when a subsurface

⁷⁴ Keith B. Hall, *Hydraulic Fracturing: If Fractures Cross Property Lines Is There An Actionable Subsurface Trespass?*, 54 LSU J. ARTS. 1, 20 (2014).

⁷⁵ 102 N.W. 12 (Wis. 1905).

⁷⁶ *Id.*

⁷⁷ *Butler v. Frontier Telephone Co.*, 186 N.Y. 486, 491 (1906) (emphasis added).

⁷⁸ *Hooper v. Herald*, 154 Mich. 529, 118 N. W. 3 (1908) (holding that a fence on neighboring land that deprived the property owner of the use of his airspace was a trespass); *Crocker v. Manhattan Life Ins. Co.*, 61 App. Div. (N.Y.), 226 (1901) (ruling that a neighboring land owner's three-hundred foot wall, iron shutters, and cornice, which projected onto the property owner's property by no more than three inches was impermissible encroachment); *Norwalk Heating Lighting Co. v. Vernam*, 75 Conn. 662 (1903) (holding that a wooden structure that projected over neighboring land without touching it was an invasion of the neighboring landowner's property right).

intrusion occurs is uncertain.⁷⁹ For example, courts have uniformly held that a subsurface trespass occurs when a well begins on one tract of land but bottoms on an adjacent tract of land without consent.⁸⁰ This situation occurs as a result of directional or slant drilling.⁸¹ Courts have consistently held that directional drilling that crosses boundary lines is a subsurface trespass because “an unauthorized, direct, and physical intrusion” has occurred.⁸² For example, in *Hastings Oil Co. v. Tex. Co.*, Texas Company sought an injunction against Hastings, claiming that Hastings had drilled three wells that deviated and bottomed on Texas Company’s land.⁸³ The Texas Supreme Court held that Hastings had committed a continuing trespass because it “subtract[ed] from the very substance of the estate...”⁸⁴

In cases of injection disposal, however, courts have not always found subsurface trespass to be actionable. At liquid disposal sites, liquid waste is pumped into permeable rock formations, creating a disposal well. As more waste is pumped into the disposal well, the waste can move across subsurface property lines.⁸⁵ In most cases of this nature, courts have refused to find an actionable trespass, holding that the plaintiff must be able to prove actual damages or interference with some reasonable, anticipated use of the subsurface.⁸⁶ For example, in *Chance v. BP Chemicals, Inc.*, plaintiffs brought a class action suit against BP for trespass.⁸⁷ The plaintiffs claimed that fluids from BP’s injection disposal well leaked into the subsurface of their properties.⁸⁸ Although the plaintiffs argued that proof of a subsurface intrusion alone was enough to recover, the Ohio Supreme Court chose to reject the *ad coelum* doctrine, holding that ownership extends only to the depths that the owner can use and occupy.⁸⁹ To recover, the plaintiffs needed to show “physical damage or actual interference with the reasonable and foreseeable use of the properties.”⁹⁰ Unlike the directional drilling cases, *Chance* demonstrates that the mere presence of physical intrusion into another’s subsurface will not be enough for actionable trespass in disposal cases.

The Restatement (Second) of Torts provides its own approach to the subsurface intrusion issue, noting that “a trespass may be committed on, beneath, or above the surface of the earth.”⁹¹ The Restatement does not, however, provide much guidance on how far up or down that right extends, nor does it comment on whether a plaintiff needs to show actual damages to recover.⁹²

⁷⁹ Hall, *supra* note 74 at 18. I will not discuss airspace intrusions as they are outside the scope of the Comment.

⁸⁰ Quinn, *supra* note 35, at 15.

⁸¹ Directional drilling is “[t]he drilling of a well that departs materially from the vertical.” MANUAL OF OIL AND GAS TERMS, *supra* note 71, at 291.

⁸² Lamarre, *supra* note 71, at 475 (2011).

⁸³ 234 S.W.2d 389, 390 (Tex. 1950).

⁸⁴ *Id.* at 398.

⁸⁵ Hall, *supra* note 74 at 25-26.

⁸⁶ *Id.* at 26.

⁸⁷ 670 N.E.2d 985, 986 (Ohio 1996).

⁸⁸ *Id.* at 986-87.

⁸⁹ *Id.* at 991-92.

⁹⁰ *Id.* at 993.

⁹¹ Restatement (Second) of Torts § 159 (AM. LAW INST. 1965).

⁹² *Id.*

III. THE RULE OF CAPTURE'S INCORRECT APPLICATION TO
SUBSURFACE INTRUSIONS RESULTING FROM HYDRAULIC
FRACTURING

Courts that have faced the issue of subsurface intrusions resulting from fracking have revolved their arguments around whether the rule of capture precludes liability. In *Coastal Oil & Gas Corp. v. Garza Energy Trust*, for example, plaintiffs presented the Texas Supreme Court with issue of “whether subsurface hydraulic fracturing of a natural gas well that extends into another’s property is a trespass for which the value of gas drained as a result may be recovered as damages.”⁹³ Although the court ultimately sidestepped the issue, ruling instead on a separate standing issue, it did note in dicta that the rule of capture precluded recovery.⁹⁴ In a large portion of the opinion, the majority justified its use of the rule of capture to preclude recovery, relying largely on public policy reasons.⁹⁵ The court’s application of the rule of capture to the subsurface trespass issue, however, was improper. In this part, I argue that the rule of capture has no proper application to the issue of subsurface trespass.

A. *The Rationales for the Rule of Capture Do Not Apply*

When the rule of capture was first applied to oil and gas law, courts justified its use as one of necessity. The courts considered the doctrine to be necessary because they believed that oil and gas were fugacious in nature and incapable of being traced to their point of origin. However, given that these rationales do not apply to shale gas or fracking, as discussed next, the rule of capture’s application to hydraulic fracturing cannot be justified.

1. Rationale One: Oil and Gas are Fugitive in Nature

As stated in Part I, when the courts began applying the rule of capture to oil and gas law, one of the two rationales they provided for the application of the doctrine was the supposed transitory nature of oil and gas.⁹⁶ For example, in *Wettengel v. Gormley*, the Pennsylvania Supreme Court reasoned that “the vagrant character of [oil and gas], and the porous sand rock in which it is found and through which it moves, fully justifies [the rule of capture].”⁹⁷ Courts also justified applying the rule of capture by comparing the minerals to wild animals, claiming that, like wild animals, oil and gas had a migratory and public nature that made them, essentially, common property.⁹⁸ For example, the Kentucky Court of

⁹³ 268 S.W.3d 1, 4 (Tex. 2008).

⁹⁴ *Id.* at 12-13.

⁹⁵ *Id.* at 34-36.

⁹⁶ *See supra*, Part I.B.

⁹⁷ 160 Pa. 559, 567 (1894).

⁹⁸ It is notable that this analogy, along with the one to percolating water, has been criticized almost since it was first used. *See* A.W. Walker, Jr., *Property Rights in Oil and Gas and Their Effect Upon Police Regulation of Production*, 16 TEX. L. REV. 370, 370-71 (1938) (“It is unfortunate that our law as to oil and gas developed before scientific information was available as to the exact nature of oil and gas reservoirs. Throughout all the earlier decisions are to be found statements indicating the prevailing erroneous opinion that oil and gas in their natural state possessed the quality of free

Appeals in *Hammonds v. Central Kentucky Natural Gas Co.* reasoned as follows:

In seeking for an analogous condition in the law, the courts, since the early Pennsylvania case, have compared natural gas and oil to that of animals *ferae naturae*. The analogy, as we have seen[,] formed the basis of the all but universal doctrine of property in these wandering minerals. So we may look to that analogous law.⁹⁹

In applying the rule of capture, the courts examined the characteristics of oil and gas and applied analogous law. Because the courts examined the nature of oil and gas to determine the correct analogous law to apply, it is proper to examine the character of oil and gas in shale formations to determine whether the analogous law applied is still proper.¹⁰⁰ As explained in Part I, shale gas is understood to be trapped and unable to move through the reservoir. Gas in shale reservoirs and other low-permeability formations do not move and, as such, do not have a migratory nature.¹⁰¹ For that reason, applying the law that was applied to wild animals and percolating waters is no longer analogous—indeed, it is erroneous.

This conclusion cannot be avoided when looking at the arguments made by courts at the time the rule of capture was applied to oil and gas law. For example, in the *Hammonds* case, noted above, the court claimed that if a person owns land and a stream runs through that land, the landowner does not own the fish.¹⁰² But the court also claimed that “a qualified property in an individual may be acquired by catching and confining fish within a private pond so they cannot escape.”¹⁰³ Like fish in a private pond, which cannot escape, gas in low permeability formations cannot escape. The owner of the land, therefore, can be said to own the oil and gas in these formations and the rule of capture cannot be properly applied. Similarly, in *Wettengel v. Gormley*, the Pennsylvania Supreme Court noted that the rule of capture does not apply to coal because “the stratum of coal is as fixed and permanent in its character as are the strata of superincumbent rocks and earth.”¹⁰⁴ If the rule of capture cannot be applied to coal because it is “fixed,” then it cannot be applied to oil and gas in the shale level since they too are “fixed.”

Although oil and gas are not solids like coal, which means that they can move and respond to changes in pressure, their chemical state has no bearing on the improper application of the rule of capture. The rule of capture applies in situations where the target can move freely, such as

migration. Even as late as 1921, one of the Texas courts indulged in the fanciful statement that oil and gas ‘are supposed to percolate restlessly about under the surface of the earth, even as the birds fly from field to field and the beasts roam from forest to forest.’ In the absence of common-law precedent, and without the benefit of scientific information, it is not surprising that the courts sought by analogy to compare oil and gas to other types of property such as wild animals [and] subterranean water... These early analogies in the light of modern scientific information have been disproven...”

⁹⁹ *Hammonds v. Central Ky. Natural Gas Co.*, 75 S.W.2d 204, 206 (1934).

¹⁰⁰ *Id.*

¹⁰¹ Ground Water Protection Council, *supra* note 1, at 14.

¹⁰² 75 S.W.2d 204, 206 (1934).

¹⁰³ *Id.*

¹⁰⁴ 160 Pa. 559, 567 (1894).

water and animals.¹⁰⁵ The chemical state of the object at issue has not historically had any bearing on whether the rule should be applied.¹⁰⁶ Rather, the rule of capture considers whether the objects or substances at issue have the ability to move unconstrained.¹⁰⁷ Despite shale oil and gas not being solids, they do not have the freedom to migrate at will, making the rule of capture improper.¹⁰⁸

2. Rationale Two: It Is Impossible to Determine Ownership of Oil and Gas

The second rationale for the application of the rule of capture to oil and gas law was the inability to determine where captured oil and gas originated from underground.¹⁰⁹ For example, legal scholar Eugene Kuntz noted that “protection of ownership in such substances was an entirely different matter when the substance could not be identified and traced in its migrations.”¹¹⁰ Furthermore, when describing why the rule of capture was adopted, Professor M. K. Woodward noted that “[t]he Rule of Capture developed as a matter of necessity. When the early cases were decided, it was impossible...to determine the extent to which the production represented drainage from neighboring land.”¹¹¹ By the 1960s, however, technology became available that made it possible to estimate how much oil or gas was drained from a neighboring tract. As Professor Woodward notes, the original rationale for the application of the rule of capture “has lost much of its force since remarkably accurate estimates can now be made in the early stages of the development of a pool.”¹¹² Similarly, other legal scholars have noted that “uncontradicted evidence may disclose the proportion of the oil and gas that is drained from each tract.”¹¹³

With hydraulic fracturing, the questions are whether it can be determined that fractures have extended into a neighboring tract or property and how much extracted gas came from the neighboring property. In 1998, Professor Laura Burney stated that fracture width can be approximated by volume.¹¹⁴ She stated that fracture length is estimable through equations.¹¹⁵ Although estimates are not exact, “the effective length of a fracture can be fairly closely determined after the fracture operation.”¹¹⁶ Furthermore, improvements in microseismic fracture mapping and analysis have greatly improved the ability to measure fracture length, height, and volume, with geophysicists noting that “microseismic images alone can tell us a lot about the basic location and simple geometry (e.g. fracture length and height) of hydraulic

¹⁰⁵ Kramer, *supra* note 29, at 904.

¹⁰⁶ *See id.* at 906.

¹⁰⁷ *Id.*

¹⁰⁸ *Ground Water Protection Council, supra* note 1, at 14.

¹⁰⁹ *See supra*, Part I.B.

¹¹⁰ Kuntz, *supra* note 34, at 406.

¹¹¹ *Ownership of Interests in Oil and Gas*, 26 OHIO ST. L.J. 353, 356-57 (1965).

¹¹² *Id.* at 357.

¹¹³ Eugene Kuntz et al. *CASES AND MATERIALS ON OIL AND GAS LAW 15* [hereinafter *Cases and Materials*] (West Publishing Co., 1st ed. 1986).

¹¹⁴ Burney, *supra* note 7, at 19-02.

¹¹⁵ *Id.*

¹¹⁶ *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 44 (2008).

fractures.”¹¹⁷ Fracture length estimates from microseismic images have been “consistent with observation of offset well pressure interference during production.”¹¹⁸ Even in instances where fracture growth is complex, “there are documented cases where fracture complexity interpreted from microseismic images is confirmed by frac[k] water [killing] offset wells.”¹¹⁹ Surface and downhole tiltmeters also “provide relative fracture orientation and length data.”¹²⁰ Although science cannot provide exact determinations of fracture length, it is no longer the case that it is impossible to determine ownership of oil and gas.

Because we can determine estimates of both fracture length and effective length, and because we can determine how much oil and gas has been extracted from each tract, the second rationale for applying the rule of capture to oil and gas law is no longer applicable.¹²¹ Therefore, its application to shale oil and gas is no longer necessary. In response, some courts have argued that since fracture length and the amount of gas coming from each tract can only be *estimated*, the rule of capture is still a necessity for shale oil and gas because determining how much natural gas was drained from adjacent tracts presents a problem of evidentiary difficulty.¹²² However, as the majority noted in *Briggs v. Southwestern Energy Production Company*, “such difficulty, in itself, is [not] a sufficient justification for precluding recovery,” especially since juries have been resolving conflicting expert testimony in various legal systems since the thirteenth century.¹²³ Furthermore, U.S. Supreme Court cases governing the admissibility of expert testimony in the federal court system show that the legal system can handle expert testimony.¹²⁴

When the rule of capture was initially applied to oil and gas law, it was done out of necessity.¹²⁵ At the time, oil and gas were believed to be migratory in nature.¹²⁶ Furthermore, it was impossible to measure how much oil and gas might have come from a neighboring tract of land.¹²⁷ Because of these obstacles, the courts adopted the rule of capture as one of the fundamental principles of oil and gas law.¹²⁸ These two rationales, however, no longer apply to shale oil and gas since shale oil and gas are known to be trapped in low-permeability rock, unable to move.¹²⁹

¹¹⁷ *Microseismic Fracture Mapping, Frac Monitoring – Results Realized*, MICROSEISMIC, <https://www.microseismic.com/solutions-category/microseismic-fracture-mapping-frac-monitoring-results-realized/>, Shawn C. Maxwell, *What Does Microseismic Tell Us About Hydraulic Fracture Deformation*, 36 CANADIAN SOC’Y EXPLORATION GEOPHYSICISTS RECORDER 30, 41 (2011).

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ Ted Urbancic et al., *Assessing the Effectiveness of Hydraulic Fractures with Microseismicity*, ENG’G SEISMOLOGY GRP. (2002), https://www.esgsolutions.com/sites/esgsolutions.com/files/resource/2002_seg-assessing_hydraulic_fracture_effectiveness.pdf.

¹²¹ Cases and Materials, *supra* note 113, at 15.

¹²² *Coastal Oil & Gas Corp. v. Garza Energy Trust*, 268 S.W.3d 1, 16 (2008).

¹²³ 184 A.3d 153, 163 (2018). K.V. Heard & D. Faust, *Expert Witness and the Legal System: Psychological Aspects*, in INTERNATIONAL ENCYCLOPEDIA OF THE SOCIAL & BEHAVIORAL SCIENCES 5141, 5142 (Elsevier Science Ltd., 2001).

¹²⁴ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993).

¹²⁵ Woodward, *supra* note 111, at 356-57.

¹²⁶ Kramer, *supra* note 29, at 904.

¹²⁷ Woodward, *supra* note 111, at 356-57.

¹²⁸ *See supra*, Part I.B.

¹²⁹ *Ground Water Protection Council*, *supra* note 1, at 14.

Furthermore, technological advances allow for accurate estimates of both fracture length and the amount of oil and gas coming from neighboring tracts.¹³⁰ Because neither of the rationales used to justify the rule of capture's application are present with low-permeability rock and hydraulic fracturing, it is improper for courts to apply this doctrine to cases involving subsurface trespasses resulting from fracking.

B. *Limitations on the Rule of Capture*

Although the rule of capture provides property owners with a broad set of protections, courts have added a number of limitations on the doctrine that are meant to protect all property owners.

1. The Natural Flow Rule

The rule of capture is inapplicable to subsurface trespass resulting from fracking because the rule of capture only precludes liability in cases of natural flow.¹³¹ In establishing limitations on the rule of capture, *Manufacturers' Gas* held that no owner has the right "to induce an unnatural flow into or through his own wells..."¹³² Furthermore, in *Young v. Ethyl Corp.*, the Eighth Circuit Court of Appeals held that the rule of capture does not protect "one who, by force, pushes minerals out from under the land of another when the minerals would remain in place without the application of such force."¹³³ Because oil and gas in shale reservoirs are trapped in tight pores, they do not flow naturally.¹³⁴ Hydraulic fracturing forcefully creates artificial fractures in the reservoir to create flow.¹³⁵ Without hydraulic fracturing, that oil and gas would remain in place. This limitation on the rule of capture precludes the doctrine from protecting subsurface trespass resulting from fracturing.

It is important to note that not every court has embraced this limitation on the rule of capture, leading some commentators to argue that artificial means of increasing flow is not a limit on the rule of capture.¹³⁶ This argument is unpersuasive because it is based on cases that operate under the assumption that oil and gas have a natural flow. Hydraulic fracturing cases can be distinguished from these cases because there is no natural flow in low-permeability formations.

Consider the following scenario: A and B, adjacent property owners, have the same river flowing through their backyards. This river, which is rich in fish, can be accessed by both property owners through their respective tracts of land. B, seeking to capture more fish, throws small bits of food into his part of the river to encourage the fish to congregate on his property. A sues B, claiming that B is stealing A's fish. The court rules in B's favor, holding that because the fish flow naturally through both A and B's properties, B has a right to catch the fish and

¹³⁰ See *supra*, Part II.A.1.

¹³¹ See *supra*, Part I.B.

¹³² 57 N.E. at 915.

¹³³ 521 F.2d 771, 772 (8th Cir. 1975).

¹³⁴ Ground Water Protection Council, *supra* note 1, at 14.

¹³⁵ Ground Water Protection Council, *supra* note 1, at 14.

¹³⁶ See *supra*, Part.I.B. Kramer, *supra* note 29, at 910.

increase their chances of catching them. This example is equivalent to courts allowing for the use of artificial means to increase the flow of oil and gas in conventional drilling methods because the oil and gas is already flowing.

Now, let us say that part of the river meandered further into both A and B's property, creating ponds on both tracts of land. The river which used to feed the ponds has dried up, but the bank still exists. B, seeking to capture the fish in A's pond, decides to throw dynamite in parts of the dry river that used to flow through B's property to encourage A's pond to flow back into the bank and through the back of their property. A again sues B for stealing A's fish. B argues that the dynamite is just another way of increasing their chances of catching fish. The reasoning from this second example, which is equivalent to hydraulic fracturing, is not logical. B is only allowed to use artificial means to increase their chances of catching fish when the fish flow naturally through B's property. When the fish are trapped on A's property and no longer flow through B's property, B cannot argue that the ruling and reasoning from the first case justifies their actions. B no longer has access to A's fish; they are not flowing onto B's property at all without artificial means. To make the analogous argument in the context of hydraulic fracturing would also be a misapplication of the cases that allowed for artificial means of increasing production in traditional drilling.

2. Legal Capture

Courts universally accept that the rule of capture does not apply when illegal means are used to capture the minerals. Once courts clarify what constitutes a subsurface trespass, the rule of capture cannot be used to preclude liability should a jury determine that the elements of the tort have been met. To do so would be to allow the rule of capture to preclude liability for illegal activity, which is uniformly not permissible.¹³⁷

IV. AN ALTERNATIVE TO THE APPLICATION OF THE RULE OF CAPTURE TO FRACKING

Because the law of actionable subsurface trespasses is unsettled, courts have an opportunity to define an actionable tort of subsurface trespass in a way that balances the needs and benefits of the oil and gas industry with protection of small landowners. In this part, I analyze two leading cases on this issue and explore policy consequences of each court's ruling. I then consider a solution presented by Keith B. Hall in *Hydraulic Fracturing: If Fractures Cross Property Lines is there an Actionable Subsurface Trespass?*, adding changes to the first element of the solution that will help to better maintain the balance between the needs of the industry and landowners.¹³⁸ Hall's solution proposes that courts consider the intent of the trespasser and whether the plaintiff can prove actual harm.¹³⁹

¹³⁷ See *supra*, Part I.B.

¹³⁸ Hall, *supra* note 74.

¹³⁹ *Id.* at 53-56.

A. *Policy Considerations: Coastal Oil and Briggs*

Despite the rule of capture's improper application to subsurface trespass resulting from hydraulic fracturing, courts have continued to misapply it, citing several policy considerations as a justification. For example, in *Coastal Oil*, Coastal Oil & Gas Corporation leased minerals from the respondents in a tract of land adjacent to a tract where Coastal Oil held the mineral estate.¹⁴⁰ Both tracts were located on the Vicksburg T formation, "a 'tight' sandstone formation, relatively imporous and impermeable, from which natural gas cannot be commercially produced without hydraulic fracturing..."¹⁴¹ Although Coastal Oil had three wells on the tract it leased from the respondents, it drilled a well on the tract it owned only 467 feet from the boundary of the tract it leased.¹⁴² The length of Coastal Oil's fractures was designed to reach 1,000 feet from the well, despite the fact that "[t]he farthest distance from the well to [the other tract's] lease line was 660 feet."¹⁴³ The respondents sued Coastal, claiming subsurface trespass and resultant loss of royalties.¹⁴⁴ The Texas Supreme Court confronted the question of "whether subsurface hydraulic fracturing of a natural gas well that extends into another's property is a trespass for which the value of gas drained as a result may be recovered as damages."¹⁴⁵ After quickly finding no actionable trespass, a conclusion that lacked any real analysis about whether subsurface intrusions constitute trespass, the Court stated that the rule of capture barred recovery of the \$1 million damages the jury found was owed to the respondents.¹⁴⁶

The Court's application of the doctrine was improper because the rule of capture cannot be applied in situations where the oil or gas was obtained by illegal activity, such as trespass. Without first deciding whether a subsurface intrusion constitutes a trespass and whether Coastal Oil was responsible for trespass, the court had no basis for its determination that the rule of capture should preclude liability. Rather, the Court missed an opportunity to clarify what constitutes an actionable subsurface trespass.

To justify its application of the doctrine, the Court cited four policy considerations. First, the court argued that "the law already affords the owner who claims drainage full recourse."¹⁴⁷ Second, the Court concluded that recovery usurps authority from the Texas Railroad Commission to courts and juries.¹⁴⁸ Third, the Court reasoned that courts cannot determine the value of oil and gas drained from different tracts.¹⁴⁹ Finally, the Court argued that, based on arguments in amicus curiae briefs,

¹⁴⁰ 268 S.W.3d 1, 6 (2008).

¹⁴¹ *Id.* at 6.

¹⁴² 467 feet was the shortest distance to the leased tract as was permissible by the Texas Railroad Commission. *Id.* at 6.

¹⁴³ *Id.* at 7.

¹⁴⁴ *Id.* at 6-7.

¹⁴⁵ *Id.* at 4.

¹⁴⁶ *Id.* at 4.

¹⁴⁷ *Id.* at 14.

¹⁴⁸ *Id.* at 14-15.

¹⁴⁹ *Id.* at 16.

the oil and gas industry does not want or need a change in how the rule of capture is applied to fracking.¹⁵⁰

The Texas Supreme Court's policy argument shows an understandable concern for the oil and gas industry and its impact on the economy. For example, in 2015, the natural gas and oil industry "supported 10.3 million U.S. jobs and added \$1.3 trillion to the nation's economy..."¹⁵¹ In Texas, the oil and gas industry supported almost 2 million jobs and added \$326.3 billion in value to the state's economy.¹⁵² The average income for those in the industry is \$101,181, which is ninety percent higher than the national average.¹⁵³ Additionally, fracking has had a positive effect on the cost of gas in the United States. For example, fracking resulted in lower gas prices in 2015, saving Americans \$540 in fuel costs that year.¹⁵⁴ Fracking is also being credited by economists as the primary reason for the increase in oil supplies and decrease in oil prices.¹⁵⁵ In 2008, the average closing price for natural gas was \$8.86.¹⁵⁶ Because of the fracking boom, that price dropped to \$2.58 in 2019.¹⁵⁷ Although fracking has its own set of environmental problems, it is potentially better for the climate than alternatives such as coal production.¹⁵⁸ Given the severity of the climate crisis, governments and firms should focus on making renewables the primary energy source for consumers, but because renewables are not currently a viable option for large-scale use, fracking currently provides consumers with cheap and consistent energy sources.¹⁵⁹

Significant damages from trespass would result in increased exploration costs, as well as greatly affect the revenue of certain states. Moreover, fear of a trespass claim would likely cause operators to shorten fracture length, leading to decreased gas production and increased waste.¹⁶⁰ In concluding that all subsurface trespass recovery would be precluded by the rule of capture, however, the *Coastal Oil* court failed to

¹⁵⁰ *Id.* at 16-17.

¹⁵¹ Michael Tadeo, *New Study: 10.3 Million U.S. Jobs Supported by Natural Gas & Oil in 2015*, AMERICAN PETROLEUM INST. (Aug. 1, 2017), <https://www.api.org/news-policy-and-issues/news/2017/08/01/10-3-million-us-jobs-supported-by-natura>.

¹⁵² *Study: US oil, gas industry supported 10.3 million jobs in 2015*, OIL & GAS JOURNAL (Aug. 1, 2017), <https://www.ogj.com/general-interest/article/17288322/study-us-oil-gas-industry-supported-103-million-jobs-in-2015>.

¹⁵³ *Id.*

¹⁵⁴ Global Energy Inst., *Brought to You By Fracking: Low Gas Prices*, U.S. CHAMBER OF COMMERCE (July 7, 2016), <https://www.globalenergyinstitute.org/brought-you-fracking-low-gas-prices>.

¹⁵⁵ James Taylor, *Fracking, Lower Gasoline Prices Returned \$1,000 To Household Budgets Last Year*, FORBES (Feb. 3, 2017), <https://www.forbes.com/sites/jamestaylor/2017/02/03/fracking-lower-gasoline-prices-returned-1000-to-household-budgets-last-year/#421d65d030ce>.

¹⁵⁶ *Natural Gas Prices – Historical Chart*, MACROTRENDS, <https://www.macrotrends.net/2478/natural-gas-prices-historical-chart>.

¹⁵⁷ *Id.*

¹⁵⁸ James Conca, *Is Fracking For Gas As Dirty As Coal?*, FORBES (May 5, 2016), <https://www.forbes.com/sites/jamesconca/2016/05/05/is-fracking-for-gas-dirty-enough-for-a-coal-resurgence/#3c3143ae4727>.

¹⁵⁹ Noah Smith, *Fracking Is the Bridge to Renewable Energy*, CRAINS CLEVELAND (Sept. 9, 2019), <https://www.crainscleveland.com/energy-and-environment/opinion-fracking-bridge-renewable-energy>.

¹⁶⁰ Matthew G. Lawson, *Fracking Industry Warns of "Devastating Effects" from Pennsylvania Court Ruling*, JENNER & BLOCK (May 15, 2018), https://environblog.jenner.com/corporate_environmental/2018/05/fracking-industry-warns-of-devastating-effects-from-pennsylvania-court-ruling.html.

consider the impact of its ruling on landowners. This argument is explored in both the *Coastal Oil* dissent and *Briggs*.

In *Briggs*, the appellants asserted claims of trespass and conversion, claiming that Southwestern Energy, who leased oil and gas rights on a tract of land adjoining theirs, was unlawfully extracting natural gas from under their property.¹⁶¹ In response, Southwestern Energy claimed that the rule of capture bars damages for natural gas drainage resulting from fracking.¹⁶² In rejecting *Southwestern's* argument, the *Briggs* court first distinguished fracking from conventional oil and gas extraction methods and then rejected other arguments made in *Coastal Oil* for the application of the rule of capture.¹⁶³ Like the *Coastal Oil* court, which gave almost no consideration to whether subsurface intrusion constitutes a trespass, the *Briggs* court did not discuss the issue of whether there had been a subsurface trespass.¹⁶⁴ Instead, in *Briggs*, the Court merely accepted that a trespass occurred, without considering that the basis of its conclusion, *ad coelum*, might not be applicable two thousand feet from the property's surface.¹⁶⁵

The *Briggs* court's policy argument, which was concerned with how a *Coastal Oil*-like decision would impact landowners, is as compelling as the one described in *Coastal Oil*. The Pennsylvania Superior Court argued that landowners would be negatively affected because they cannot adequately protect their interests through self-help due to fracking's costliness and complexity.¹⁶⁶ Thus, landowners would not have the resources to "go and do likewise."¹⁶⁷ Furthermore, the Court argued that the inability for self-help would lead to unfair outcomes for landowners:

[P]recluding trespass liability based on the rule of capture would effectively allow a mineral lessee to expand its lease by locating a well near the lease's boundary line and withdrawing natural gas from beneath the adjoining property, for which it does not have a lease. Such an allowance would nearly eradicate a mineral lessee's incentive to negotiate mineral leases with small property owners, as the lessee could use hydraulic fracturing to create an artificial channel from beneath an adjoining property, and withdraw natural gas from beneath the neighbor's land without paying a royalty.¹⁶⁸

Because it would be impracticable for landowners, particularly small landowners, to help themselves by drilling their own wells, they would essentially be at the mercy of oil and gas companies and left without

¹⁶¹ 184 A.3d 153, 154 (2018).

¹⁶² *Id.* at 155.

¹⁶³ *Id.* at 155-163.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

¹⁶⁶ *Id.* at 163.

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

protection. As a result, the Pennsylvania Superior Court held that the rule of capture did not preclude liability for the subsurface trespass.¹⁶⁹

B. Hall's Solution: A Balance Between the Oil and Gas Industry and Landowners

In this section, I will present and modify a solution by Keith B. Hall, which represents a balance between industry and landowners. Because the *ad coelum* doctrine has been rejected in modern times, it would be improper to base a decision about whether subsurface intrusions constitute actionable trespass on the doctrine.¹⁷⁰ The trend toward “courts limiting the ability of plaintiffs to recover in trespass for intrusions at high elevation and great depths” confirms its irrelevance in the subsurface intrusion issue.¹⁷¹ To decide whether subsurface intrusions resulting from fracking are actionable, Hall suggests that courts consider the development of the issue in other scenarios, as well as the valid policy concerns raised in both *Coastal Oil* and *Briggs*. A careful analysis of both considerations leads Hall to the solution that subsurface trespass resulting from fracking should only be actionable if: (1) there is proof of harm and (2) the act is intentional.¹⁷²

When analyzing how courts treat subsurface intrusions resulting from a variety of situations, such as slant drilling and injection well sites, one common requirement emerges: proof of harm. In these cases, the plaintiff should be able to show proof of harm by showing that they could “reasonably be expected to exercise exclusive use of the [subsurface] in some manner that would not involve the landowner himself likely causing intrusions into another person’s...subsurface,” and that the operator interfered with that expected use.¹⁷³ As such, mere fractures into the subsurface would not qualify as proof of harm. However, once the operator pumps fracking fluid and extracts natural gas from the adjoining property, the harm element should be easily satisfied. Because this requirement is uniformly accepted in both airspace and subsurface intrusion cases, its application here should not be construed as improper or out of place.¹⁷⁴ In theory, if the plaintiff is not able to show that they have a reasonable use for the subsurface, the intrusion would not constitute an actionable trespass. In a departure from Hall, however, I believe this element should merely be a formality. It should not be difficult for landowners in areas rich in natural gas to prove they can reasonably use their property for the development of that gas. Should this element become exceedingly difficult to prove or be used by the courts to sway the pendulum in favor of industry, it should quickly be abandoned altogether.

Because the Restatement (Second) of Torts states that a person is only liable for trespass if the person had the *intent* to enter another person’s

¹⁶⁹ *Id.*

¹⁷⁰ Owen L. Anderson, *Subsurface “Trespass”: A Man’s Subsurface is Not His Castle*, 49 WASHBURN L.J. 247, 253-54 (2010).

¹⁷¹ Hall, *supra* note 74 at 51.

¹⁷² *Id.* at 52.

¹⁷³ *Id.*

¹⁷⁴ See *supra*, Part I.C.1.

land, Hall focuses the second part of his solution on intentionality. Furthermore, the intent of the company serves to preserve the balance between landowners and industry. To determine whether a subsurface trespass is intentional, Hall advises that courts consider how deep into the adjoining property the fractures go and glean from that number whether the operator designed the fractures to extend significantly beyond its borders.¹⁷⁵ Additionally, he suggests that courts also consider whether the operators “negligently cause the fractures to extend beyond the border for a significantly greater distance than the fractures otherwise would have in the absence of negligence.”¹⁷⁶ If it is clear that the operator intended to fracture into the adjoining property, the intrusion would constitute an actionable trespass.

At this point, the question of how deep into the adjoining property the operator should be allowed to frack becomes an issue. Because operators can control fracture lengths plus or minus five hundred feet, Hall has advocated for a buffer zone of five hundred feet.¹⁷⁷

[N]either Operator nor Neighbor can intentionally use the area within five hundred feet of the property line, unless they accept the possibility that they might unintentionally cause fractures to cross the property line. But if they design their fractures to extend all the way to the property line, accepting the possibility of unintentional subsurface intrusions, they are each accepting the possibility that they will not have exclusive actual use of the five hundred feet of their subsurface that is nearest the property line.¹⁷⁸

Here, both the operator and the neighbor can design fractures to extend to the end of their property line and not worry about potential liability problems. Furthermore, Hall believes that because operators can design fractures up to plus or minus five hundred feet, fractures that extend beyond five hundred feet into the adjoining property can safely be concluded as intentional.¹⁷⁹ Additionally, I propose that this “buffer zone” be adaptable to changing technology. As technological improvements allow for better control of fracture length, the law should respond in kind to preserve the balance between the industry and the landowner. For example, if the ability to control fracture length eventually lowers to three hundred feet plus or minus, the acceptable buffer zone that courts abide by should also drop to three hundred feet. This caveat prevents courts from continuing to apply doctrines that are no longer relevant given scientific discoveries and technological improvements—much as they have done with the rule of capture.

A buffer zone that can vary over time as technology changes is preferable because it considers both the landowner and the oil and gas industry. Because subsurface trespasses extending beyond five hundred feet would be actionable, the landowner will be remedied for the trespass and its consequences. On the other hand, the oil and gas industry will

¹⁷⁵ Hall, *supra* note 74 at 53.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.* at 53-54.

¹⁷⁸ *Id.* at 54.

¹⁷⁹ *Id.* at 53-54.

receive protection by not being liable for every minor and unintentional intrusion that occurs on an adjoining property. This solution also will help to prevent waste by allowing operators to obtain as much gas as possible from their property, which, in turn, will benefit landowners and all consumers of oil and gas.¹⁸⁰

V. CONCLUSION

As the question of whether subsurface intrusions resulting from fracking are actionable trespasses becomes more prevalent, courts need to undertake the analysis of what constitutes an actionable trespass. The three courts that have confronted the issue so far, *Coastal Oil*, *Stone*, and *Briggs*, have left the issue as they found it—with a big question mark. In this Comment, I have analyzed a better answer to the issue of subsurface intrusions resulting from fracking that is both manageable and responsive to improving technology by looking at policy considerations and analogous law. Two factors that must be satisfied to constitute an actionable trespass. The first factor is that the plaintiff must be able to prove that a harm has occurred. This element, however, is not meant to be used by courts to prevent landowners from obtaining a remedy. The second factor is that the defendant's intrusion must not be intentional. To ensure the balance between industry and landowners remains intact, I have proposed that Hall's buffer zone of five hundred feet be adjustable—that it can be reduced in size or even removed altogether if technology makes the need for such a zone obsolete. If an operator's fractures extend beyond the buffer zone, the intrusion will constitute an actionable trespass.

Because courts improperly ground their answer to the issue of subsurface intrusions resulting from hydraulic fracturing in the rule of capture, this Comment also argued the inapplicability of the doctrine to the issue. In doing so, I have analyzed two of the main justifications for the doctrine, including that oil and gas move naturally throughout the earth and that it is impossible to estimate how much oil and gas comes from neighboring tracts. The low permeability of shale rock formations, coupled with vast improvements in technology, show that the rule of capture is not applicable to fracking or the issue at hand. Furthermore, two limitations on the rule of capture, the inability to engage in illegal activity and the natural flow rule, also indicate that its application to the issue is improper.

¹⁸⁰ See *supra*, Part III.A.