


2016

Regulation of Fracking Is Not a Taking of Private Property

Kevin Lynch

Follow this and additional works at: http://digitalcommons.du.edu/law_facpub

 Part of the [Environmental Law Commons](#), and the [State and Local Government Law Commons](#)

Recommended Citation

84 U. Cin. L. Rev. 38 (2016)

This Paper is brought to you for free and open access by the Denver Law at Digital Commons @ DU. It has been accepted for inclusion in Faculty Scholarship by an authorized administrator of Digital Commons @ DU. For more information, please contact jennifer.cox@du.edu.

REGULATION OF FRACKING IS NOT A TAKING OF PRIVATE PROPERTY

*Kevin J. Lynch**

Abstract

The oil and gas industry should lose most, if not all, takings claims they might bring as a result of regulation on fracking, even regulation that bans fracking in specific communities or even statewide. Many in government and in the oil and gas industry think otherwise, and therefore when industry threatens takings claims, the assumption is they will win. These threats act to scare off government officials from enacting protections demanded by their constituents. This Article lays out the many difficulties faced by those who would bring fracking-takings claims in an attempt to show that governments should not be deterred from enacting regulations to protect against the worst harms of fracking.

As the use of fracking has spread during the recent oil and gas boom, inevitable conflicts have arisen between industry and its neighbors, particularly as fracking has moved into densely populated urban and suburban areas. Concerned over the impacts of fracking—such as risks to health and safety, diminished property values, air and water pollution, as well as noise, traffic, and other annoyances—many people have demanded a government response.

Government regulation of fracking has struggled to catch up to the changes in industry, although, in recent years, many state and local governments

* Assistant Professor of Law, University of Denver Sturm College of Law. I would like to thank those who provided helpful feedback and comments on earlier drafts of this Article, particularly Jan Laitos, Rachael Rawlins, K.K. DuVivier, Justin Pidot, Ed Ziegler, Nancy Leong, Margaret Kwoka, Sam Kamin, Ian Farrell, Tom Romero, Alan Chen, César García Hernández, Zygmunt Plater, Sarah Schindler, Gina Warren, John Echeverria, and Beto Juárez. Any remaining errors are, of course, my own.

have taken steps to reduce the impacts of fracking in their communities or to ban the practice outright. This article focuses on government restrictions in New York and Colorado, two of the key battlegrounds in the fight over fracking. New York recently prohibited fracking across the entire state after several towns had enacted their own bans. In Colorado, the people have used the ballot initiative process to enact restrictions on fracking directly in a handful of local communities, and a few statewide measures are expected to be on the ballot this Fall.

The industry has responded, not only with public relations spending to improve fracking's damaged reputation, but also with legal challenges to these efforts to rein in oil and gas development. In addition to suing local governments, often arguing they do not have authority to regulate fracking, the industry threatens to bring costly takings claims for compensation due to alleged economic harms.

This Article examines the numerous legal and factual issues that should make it difficult for the industry to succeed on fracking-takings claims. First, regulation of fracking, even including outright bans, almost always can be defended as necessary to prevent a nuisance or other background principle of law that justifies government regulation. Second, even if a nuisance defense could be overcome, industry would have difficulty proving that regulation has destroyed all economic value in their property, and are thus unlikely to be able to take advantage of the categorical takings rule. When fracking-takings claims are considered under the default balancing test, takings are unlikely to be found except in rare outlier cases. Finally, because requiring governments to pay compensation in fracking-takings cases would risk creating a windfall for industry at the expense of the public, particularly if

the oil and gas eventually is extracted, courts should resist the temptation to rule against government restrictions to protect public health, safety, and the environment. Fracking-takings claims should therefore only succeed in rare circumstances where the regulation of fracking is patently unreasonable or unnecessary, and therefore government officials and policymakers should not be dissuaded from regulating fracking based on threats of takings liability.

I. Introduction	41
II. Regulation of Fracking.....	42
A. Background on Fracking.....	42
B. The Continuum of Fracking Regulation	46
1. New York Case Study.....	47
2. Colorado Case Study.....	49
III. Takings Law.....	52
A. Development of Regulatory Takings Jurisprudence.....	53
1. The Rise of Regulatory Takings	54
a. The Default – the Balancing Test of Penn Central	55
b. The Categorical Rule – Lucas “Total Takings”	58
2. Background Principles – a Defense to Takings Claims	60
3. The Denominator Problem.....	63
4. Temporary Limitations on Property.....	66
B. Takings in the Oil and Gas Industry	69
C. State- Specific Takings Law	76
1. New York Takings Law	76
2. Colorado Takings Law	77
IV. Does Regulation of Fracking Cause a Taking of Private Property?.....	79
A. Fracking and Background Principles.....	79
B. Defining the Scope of the Property Right for a Total Take	85
C. Regulation of Fracking under the Penn Central Factors	89
D. Temporary Restrictions on Fracking: The Case of Moratoria.....	91
E. Valuation of Any Takings Found.....	92
V. Conclusion	96

I. INTRODUCTION

The oil and gas industry has been booming across the United States for several years now, primarily due to widespread use of high volume hydraulic fracturing (fracking). Modern fracking depends on new directional and horizontal drilling techniques to produce oil and gas reserves that previously were unrecoverable. The industry aggressively has been exploiting this newfound oil and gas supply, leading to record profits. However, a growing body of public health literature supports what many communities in oil country already know: modern fracking techniques create serious impacts to public health, public safety, and the environment, particularly when industry seeks to extract oil and gas from densely populated urban and suburban areas.

In response to the encroachment of fracking operations—which places large-scale industrial operations in the middle of residential, commercial, or other sensitive areas—many local communities have decided to protect their quality of life, as well as their health, safety, and property rights, from the impacts of fracking. The range of available government responses to fracking includes zoning restrictions to preserve the character and safety of residential neighborhoods, regulations to prevent some of the worst impacts of fracking, outright bans on fracking at the state and local level, or a time-out (moratorium) to allow time for further study or to develop an appropriate regulatory response.

The oil and gas industry has gone all out to defeat or limit any restrictions on the extraction of oil and gas through fracking. Almost any local restriction immediately is challenged as preempted by state law, with mixed success. Industry also threatens, before restrictions are enacted, to file takings claims that will bring dire consequences following any government regulation that reduces the economic value of oil and gas interests. These threats undoubtedly have discouraged some communities from enacting restrictions that otherwise would have been adopted.

However, takings claims based on government restrictions on fracking, referred to here as “fracking-takings,” are not a straightforward matter. Despite a popular misconception, the Takings Clause of the U.S. Constitution does not require compensation for any government action that reduces the value of private property. Rather, takings jurisprudence recognizes that government has an important role to play in balancing the interests of private property against the interests of the public as a whole. Because fracking is just one completion method that can be used to produce oil and gas, and particularly because modern fracking techniques create great risks to the health, safety, and environment of neighboring communities, fracking-takings are not

likely to succeed. Furthermore, any fracking-takings cases which require payment of just compensation would risk creating a windfall profit for the oil and gas industry or inappropriately limiting necessary government regulation.

This Article examines many difficulties facing fracking-takings claimants. Although takings law is notoriously confusing and indeterminate, fracking-takings claims are not likely to prevail. Rather, only in rare and limited circumstances should fracking-takings claims succeed. Part II of this Article lays out the recent developments in technology and economic conditions that have led to the fracking boom, the growing understanding of the impacts that fracking has on surrounding communities, and the regulatory response taken by state and local governments in New York and Colorado. Part III examines the law of regulatory takings in general as well as the limited takings cases in the oil and gas industry, including state-specific takings cases that bear on the key issues likely to arise in fracking-takings cases. Part IV then explains, for each stage of the takings analysis, why mineral owners or oil and gas companies will have a difficult time prevailing on a fracking-takings claim. Ultimately, despite the unpredictable nature of takings claims in new substantive areas, fracking-takings cases appear unlikely to succeed, and many policy reasons suggest caution is warranted to avoid creating windfall profits for the oil and gas industry.

II. REGULATION OF FRACKING

A. *Background on Fracking*

Much of the oil and gas being produced today in the United States using fracking could not have been produced even a decade ago.¹ The combination of horizontal and directional drilling technology, the use of enormous volumes of water for hydraulic fracturing, and the high price for oil and natural gas² has made it economical to produce oil and gas from tight formations such as shale. This tremendous reserve of oil and gas was known previously but assumed to have little to no value because there was no way to extract it at a reasonable cost that would allow for a profit. That changed in recent years and led to incredible growth in the

1. Patrick C. McGinley, *Regulatory Takings in the Shale Gas Patch*, 19 PENN. ST. ENVTL. L. REV. 193, 193-94 (2011) (discussing the development of technology that has enabled production of natural gas reserves in shale which was previously uneconomic to produce).

2. Fracking in the United States is very expensive and it relies on high prices for oil and gas for the investment to make business sense. If oil prices are above \$100/barrel, then the industry can make a large profit even off of very expensive wells. However, at lower prices such as exist currently, the ability to profitably produce oil and gas through fracking is called into question. See discussion *infra* Part IV.D.

oil and gas industry in many parts of the U.S., including New York and Colorado.³

Fracking is one completion technique, a single part of the process of developing a well, and yet it is the key technology that has created such conflict when it comes into new communities. Completion is the process that occurs after a well bore has been drilled, but before the well begins producing oil and gas.⁴ The well typically would produce oil and gas regardless, even without fracking, but fracking normally is done to increase the amount of oil and gas produced, which helps to offset the tremendous cost of drilling long horizontal wells and the cost of the fracking process. Fracking involves pumping large volumes of water, along with sand and chemicals—often hazardous ones⁵—down a well bore, under pressure, with the intent of widening underground fissures to allow more oil and gas to escape from the rock formation.⁶ Fracking is but one completion process; other processes commonly were used historically,⁷ and new processes are being developed that might obviate the need to frack at all.⁸

However, the boom of the oil and gas industry does not come without costs. Initial fears about the impacts of fracking were focused on water quality issues, both because the process of fracking is very disruptive to

3. See, e.g., Daniel J. Graeber, *Low oil prices may hurt Colorado economy*, UPI (Mar. 19, 2015, 6:32 AM), http://www.upi.com/Business_News/Energy-Industry/2015/03/19/Low-oil-prices-may-hurt-Colorado-economy/2631426758579/.

4. Well completion has been defined as “the activities and methods of preparing a well for the production of oil and gas or for other purposes, such as injection; the method by which one or more flow paths for hydrocarbons are established between the reservoir and the surface.” U. OF TEX. CONTINUING EDUC., PETROLEUM EXTENSION SERV., A DICTIONARY FOR THE OIL AND GAS INDUSTRY 229 (1st ed. 2005).

5. See Theo Colborn et al., *Natural Gas Operations from a Public Health Perspective*, THE ENDOCRINE DISRUPTION EXCHANGE, <http://www.endocrinedisruption.org/assets/media/documents/GasManuscriptPreprintforweb12-5-11.pdf> (last visited May 18, 2016).

6. Hydraulic fracturing is defined as “an operation in which a specially blended liquid is pumped down a well and into formation under pressure high enough to cause the formation to crack open, forming passages through which oil can flow into the wellbore. Sand grains, aluminum pellets, glass beads, or similar materials are carried in suspension into the fractures. When the pressure is released at the surface, the fractures partially close on the proppants, leaving channels for oil to flow through to the well.” PETROLEUM EXTENSION SERV., *supra* note 4, at 127. Historically, oil and gas development used vertical wells and limited, if any, fracking, thus the impacts at the surface and to neighboring communities was dramatically less in the past.

7. Dep. of Stuart Ellsworth at 32:1-24, May 8, 2014, Colo. Oil & Gas Ass’n v. City of Longmont, No. 2013CV63 (Boulder Cty. Colo.) (discussing how wells in Colorado were producing since the 1860s, long before fracking was developed).

8. For example, a process called “underbalanced drilling” allows for production to occur based on the pressure in the reservoir, rather than relying on fracking, in order to economically produce oil and gas without many of the negative impacts associated with fracking. See, e.g., WEATHERFORD INT’L, UNDERBALANCED DRILLING, <http://www.weatherford.com/products-services/well-construction/secure-drilling/underbalanced-drilling> (last visited Mar. 10, 2015).

the rock formations where the oil and gas are found, and also because fracking fluid contains many dangerous and toxic chemicals.⁹ If those chemicals reach drinking water supplies, it can be impossible to remove the contamination. In some places tap water could even be lit on fire due to natural gas that had migrated into the water supply. The Environmental Protection Agency (EPA) currently is working on a study of the potential threats to drinking water from fracking and has released a draft of that report.¹⁰ In addition to water, other concerns about fracking quickly became apparent, such as concerns over air pollution caused by fracking and associated activities.¹¹ Additionally, fracking has been linked to serious adverse health consequences,¹² as well as to reductions in neighboring property values.¹³

Fracking operations are essentially large scale industrial operations with all the concomitant noise, light, traffic, air pollution, and impacts to water and wildlife habitat that any large industrial operation would have. The difference with fracking is that the operations go where the oil and gas are found, which often is right beneath neighborhoods, schools, and parks. Rather than people coming to the nuisance, this is a case where the nuisance comes to the people. This situation has created inevitable conflicts as the annoyance¹⁴ of having fracking operations next door is

9. See Colborn et al., *supra* note 5. (“Some of these chemicals include benzene, a known carcinogen, and methylene chloride which is highly toxic to humans.”)

10. EPA, ASSESSMENT OF THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING FOR OIL AND GAS ON DRINKING WATER RESOURCES, EXTERNAL REVIEW DRAFT (June 2015). Despite much publicity of the statement that EPA “did not find evidence that [fracking] mechanisms have led to widespread, systematic impacts on drinking water resources in the United States,” the report did still recognize the threats that fracking poses to drinking water such as using up scarce water supplies, spills of fracking fluids or produced water, fracking directly into underground water resources, migration of fluids and gases underground, and inadequate wastewater management. *Id.* at ES-6. EPA confirmed a number of instances where fracking had impacted drinking water supplies during both routine activities as well as accidents. *Id.* at ES-23.

11. See, e.g., Rachael Rawlins, *Planning for Fracking on the Barnett Shale: Urban Air Pollution, Improving Health Based Regulation, and the Role of Local Governments*, 31 VA. ENVTL. L.J. 307 (2013).

12. See, e.g., Colborn et al., *supra* note 5 (discussing known health effects of chemicals used in natural gas production); Lisa M. McKenzie et al., *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources*, 424 SCI. TOTAL ENVIRON. 79, 82-83 (2012) (finding residents living with a half mile of wells to be at greater risk of cancer and other health effects). For a more comprehensive listing of peer-reviewed papers on the topic, see THE ENDOCRINE DISRUPTION EXCHANGE, *Chemicals in Natural Gas Operations: Peer-Reviewed Papers*, <http://endocrinedisruption.org/chemicals-in-natural-gas-operations/peer-reviewed-articles> (last visited Mar. 10, 2015).

13. Ron Throupe et al., *A Review of Hydro “Fracking” and Its Potential Effects on Real Estate*, 21 J. OF REAL ESTATE LIT. 205, 227 (2013) (finding an expected decrease of 5-15% on home values in robust real estate markets, and up to 25% decrease in weaker markets).

14. Annoyance may be too mild a term, as neighbors to fracking operations often report unbearable noise, light, or vibration as well as toxic fumes which cause headaches, nosebleeds, and more serious health impacts.

combined with our growing but still incomplete knowledge of the public health impacts associated with fracking operations. As a result, many people who have fracking disrupting their lives have demanded that their governments—both state and local—do something to protect them from this harm. Where governments refuse or are too slow to respond, citizens take matters into their own hands through their ability to enact regulations or prohibitions at the ballot box.

In response, industry¹⁵ has raised several challenges against these restrictions on what they see as their absolute right to extract oil and gas, regardless of the consequences. As an initial matter, once it recognized the public relations issue on its hands, industry began spending a small portion of its newfound wealth to try to assure the public that fracking was safe and there was no reason to be concerned. Then, when local governments enacted regulations, industry argued that local governments do not have authority to regulate the industry due to state preemption. The ultimate argument presented by industry is that if government wants to regulate, or especially prohibit, fracking, then it will have to pay for “taking” its property. In response to these arguments, governments typically have responded by under-regulating the industry in the eyes of their constituents. Citizens have in some instances skirted their elected representatives by voting for additional regulation at the ballot box.¹⁶

This last point is rather remarkable in light of the history and development of the oil and gas industry. The mineral rights now asserted to be so valuable previously had little to no value. Only the technological advances and high prices for oil and gas made these resources so desirable. Thus, mineral interest owners who bring fracking-takings claims may experience a large windfall if they are able to extract these previously worthless resources.¹⁷ Yet they threaten

15. The term “industry” is used broadly in this Article to include oil and gas companies, mineral rights owners, industry associations or trade groups, and others who support, lobby, and generally argue against regulations or restrictions that may be placed on fracking.

16. Fort Collins, Colorado, provides a good example of this phenomenon. Although the city council had initially put its own moratorium on fracking in place, it later exempted the only operator, Prospect Energy, from that moratorium. When the citizens of Fort Collins proposed to reinstate the full moratorium at the ballot box, the city council adopted a resolution urging the defeat of the measure, in part due to concerns over the cost of litigation that the city would face from industry. *See* Fort Collins City Council, Meeting Minutes, Oct. 1, 2013 at 314-18.

17. Of course, windfalls might occur in other contexts as well, and the presence of a windfall would not necessarily bar all takings claims. However, the presence of a windfall should be relevant to a court that is determining whether the government is “forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.” *Armstrong v. U.S.*, 364 U.S. 40, 49 (1960). The problem is particularly pronounced in the fracking context due both to the large relative amount of the windfall/potential takings claim as well as the potential harm to the public in terms of serious health consequences and possibly even deaths. A court that would impose a multi-million dollar fracking-takings judgment against a local government would thereby be elevating

takings claims if they are denied the ability to capture this windfall. Such a windfall is harmful because it imposes potentially crippling costs on the public simply to reward a private property owner for having done nothing.¹⁸ Alternatively, the threat of takings liability (either before or after resolution by the courts) might lead governments simply not to regulate, thus allowing industry to impose negative externalities on the public in terms of pollution, noise, traffic, and general disturbance of the peace of formerly quiet residential neighborhoods. Thus, regardless of the current state of takings law and how it might apply to fracking-takings, it would be bad public policy if the courts were to hold that governments must reimburse mineral owners for this windfall in order to protect the public from the risks and harms of fracking.

B. The Continuum of Fracking Regulation

In response to the explosive growth of fracking and the encroachment of oil and gas operators on residential areas, many state and local governments, or their citizens, have shown interest in regulating or prohibiting fracking outright. The first approach that can be taken is a moratorium—a time-out on development to allow the government to study the risks and benefits and develop an appropriate regulatory response. The next step might be issuing zoning regulations that restrict the areas in which fracking can occur. Local governments potentially could regulate the technical process of fracking, limiting the types and amounts of chemicals used or regulating the pressure used to force the water into the formation. Oftentimes, however, this type of regulation will fall to the state level as local regulations may be preempted in some states. Ultimately, some communities or even entire states may decide that the risks of fracking are too great, and it should be prohibited outright. These options encompass the range of fracking regulation that currently exists today.

windfall profits over protection of public health, particularly since many governments might respond by simply removing the regulation and allowing the harm to occur. Such a result would not support notions of “fairness and justice” which underlie takings jurisprudence. This is obviously a complicated topic which bears further research and study, but it should at least be noted at this time as a potential argument against a fracking-takings claim.

18. Perhaps a company which invested significant resources in developing fracking technology to exploit new oil and gas reserves might be able to claim they deserve the opportunity to profit from their investment and innovation. However that is not the typical claimant in a hypothetical fracking-takings case. Those claimants instead likely have invested very little, if any, money or time in making their formerly valueless resource become profitable to extract.

1. New York Case Study

New York perhaps has gone farther than any other state to protect its citizens and its environment from the unknown risks and the known impacts of fracking. Initially, the state adopted a moratorium in order to conduct further study to see if fracking could be done safely. Then-Governor David Patterson put this moratorium in place in 2010 while directing that state agencies such as the Department of Environmental Conservation

complete its review of the public comments, make such revisions to the Draft SGEIS that are necessary to analyze comprehensively the environmental impacts associated with high-volume hydraulic fracturing combined with horizontal drilling, ensure that such impacts are appropriately avoided or mitigated consistent with the State Environmental Quality Review Act (SEQRA), other provisions of the Environmental Conservation Law and other laws, and ensure that adequate regulatory measures are identified to protect public health and the environment.¹⁹

Because of the complicated nature of this issue, it took four additional years to complete the state's analysis. In late 2014, the current Governor Andrew Cuomo made the moratorium into a permanent ban, relying on the advice from the Department of Environmental Conservation and the Department of Health.

The review compiled by the New York Department of Health was quite thorough and broad, and it sets out ample reasons why the state should not rush ahead with allowing fracking when the impacts, both short and long term, are unknown.²⁰ The study noted air impacts that could affect respiratory health, climate change impacts, drinking water impacts, soil and water contamination from spills, surface-water contamination from waste treatment, induced earthquakes, and

19. Exec. Order No. 41, issued Dec. 13, 2010 (Requiring Further Environmental Review of High-Volume Hydraulic Fracturing in the Marcellus Shale), [https://govt.westlaw.com/nycrr/Document/Ib2187f04646111e09f33000845b8d3e?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Ib2187f04646111e09f33000845b8d3e?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)).

20. N.Y. STATE DEP'T OF HEALTH, A PUBLIC HEALTH REVIEW OF HIGH VOLUME HYDRAULIC FRACTURING FOR SHALE GAS DEVELOPMENT (2014). The study concluded that "the overall weight of the evidence from the cumulative body of information . . . demonstrates that there are significant uncertainties about the kinds of adverse health outcomes that may be associated with [fracking], the likelihood of the occurrence of adverse health outcomes, and the effectiveness of some mitigation measures in reducing or preventing environmental impacts which could adversely affect public health. Until the science proves provides sufficient information to determine the level of risk to public health from [fracking] to all New Yorkers and whether the risks can be adequately managed, DOH recommends that [fracking] should not proceed" in New York. *Id.* at 2.

community impacts associated with boom-town economics.²¹ While recognizing the importance of further study to reduce uncertainty, the study concluded that fracking has resulted in environmental impacts that threaten public health, justifying a ban on fracking statewide.²² As a result, the New York Department of Environmental Conservation has stated its intent to ban fracking in New York.²³

In addition to the statewide measure prohibiting fracking, many local jurisdictions in New York also have taken steps to prohibit fracking through their zoning authority. Most notably, the Town of Dryden was one of the first local governments in New York to prohibit fracking. In August 2011, the Town Board of Dryden voted to amend the local zoning ordinance expressly to prohibit extraction of oil and gas or other associated processes.²⁴ The Town Board declared that natural gas exploration “poses a significant threat to [Dryden’s] residents’ health, safety, and general welfare.”²⁵

The local ban in Dryden was challenged by industry as being preempted by state law. However, the courts in New York upheld the authority of towns such as Dryden to use their zoning authority to prohibit certain land uses, such as fracking, from their jurisdictions. Ultimately, the New York Court of Appeals held that state law did not prohibit local zoning laws which prohibit oil and gas development, based on the plain language, statutory scheme, and legislative history of the New York Oil, Gas, and Solution Mining Law.²⁶ The ultimate resolution of the case was based on “the relationship between the State and its local government subdivisions.”²⁷ Although the state could have preempted local regulation of oil and gas operations, there was not sufficient evidence to show “a clear expression of preemptive intent.”²⁸

Thus, the current law in New York is that the state has prohibited fracking for an indefinite duration. Even if this statewide ban eventually is modified or removed, local governments have the authority to prohibit

21. *Id.* at 4.

22. *Id.* at 11.

23. Press Release, N.Y. State Dep’t of Envtl. Cons., New York State Department of Health Completes Review of High-volume Hydraulic Fracturing (Dec. 17, 2014), <http://www.dec.ny.gov/press/100055.html> (stating that DEC Commissioner Joe Martens will implement the recommendation to ban fracking in New York).

24. TOWN OF DRYDEN, ZONING LAW, art. V, § 502 (2012). *See also* Dryden Town Board, Res. No 126 (2011), Resolution in Support of Adopting Amendments to the Town of Dryden Zoning Ordinance Clarifying the Town’s Prohibition of Natural Gas Exploration and Extraction (Aug. 2, 2011), http://dryden.ny.us/Board_Meeting_Minutes/TB/2011/TB2011-08-02.pdf.

25. *Id.* at 10.

26. *Wallach v. Town of Dryden*, 16 N.E.3d 1188, 1201 (N.Y. 2014).

27. *Id.* at 1203.

28. *Id.*

fracking themselves, and several jurisdictions already have done so.²⁹

2. Colorado Case Study

Colorado has experienced tremendous population growth since previous oil and gas booms. Thus, a small portion of the oil and gas that now are recoverable through the use of fracking lie beneath land that is much more heavily populated than before.³⁰ The conflicts in Colorado between industry and the public largely have occurred in suburban areas along the Front Range,³¹ where many people have moved for the quality of life to be found in quiet residential communities. That quality of life increasingly has been threatened as the oil and gas industry has encroached upon those communities, proposing massive wellsites right in the middle of many residential neighborhoods as well as near parks and schools.³² This has led to demands that all levels of government take action to prevent harm and protect communities from fracking.

Several state agencies have responsibility for regulating the oil and gas industry. Historically, primary responsibility for regulation of the industry at the state level was in the Colorado Oil and Gas Conservation Commission (COGCC), part of the Department of Natural Resources. The COGCC derives its authority from the Oil and Gas Conservation Act, which has been amended several times in recent years to require that oil and gas development be “consistent with protection of public health, safety, and welfare, including protection of the environment and wildlife resources.”³³ In spite of this statutory mandate to protect the public and the environment, the COGCC never has denied an application for a permit to drill based on environmental concerns.³⁴ The COGCC also has not set any substantive limitations on when or how

29. *The Story of Dryden: The Town That Fought Fracking (And Is Winning)*, EARTHJUSTICE, www.earthjustice.org/features/the-story-of-dryden-the-town-that-fought-fracking-and-is-winning (last visited July 25, 2015) (noting that more than 100 towns in New York have enacted local bans or moratoria on gas drilling).

30. For example, Longmont only occupies 0.02% of the land area of Colorado but has a population density of 3,294 people per square mile. *Aff. of Mary Ellen Denomy* ¶ 8, May 30, 2014, *Colo. Oil & Gas Ass’n v. City of Longmont*, No. 2013CV63 (Boulder Cty. Colo.).

31. The Front Range refers to the area where the majority of the population in Colorado lives, in the urban corridor abutting the Rocky Mountains. *See Understanding Colorado Regions*, 9NEWS.COM, http://archive.9news.com/weather/resources/region_guide/ (last visited Dec. 2, 2015).

32. *See, e.g., Sarah Jane Kyle, Proposed wells near school draw ire of Timnath residents*, COLORADOAN (Dec. 10, 2014, 7:59 AM), <http://www.coloradoan.com/story/news/2014/12/09/proposed-wells-draw-fear-timnath-residents/20163783/>.

33. COLO. REV. STAT. § 34-60-102(1)(a)(I) (2014).

34. *Dep. of Stuart Ellsworth* at 146:25-148:4, May 8, 2014, *Colo. Oil & Gas Ass’n v. City of Longmont*, No. 2013CV63 (Boulder Cty. Colo.) (head of engineering for state agency could not recall a permit to drill ever being denied).

industry may frack wells.³⁵ Instead, the regulations only require limited notice to neighboring landowners and the state before fracking begins and disclosure of some of the chemicals that are used in the fracking process.³⁶ In response to pressure from the public, the COGCC also has moderately increased setbacks for all wells whether the wells use fracking or other methods.³⁷

Unhappy with the severe impacts that fracking still can have on communities under state regulations, many citizens have pushed their local governments to take further steps to protect them. In response to citizen pressure, the City of Longmont enacted a series of land use regulations applicable to oil and gas operators and secured the agreement of industry to comply with those.³⁸ Unsatisfied that these regulations still would allow fracking to occur in their community, many residents of Longmont successfully organized a campaign to amend the city charter to prohibit fracking entirely.³⁹ This ban on fracking was challenged in state court on preemption grounds.⁴⁰

35. Some COGCC regulations do relate to technical matters such as well casing, but those apply to all wells broadly, and not wells that will be fracked, specifically. *See, e.g.*, COGCC Rule 207, 308B, 317, 318A, 341, 523, 703, 802, 804. The only regulations which apply specifically to fracking simply require completion of a chemical disclosure registry form (including exemptions for “trade secrets”) and a requirement for providing 48 hours of advance notice before fracking is conducted. COGCC Rule 205A, 316C.

36. *See* Colo. Oil & Gas Conserv. Comm’n, Rule 205A(b)(2) (requiring disclosure of chemicals after fracking occurs on a well); Rule 316C (requiring 48 hours advance notice be provided before fracking). No other state regulations specifically apply to fracking operations although some general requirements would apply to fracking, such as Rule 805.c related to fugitive dust from oil and gas operations. Rule 805.c.

37. Colo. Oil & Gas Conservation Comm’n, Rule 604.a(1) (2014) (setting the default setback to be 500 feet from any “building unit”). The previous setback was only 150 feet. The regulations do allow for waivers of this minimum requirement, and the state has not even been enforcing the requirement. SIERRA CLUB, REVIEW OF THE OIL AND GAS INDUSTRY AND THE COGCC’S COMPLIANCE WITH COLORADO’S SETBACK RULES 2 (2015), <http://www.law.du.edu/documents/student-law-office-clinical-programs/ELC-Form-2a-Executive-Summary.pdf> (noting that 181 permit applications since August 1, 2013, out of a total of 1,300 application, lacked critical information necessary to ensure compliance with setbacks and other requirements).

38. CITY OF LONGMONT, Ordinance O-2012-25 (2012). This ordinance amended the city code. *See, e.g.*, LONGMONT MUNICIPAL CODE, §§ 15.04.020.B.32 (laying out zoning requirements for oil and gas operations and facilities under the Land Development Code). Those regulations included greater setbacks than state law required (350 feet), a ban on oil and gas development in residentially zoned areas, and other requirements to minimize noise and visual impacts of fracking operations. *See id.* Although the state and industry sued to block these regulations, arguing they were preempted by state law, both parties agreed to drop their suit and, therefore, the regulations in Longmont can be enforced to any future oil and gas development. Colo. Oil & Gas Conservation Comm’n v. City of Longmont, No. 2012CV702 (Boulder Cty. Colo.), *dismissed by stipulation and without prejudice* (Oct. 15, 2014).

39. Longmont City Charter, Article XVI (the “Longmont Public Health, Safety and Wellness Act” cites to the inalienable rights provision of the Colorado constitution as justification for a prohibition on hydraulic fracturing within the city).

40. *See* City of Longmont v. Colo. Oil & Gas Ass’n, No. 2014CA1759 (Colo. Ct. App.). Briefing on this appeal was completed on April 2015. In an unusual development, the Court of Appeals

Following the actions taken by Longmont and its citizens, other jurisdictions began to take action against fracking as well. In November 2013, citizens of Fort Collins, Broomfield, Boulder, and Lafayette all voted to place limitations on fracking.⁴¹ Some of these measures also have been challenged in court by the oil and gas industry, with the Fort Collins case challenging a five-year moratorium having proceeded all the way up to the Colorado Supreme Court.⁴²

As this Article was undergoing final edits, the Colorado Supreme Court decided both the *Longmont* and *Fort Collins* cases, striking down the fracking ban and moratorium that had been enacted locally in those communities, respectively, on preemption grounds.⁴³ The Court did not close the door on all moratoria related to oil and gas, leaving open the possibility that a moratorium of shorter duration might not be preempted.⁴⁴ And the Court rejected claims of implied preemption, meaning that some regulation on fracking might still be permissible even at the local level.⁴⁵ The state might also decide to enact a ban, or to change the Oil and Gas Conservation Act to allow local bans, although this would require a significant change in politics. Additionally, Colorado voters are expected to consider statewide ballot

asked the Colorado Supreme Court to take up this case, and the companion case out of Fort Collins, before the Court of Appeals ruled. The Colorado Supreme Court agreed to hear the cases, and ultimately issued its decisions in May 2016. For procedural background, see *City of Longmont v. Colo. Oil & Gas Ass'n*, 369 P.3d 573, 577 (Colo. 2016). See also *City of Fort Collins v. Colo. Oil*, 369 P.3d 586, 590 (Colo. 2016).

41. Fort Collins and Broomfield voters both approved temporary moratoria on oil and gas development, and the City of Boulder extended its moratorium to allow time for further study of the impacts of fracking and for the local government to develop an appropriate response. See *Ballot Issue 2A Election Results*, DENVER POST, http://data.denverpost.com/election/results/ballot-issue/2013/fort-collins_city_ballot-issue-2a/ (last visited Dec. 2, 2015); *Broomfield Five Year Fracking Suspension, Question 300* (November 2013), BALLOTPEdia, [https://ballotpedia.org/Broomfield_Five_Year_Fracking_Suspension,_Question_300_\(November_2013\)](https://ballotpedia.org/Broomfield_Five_Year_Fracking_Suspension,_Question_300_(November_2013)) (last visited Dec. 2, 2015). Lafayette voters approved a “Community Bill of Rights” provision to amend the city charter, which was designed to prohibit the extraction of oil and gas in the city and to affirm the rights of natural people over corporations. *City of Lafayette “Community Rights Act” Fracking Ban Amendment, Question 300* (November 2013), BALLOTPEdia, [https://ballotpedia.org/City_of_Lafayette_%22Community_Rights_Act%22_Fracking_Ban_Amendment,_Question_300_\(November_2013\)](https://ballotpedia.org/City_of_Lafayette_%22Community_Rights_Act%22_Fracking_Ban_Amendment,_Question_300_(November_2013)) (last visited Dec. 2, 2015); see also *Community Rights*, COMMUNITY ENVTL. LEGAL DEFENSE FUND, <http://www.celdf.org/section.php?id=423> (last visited Mar. 10, 2015).

42. See *City of Fort Collins v. Colo. Oil & Gas Ass'n*, No. 2014CA1991 (Colo. Ct. App.). Briefing on this appeal was completed April, 2015. Just as in the Longmont case, this case was transferred to the Colorado Supreme Court after briefing was completed. *City of Fort Collins v. Colo. Oil*, 369 P.3d 586, 590 (Colo. 2016).

43. See *City of Longmont v. Colo. Oil & Gas Ass'n*, 369 P.3d 573 (Colo. 2016); *City of Fort Collins v. Colo. Oil*, 369 P.3d 586 (Colo. 2016).

44. *City of Fort Collins*, 369 P.3d at 594 (“We express no view as to the propriety of a moratorium of materially shorter duration.”).

45. *City of Longmont*, 369 P.3d at 583-84.

measures in November 2016, one that would restore local control over oil and gas operations and another that would increase minimum setback requirements,⁴⁶ which could give rise to similar threats of takings liability. Regardless, these preemption decisions from the Colorado Supreme Court will not end the debate over the necessity of further regulations on fracking at the state or local level. As long as the industry seeks to drill and frack near homes, schools, parks, and other sensitive communities, members of the public will demand greater protections from local and state officials. Therefore, the analysis in this Article should remain helpful for future decision-making, even if the specific Colorado laws which are analyzed have been found to be preempted by state law.

III. TAKINGS LAW

Takings jurisprudence in the United States is notoriously complex and inconsistent⁴⁷ with the hallmark of the development of the law being dramatic swings by the Supreme Court from one end of the spectrum to the other. As a result, the application of takings law to new situations is relatively difficult to predict. Private interests can find helpful language in Supreme Court opinions which support their position that government regulation has gone too far and amounted to a de facto condemnation of their property. Government and public interests can find equally helpful language in those same opinions to support their position that reasonable regulation, such as theirs, is well within the scope of their authority and no compensation is required.

However, in some situations (such as the oil and gas context) the specter of astronomical takings judgments against states or local governments can be used by private interests to intimidate them, dissuading enactment of regulations demanded by the public. However, despite the scare tactic of potential takings claims and the uncertainty as to how courts will apply takings law to new situations, a few general

46. CREED, Initiatives, <http://resistextremeenergy.org/initiatives/> (last visited May 25, 2016); see also Joshua Zaffos, *Colorado activists set their sights on ballot measure to limit drilling*, HIGH COUNTRY NEWS (Feb. 22, 2016), <https://www.hcn.org/issues/48.3/the-fractured-terrain-of-oil-and-gas-opposition/colorado-activists-set-their-sights-on-a-ballot-measure-to-limit-drilling>.

47. The confusing state of the law has been described as a “crazy quilt pattern of Supreme Court doctrine.” Allison Dunham, *Griggs v. Allegheny County in Perspective: Thirty Years of Supreme Court Expropriation Law*, 1962 SUP. CT. REV. 63; see also Dwight H. Merriam, *Rules for the Relevant Parcel*, 25 U. HAW. L. REV. 353, 353 (2003) (noting that “the complexities and arcane nuances of takings cases sometimes overwhelm us”); Patrick C. McGinley, *Bundled Rights and Reasonable Expectations: Applying the Lucas Categorical Taking Rule to Severed Mineral Property Interests*, 11 VT. J. OF ENVTL. L. 525, 544-45 (2010) (discussing the difficulty of defining the scope of property for takings analysis and describing caselaw as “regulatory takings pronouncements promise[] to drown the student and the most accomplished advocate in confusing and conflicting verbiage”).

conclusions can be drawn. These conclusions indicate that private interests asserting takings claims in the fracking context face an uphill battle with several potentially difficult issues of proof. Governments at the state and local level, if they determine takings claims to be a risk, can take steps to prepare a strong defense against those takings claims. For example, New York's study of fracking and its potential impacts⁴⁸ will go a long way towards either establishing that a background principle or the nuisance defense precludes a taking, or that no taking under the *Penn Central* factors⁴⁹ is appropriate. Other governments wishing to insulate themselves from liability can conduct their own similar studies or cite to existing literature on the impacts and threats of fracking.

In order to set the stage for applying takings law to the fracking context, three key background topics will be introduced. First, a brief history of the development of takings jurisprudence in the Supreme Court will shed light on those uphill battles and the defenses available to governments. Second, takings claims in the oil and gas context, although limited (perhaps due to a history of under-regulation of the industry), also will provide some context for how takings claims may play out in the fracking context. Finally, the takings law of our two case-study jurisdictions, New York and Colorado, also will be examined to explore the key issues created by the federal takings framework.

A. Development of Regulatory Takings Jurisprudence

Takings law historically applied first to the physical appropriation of property, specifically real property. Thus, early takings claims based on government regulation of property were framed as de facto physical takings without just compensation.⁵⁰ The Supreme Court, however, did not take the bait and rejected the analogy to eminent domain cases, holding that exercise of the police power to restrict the use of private property "is very different from taking property for public use."⁵¹ Thus, regulatory takings (as commonly understood) were squarely rejected in the nineteenth century: "[a] prohibition simply upon the use of property for purposes that are declared, by valid legislation, to be injurious to the health, morals, or safety of the community, cannot, in any just sense, be deemed a taking or an appropriation of property for the public

48. N.Y. STATE DEP'T OF HEALTH, A PUBLIC HEALTH REVIEW OF HIGH VOLUME HYDRAULIC FRACTURING FOR SHALE GAS DEVELOPMENT 5-8 (2014).

49. See discussion *infra* Part III(A)(1)(a).

50. *Mugler v. Kan.*, 123 U.S. 623, 664 (1887).

51. *Id.* at 669.

benefit.”⁵² Only in the twentieth century did the Supreme Court change course and hold that “if regulation goes too far it will be recognized as a taking.”⁵³ Thus, the concept of “regulatory takings” was born.

1. The Rise of Regulatory Takings

The development of regulatory takings jurisprudence has charted an erratic course as the Supreme Court has attempted to create workable standards that could be applied to regulatory takings claims. The Court developed a balancing test to weigh relevant factors but also attempted to streamline the process by injecting some categorical rules. All of the regulatory takings tests, however, are centered around the same goal. “Each aims to identify regulatory actions that are functionally equivalent to the classic taking in which government directly appropriates private property or ousts the owner from his domain. Accordingly, each of these tests focuses directly upon the severity of the burden that government imposes upon private property rights.”⁵⁴

However, for the purposes of this Article, the history is not as important as the result. As takings law currently stands, the pendulum has swung back towards the balancing test. Thus, this Article briefly will explore the dominant balancing test that courts have been instructed to apply in most instances. However, the categorical rule regarding “total takings” also will be presented, because fracking-takings plaintiffs inevitably will seek to shoehorn their case under this test rather than give full consideration to the entirety of circumstances, including the police power justifications for a particular regulation.

52. *Id.* at 668-69.

53. *Penn. Coal Co. v. Mahon*, 260 U.S. 393, 415 (1922). An alternate approach, laid out by numerous previous courts, would not have been to say that compensation is due if regulation goes too far, but rather to test whether the regulation in question falls outside of the government’s police power. “If, therefore, a statute purporting to have been enacted to protect the public health, the public morals, or the public safety, has no real or substantial relation to those objects, or is a palpable invasion of rights secured by the fundamental law, it is the duty of the courts to so adjudge, and thereby give effect to the constitution.” *Mugler*, 123 U.S. at 661. Rather than leaving the issue largely to the legislative branches to sort out, the Supreme Court chose to dive headlong into the regulatory takings concept, creating a complicated, confusing, and indeterminate system placing real and significant limits on the ability of all levels of government to protect the public health, safety, and welfare of their communities. *Id.*

54. *Lingle v. Chevron U.S.A., Inc.*, 544 U.S. 528, 539 (2005). The Supreme Court also discussed a third category of regulatory takings which are not relevant here, a category which includes both permanent physical invasions as well as the exactions cases. *Id.* (citing *Dolan v. City of Tigard*, 512 U.S. 374 (1994), *Nollan v. Cal. Coastal Comm’n*, 483 U.S. 825 (1987), and *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982)). Perhaps the exactions cases might come up in the future if the government action being challenged was not state or local bans on fracking but instead government land use approval that imposed limitations on fracking as an exaction or condition of approval. However, prohibiting the use of fracking as part of approving local land uses would not be very analogous to the situation in *Nollan* and *Dolan*, which the Court compared to appropriation of an easement over the relevant property.

a. The Default – the Balancing Test of Penn Central

The hallmark of modern regulatory takings law is that each case involves “essentially ad hoc, factual inquiries” based on the “particular circumstances” of each case rather than any “set formula” for determining if a taking has occurred.⁵⁵ The factors to be considered were laid out most prominently by Justice Brennan in the *Penn Central* case.⁵⁶ The non-exclusive⁵⁷ list of factors to be considered includes (1) the economic impact of the regulation; (2) the extent to which the regulation has interfered with distinct investment-backed expectations; and (3) the character of the government action.⁵⁸ However, ultimately, the factors are to be used by courts to determine “when ‘justice and fairness’ require that economic injuries caused by public action be compensated by the government, rather than remain disproportionately concentrated on a few persons.”⁵⁹ The ultimate conclusion in most takings cases “necessarily requires a weighing of the private and public interests.”⁶⁰ Regulatory takings cases thus are not susceptible to simple analyses, but involve detailed factual findings that can inform the court’s balancing of the relevant interests.⁶¹

In order to determine the economic impact of the regulation on the property, courts must first determine the proper scope of the property right in a particular case.⁶² Courts look not simply to the absolute economic impact of the regulation, but rather to how much economic value remains in the property after the regulation is applied. Because

55. *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978). The ad hoc nature of the inquiry recently has been reiterated by the Supreme Court, when it stated “no magic formula enables a court to judge, in every case, whether a given government interference with property is a taking” and noted the “few invariable rules” that have been recognized in takings law. *Ark. Game & Fish Comm’n v. United States*, 133 S. Ct. 511, 518 (2012). Regulatory takings are quite distinct from condemnations and physical takings, which typically involve application of per se rules. *Tahoe-Sierra Pres. Council v. Tahoe Reg. Planning Agency*, 535 U.S. 302, 322 (2002). Instead, regulatory takings jurisprudence “is characterized by ‘essentially ad hoc, factual inquiries’ . . . designed to allow ‘careful examination of all the relevant circumstances.’” *Id.* (citing *Penn Cent.*, 438 U.S. 104; *Palazzolo v. R.I.*, 533 U.S. 606 (2001) (O’Connor, J., concurring)).

56. *Penn Cent.*, 438 U.S. at 124.

57. Although Justice Brennan notes only that these are “several factors that have particular significance,” *id.*, in practice these are typically the only factors discussed by courts. However, the factors are sufficiently broad-reaching that the factors are not overly restrictive.

58. *Id.* at 124.

59. *Id.* (quoting *Goldblatt v. Hempstead*, 369 U.S. 590, 594 (1962)).

60. *Agins v. Tiburon*, 447 U.S. 255, 261 (1980).

61. *Tahoe-Sierra*, 535 U.S. at 322 n.17 (“When the government condemns or physically appropriates the property, the fact of a taking is typically obvious and undisputed. When, however, the owner contends a taking has occurred because a law or regulation imposes restrictions so severe that they are tantamount to a condemnation or appropriation, the predicate of a taking is not self-evident, and the analysis is more complex.”).

62. *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 496 (1987).

the economic impact depends on the value of the underlying property, takings claimants have an incentive to define the property interest narrowly, while government has the opposite incentive. This tension inevitably has led to what is described as the “denominator problem.”⁶³ However, in general, courts instruct that the “parcel as a whole” is the relevant scope of the inquiry.⁶⁴

Under the “parcel as a whole” standard, courts have rejected attempts by private property owners to define their property rights narrowly. The “parcel as a whole rule has three basic dimensions: horizontal, vertical, and temporal.”⁶⁵ Thus, courts have refused to consider air rights separately (for development purposes),⁶⁶ temporary restrictions on development rights,⁶⁷ restrictions only on commercial uses of eagle feathers,⁶⁸ and restrictions on only a portion of property, such as setback requirements.⁶⁹ Under this standard, “where an owner possesses a full ‘bundle’ of property rights, the destruction of one ‘strand’ of the bundle is not a taking.”⁷⁰ Although the Supreme Court for a time questioned the legitimacy of the “parcel as a whole” requirement,⁷¹ it has been reaffirmed.⁷²

In determining the economic impact of the regulation, courts look not just to the diminution in value compared to the parcel as a whole, but also to the extent to which the regulation interferes with distinct investment-backed expectations. This second factor in the *Penn Central* analysis has several key components. First, the timing of when the regulation was enacted in relation to when the property interest was

63. The denominator problem is examined more fully *infra* Part II.A.3.

64. *See, e.g.*, *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 130 (1978); *Animas Valley Sand & Gravel v. Bd. of Cty. Comm’rs*, 38 P.3d 59, 69 (Colo. 2001). This Article focuses on the separation of property into less than a fee simple estate, and does not examine the case of breaking property into portions which are developed at separate times, because presumably regulations or bans on fracking apply the entire property owned, even if that property is just the mineral estate. Courts have recently taken a more narrow view of what constitutes the “parcel as a whole” when development occurs in pieces over time. *See, e.g.*, *Lost Tree Vill. Corp. v. United States*, 707 F.3d 1286, 1293 (Fed. Cir. 2013).

65. Daniel L. Siegal, *How the History and Purpose of the Regulatory Takings Doctrine Help to Define the Parcel as a Whole*, 36 VT. L. REV. 603, 604 (2012). “Horizontal refers to the land surface (‘metes and bounds’); vertical to air space and subsurface rights; and temporal to past and future uses of the land.” *Id.* For a different take on the parcel as a whole, from a proponent of greater protection of private property under the Takings Clause, see Steven J. Eagle, *The Parcel and Then Some: Unity of Ownership and the Parcel as a Whole*, 36 VT. L. REV. 549 (2012).

66. *Penn Cent.*, 438 U.S. at 130.

67. *Tahoe-Sierra*, 535 U.S. at 332.

68. *Andrus v. Allard*, 444 U.S. 51, 66 (1979).

69. *See generally* *Gorieb v. Fox*, 274 U.S. 603 (1927).

70. *Allard*, 444 U.S. at 65-66.

71. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1016 n.7 (1992).

72. *Tahoe-Sierra*, 535 U.S. at 332.

acquired is relevant, though not dispositive, in determining the reasonableness of the property owner's expectations.⁷³ Second, investment-backed expectations must be reasonably probable rather than speculative—not “starry eyed hope of winning the jackpot if the law changes.”⁷⁴ Third, courts look to whether the owner was operating in a “highly regulated industry.”⁷⁵ Fourth, courts examine whether there was notice of the problem that spawned the need for the regulation.⁷⁶ Fifth, courts assess whether the owner might have “reasonably anticipated” the regulation in light of the “regulatory environment” at the time of purchase.⁷⁷ Finally, the expectations of others on whether the regulation will be followed are also relevant in determining the impact on investment-backed expectations.⁷⁸

The last *Penn Central* factor deals with the character of the government action. As the Court explained in *Penn Central*, takings “may more readily be found when the interference with property can be characterized as a physical invasion by the government . . . than when interference arises from some public program adjusting the benefits and burdens of economic life to promote the common good.”⁷⁹ If the regulation in question was designed to promote public health, safety, and welfare, regardless of whether it prevents a nuisance, the character of the government action weighs against finding a taking.⁸⁰ Another aspect of this factor is the purposes served and the effects produced by the regulation—thus courts must look not just at the economic impact of

73. *Palazzolo v. R.I.*, 533 U.S. 606, 627 (2012) (O'Connor, J., concurring). The Supreme Court has rejected postenactment purchase as a categorical defense against a taking, holding that the government “may not put so potent a Hobbesian stick into the Lockean bundle.” *Id.* at 627. Justice O'Connor explained in her concurring opinion that “the regulatory regime in place at the time the claimant acquires the property at issue helps to shape the reasonableness of those [distinct investment-backed] expectations.” *Id.* at 633.

74. *Guggenheim v. City of Goleta*, 638 F.3d 1111, 1120 (9th Cir. 2010). The court acknowledged that property owners might pay “a slight speculative premium” based on the theory that the regulatory restriction might someday end, but that such speculation does not qualify as a protected “expectation.” *Id.*

75. *Rith Energy, Inc. v. United States*, 270 F.3d 1347, 1351 (Fed. Cir. 2001). The court explained that a party in a highly regulated environment “necessarily understands that it can expect the regulatory regime to impose some restraints on its” property, the right to mine coal, in this case. *Id.*

76. *Appollo Fuels, Inc. v. United States*, 381 F.3d 1338, 1349 (Fed. Cir. 2004) (noting that there was no suggestion the claimant “was unaware that surface mining was a potentially environmentally hazardous activity”).

77. *Id.* (discussing the ability of the claimant to reasonably anticipate the possibility of an adverse administrative finding which would limit its right to mine coal).

78. *Guggenheim*, 638 F.3d at 1122 (noting the investment-backed expectations of tenants who reasonably expect rent control regulations to remain in place). This factor has also been described as the “average reciprocity of advantage” secured by a regulatory scheme, which serves to justify restrictions on property. *See Penn. Coal Co. v. Mahon*, 260 U.S. 393, 415 (1922).

79. *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978).

80. *Bass Enters. Prod. Co. v. United States*, 381 F.3d 1360, 1369 (Fed. Cir. 2004).

the regulation but also at the public purpose such as the avoidance of impending harm absent regulation.⁸¹ Scholars have noted that the character of the government action factor is consistent with, but not identical to, the nuisance background principles defense.⁸²

b. The Categorical Rule – Lucas “Total Takings”

The primary categorical rule of relevance to this Article is the per se taking rule based on deprivation of “all economically viable use of property” announced in the *Lucas* case. Takings law contains very few per se rules,⁸³ but the “total taking” rule is the most prominent. As a result, if a claimant can show that he has been denied all economically beneficial use of his property, then there is no need to assess the full set of circumstances surrounding the case using the *Penn Central* factors. In effect, this categorical rule cuts out the “character of the government action” factor and puts primary emphasis on the “economic impact factor.” The “interference with distinct investment-backed expectations” factor is not explicitly considered, although one could argue that the “background principles” defense subsumes most, if not all, of that factor.

As with most categorical rules, the total takings rule is simple to state but often complicated to apply.⁸⁴ Under the *Lucas* framework, courts are required to “simply” determine what the relevant property interest is and then determine whether any economically beneficial use remains the property. As discussed more fully below, this makes the determination

81. *Palazzolo v. R.I.*, 533 U.S. 606, 634 (2001) (O’Connor, J., concurring). On remand, the court in Rhode Island emphasized the many public harms justified by the wetlands regulations at issue and even found that construction in the area would damage public trust interests and constitute a nuisance, effectively overcoming the relatively minor economic impact. ZYGMUNT J.B. PLATER, ENVIRONMENTAL LAW AND POLICY: NATURE, LAW AND SOCIETY 920 (4th ed. 2010).

82. See, e.g., Mark Fenster, *The Stubborn Incoherence of Regulatory Takings*, 28 STAN. ENVTL. L.J. 525, 571 (2009).

83. “Quite simply, there are very few per se rules in regulatory takings cases.” *Lost Tree Vill. Corp. v. United States*, 100 Fed. Cl. 412, 430 n.28 (2011), *rev’d on other grounds*, 707 F.3d 1286 (Fed. Cir. 2013).

84. Of course, as pointed out by the dissent in *Lucas*, the trial court’s finding that the relevant property was valueless was absurd. *Lucas v. S.C. Coastal Council*, 505 U.S. 1033, 1044 (1992) (Blackmun, J., dissenting). Instead, almost inevitably any property subject to regulation will have some remaining value. The Supreme Court has held that \$200,000 of residual value was enough to mean the property was not left “economically idle,” *Palazzolo*, 533 U.S. at 631, but it has not provided any clear guidance on how much value is enough. This problem is magnified in the oil and gas context, where the “value” of the relevant property interest depends on many factors, most notably the cost of production and the price obtained for the oil and gas. Because these factors can shift dramatically in very short time periods due to changes in technology, operational efficiency, global supply and demand, or even international relations, relying on the economic viability of producing oil and gas, with or without a particular technique such as fracking, is especially problematic. Profits of \$10 million today could easily turn to only \$500,000 or even a net loss tomorrow.

of the proper scope of the property right to be determinative of the outcome.⁸⁵ However, the test is not so simple as to end there, for the *Lucas* court recognized that “background principles” such as nuisance law might provide a defense to these categorical total takes.⁸⁶ Therefore, courts must go beyond assessing the economic impact to also analyze

the degree of harm to public lands and resources, or adjacent private property, posed by the claimant’s proposed activities . . . , the social value of the claimant’s activities and their suitability to the locality in question . . . , and the relative ease with which the alleged harm can be avoided through measures taken by the claimant and the government (or adjacent private landowners) alike.⁸⁷

This defense has come to be known as the “background principles” defense based on language from *Lucas* describing these as “background principles of nuisance and property law.”⁸⁸ Subsequent court decisions and scholars have noted that this analysis applies not just in total takings cases but can operate as a defense even in the default *Penn Central* balancing cases.⁸⁹

Lucas is an interesting and unusual case for several reasons. First, as explained by Justice Scalia in his majority opinion, a regulation will deprive a property owner of all economically beneficial use of property in only “extraordinary circumstances.”⁹⁰ Second, the finding of a total take was highly questionable and ignored the remaining value in the property that did not involve development of single-family residences, such as use for recreation or camping.⁹¹ Third, the state actually had

85. This issue, the “denominator problem,” is discussed *infra* Part III.A.3. This test is highly subject to manipulation by prospective litigants as well as to indeterminate outcomes from courts.

86. “Where the State seeks to sustain regulation that deprives land of all economically beneficial use, we think it may resist compensation only if the logically antecedent inquiry into the nature of the owner’s estate shows that the proscribed use interests were not part of his title to begin with.” *Lucas*, 505 U.S. at 1027.

87. *Id.* at 1030-31 (internal citations omitted).

88. *Id.* at 1030.

89. *Appolo Fuels, Inc. v. United States*, 381 F.3d 1338, 1347 (Fed. Cir. 2004); *Coalition for Gov’t Procurement v. Fed. Prison Indus., Inc.*, 365 F.3d 435, 481 (6th Cir. 2004); Michael C. Blumm & Lucas Ritchie, *Lucas’s Unlikely Legacy: The Rise of Background Principles as Categorical Takings Defenses*, 29 HARV. ENVTL. L. REV. 321, 325-26 (2005) (citing those and other cases).

90. *Lucas*, 505 U.S. at 1017. The majority only recognizes the “extraordinary” nature of this finding once in its opinion. However, the dissent from Justice Blackmun emphasizes this point as well in arguing that the majority was making a dramatic change in takings law in order to address a very rare circumstance, using the memorable phrase “[t]oday the Court launches a missile to kill a mouse.” *Id.* at 1036. Future development of takings law has confirmed that only rarely can plaintiffs demonstrate a total taking has occurred. *See, e.g.*, Blumm & Ritchie, *supra* note 89, at 322.

91. The trial court’s finding that the property had lost all economic value was not reviewed by the appellate courts in South Carolina or the Supreme Court, which instead based its decision on the

amended the relevant law in a way that might have allowed for a special use permit for the sought-after development. This highlighted the fact that the law can, and often does, change, thus calling into question the possibility for regulation ever to entirely take all value of a property.⁹² Despite these unusual aspects of the case, the Supreme Court nevertheless proceeded to announce what was seen at the time as a dramatic alteration of existing takings law, inserting a categorical rule to replace the default balancing test of *Penn Central*.

2. Background Principles – a Defense to Takings Claims

The *Lucas* case recast many earlier takings decisions⁹³ and focused future cases on weighing, as an initial matter, whether the proposed use of property would be permissible under “background principles” of property or nuisance law. Although the *Lucas* case itself focused primarily on nuisance law,⁹⁴ subsequent cases have identified numerous other background principles which may apply.

The *Lucas* case examined in some detail what it would take for a government to invoke nuisance as a “background principles” defense. First, the Supreme Court made clear that background principles provide

assumption that finding was correct. However, Justice Blackmun pointed out in his dissent that the conclusion “is almost certainly erroneous” because the owner retained important property rights such as the right to exclude others, the right to alienate the land for its remaining value, or the right to use the land to “picnic, swim, camp in a tent, or live on the property in a moveable trailer.” *Lucas*, 505 U.S. at 1044.

92. *Id.* at 1011-12. In effect, the court was deciding a “temporary takings” case, although the Supreme Court later clarified its position on temporary takings in the *Tahoe-Sierra* case, where it upheld a moratorium against development lasting 32 months against a takings challenge, finding that compensation was not required under those circumstances. *Tahoe-Sierra Pres. Council v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 331 (2002).

93. For example, the *Mugler* case was distinguished as being a “generally applicable criminal prohibition on the manufacturing of alcoholic beverages” rather than “a regulation *specifically directed to land use*.” *Lucas*, 505 U.S. at 1027 n.14 (emphasis added). Several other cases, such as *Nollan*, *Agins*, and *Euclid*, were converted from cases prohibiting “harmful or noxious use” to cases affirming that regulation is not a taking if it “substantially advances legitimate state interests.” *Lucas*, 505 U.S. 1023-24. Ultimately, the Court distinguished earlier cases which could readily be interpreted to support a broader police power defense to takings claims because they did not involve allegations that “the regulation wholly eliminated the value of claimant’s land.” *Lucas*, 505 U.S. at 1026 (citing *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 513-14 (1987) (Rehnquist, C.J., dissenting)). For example, the *Goldblatt* case was re-characterized as one where “other uses [were] permitted”, *Lucas*, 505 U.S. at 1026 n.13, even though the *Goldblatt* decision repeatedly points out that the regulation “completely prohibits a beneficial use to which the property has previously been devoted,” and that the claimant argued that the regulation “would confiscate the entire mining utility of their property.” *Goldblatt v. Town of Hempstead*, 369 U.S. 590, 592, 596 (1962). No taking was found in that case even though “the use prohibited [was] arguably not a common-law nuisance.” *Id.* at 593. The *Lucas* court similarly reimagined the decisions from *Hadacheck v. Sebastian*, 239 U.S. 394 (1915) and *Miller v. Schoene*, 276 U.S. 272 (1928). See *Lucas*, 505 U.S. at 1048.

94. *Lucas*, 505 U.S. at 1020-32.

an affirmative defense, and thus the burden is on the government agency to prove that the use would be prohibited under the background principles.⁹⁵ Second, the *Lucas* court emphasized that the government must do more than rely on legislative findings that the use of property would be against the public interest,⁹⁶ thus rejecting broad assertions of immunity based on the police power. Third, background principles must have existed for some time and cannot have been “newly legislated or decreed (without compensation).”⁹⁷ Finally, the *Lucas* court cited some broadly-applicable issues to be resolved in answering this question, relying on the Restatement (Second) of Torts rather than the specific nuisance law in South Carolina.⁹⁸

The nuisance exception has been applied as a defense in many cases after the *Lucas* decision was announced.⁹⁹ Colorado applied the nuisance background principle defense to deny a takings claim where the proposed action would have spread radioactive contamination, basing its ruling on common law principles.¹⁰⁰ Other states have relied on public nuisance statutes. For example, government installation of groundwater monitoring wells was found to be immune to a takings challenge because the contamination of groundwater constituted a public nuisance under the California code.¹⁰¹ Florida found that compensation was not required where a city mandated closure of a hotel that had become inextricably entwined with drug and nuisance activity.¹⁰²

Ultimately, the nuisance defense will depend on the particulars of state nuisance law. But the Restatement (Second) of Torts does provide some helpful guidelines. A nuisance may be either public or private.¹⁰³ Public nuisance is based on interference with a right common to the public, such as public health, public safety, the public peace, the public comfort, or the public convenience.¹⁰⁴ Private nuisance is based on an

95. *Id.* at 1031 (“South Carolina must identify background principles of nuisance and property law that prohibit the uses [Lucas] now intends in the circumstances in which the property is presently found.”); Blumm & Ritchie, *supra* note 89, at 326.

96. *Lucas*, 505 U.S. at 1031.

97. *Id.* at 1029. This part of the *Lucas* decision was not joined by Justice Kennedy, who explained in his concurrence that “[t]he common law of nuisance is too narrow a confine for the exercise of regulatory power in a complex and interdependent society. The state should not be prevented from enacting new regulatory initiatives in response to changing conditions, and courts must consider all reasonable expectations whatever their source.” *Id.* at 1035 (Kennedy, J., concurring).

98. *Id.* at 1030-31.

99. Blumm & Ritchie, *supra* note 89, at 335.

100. *Colo. Dep’t of Health v. The Mill*, 887 P.2d 993 (Colo. 1994).

101. *Hendler v. United States*, 38 Fed. Cl. 611 (1997).

102. *Keshbro, Inc. v. City of Miami*, 801 So. 2d 864, 876 (Fla. 2001).

103. Restatement (Second) of Torts: Nuisance § 821A (1979).

104. *Id.* § 821B. Courts also will examine a variety of factors such as the gravity of the harm, the utility of the conduct, and whether the invasion was intentional. *Id.* §§ 825, 827, 828.

invasion of another's interest in the private use and enjoyment of land, which includes the right to freedom from discomfort and annoyance while using the land.¹⁰⁵ The harm must be more than slight inconvenience or petty annoyance, but, rather, a significant harm.¹⁰⁶

Lucas did not limit the background principles defense to nuisance, but instead opened the door for a range of other legal doctrines to work as affirmative defenses to takings claims. Scholars have noted the success of background principles defenses¹⁰⁷ based on the public trust doctrine, the natural use doctrine,¹⁰⁸ the federal navigational servitude,¹⁰⁹ customary rights—particularly of indigenous people's rights,¹¹⁰ water rights restrictions,¹¹¹ the wildlife trust,¹¹² and treaty rights of Native Americans.¹¹³ The Pennsylvania Supreme Court also has recognized another background principle that may provide a defense to takings claims—the environmental rights amendment embodied in the state constitution.¹¹⁴ Citizens in Colorado have cited to their own constitution, which protects inalienable rights to protect their lives, liberties, and property, as justification for passing local bans or moratoria on fracking.¹¹⁵ The application of these and other background principles to the fracking context will be discussed in Part III.A.

The effect that the *Lucas* decision on takings law has been to create an initial opportunity for the government to raise a defense based on background principles. If the government is able to prove that a background principle could impose the same limit as the regulation, then no compensation is required. Only once the court has moved past this “logically antecedent inquiry”¹¹⁶ can the takings claimant seek recovery based on the “total taking” per se rule.

105. *Id.* § 821D cmt. b.

106. *Id.* § 821F cmt. c.

107. For a comprehensive discussion of these defenses, see Blumm & Ritchie, *supra* note 89, at 341-54.

108. *See, e.g.,* *Just v. Marinette Cty.*, 201 N.W.2d 761 (Wis. 1972).

109. *See, e.g.,* *United States v. 30.54 Acres of Land*, 90 F.3d 790, 795 (3d Cir 1996).

110. *See, e.g.,* *Stevens v. City of Cannon Beach*, 854 P.2d 449 (Or. 1993) (custom of beach access prevented taking); *Public Access Shoreline Haw. v. Haw. Cty. Planning Comm'n*, 903 P.2d 1246 (Haw. 1995) (native Hawaiian gathering rights).

111. Blumm & Ritchie, *supra* note 89, at 350-52.

112. John D. Echeverria & Julia Lurman, “*Perfectly Astounding*” *Public Rights: Wildlife Protection and the Takings Clause*, 16 TUL. ENVTL. L.J. 331, 376-81 (2003).

113. Blumm & Ritchie, *supra* note 89, at 354.

114. *Robinson Twp. v. Commonwealth*, 83 A.3d 901, 946-50 (Pa. 2013).

115. COLO. CONST. art. II, § 3.

116. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1027 (1992).

3. The Denominator Problem

Once any background principles defense to a takings claim has been resolved, courts must next determine the scope of the property right against which the regulation's impact is to be measured. This analysis presents the denominator problem. The denominator problem will feature prominently in any litigation over takings in the fracking context because even bans on fracking outright cannot be said to deprive all value of the property unless the property is divided at least down to a severed mineral interest.

The denominator problem has been identified since the inception of regulatory takings jurisprudence. In his dissent in *Mahon*, Justice Brandeis argued that "If we are to consider the value of the coal kept in place by the restriction, we should compare it with the value of all the parts of the land. That is, with the value not of the coal alone, but with the value of the whole property."¹¹⁷ Justice Brandeis specifically cautioned against attempts by property owners to increase their rights by "dividing the interests in his property into subsurface and soil."¹¹⁸ Despite these objections, the majority in *Mahon* found a taking based on the reasoning that "to make it commercially impracticable to mine *certain coal* has very nearly the same effect for constitutional purposes as appropriating or destroying it."¹¹⁹

Numerous scholars also have addressed the denominator problem. Professor Sax highlighted the issue in an important article attempting to create a consistent theory for takings cases.¹²⁰ Professor Sax lamented the "unworkable problem of definition" inherent in the diminution in value test and the "terrible complexities" of trying to identify the property at issue in a takings case.¹²¹ Professor Michelman further elaborated on the issue and coined the name by which it is now known when he explained that the "question is raised of how to define the 'particular thing' whose value is to furnish the *denominator* of the fraction."¹²² Professor Michelman then went on to raise the rhetorical question:

Suppose I am forbidden to remove gravel from my land
. . . Inasmuch as mining rights are well recognized,
divisible interests in land, . . . why not say that any land

117. Penn. Coal Co. v. Mahon, 260 U.S. 393, 419 (1922) (Brandeis, J., dissenting).

118. *Id.*

119. *Id.* at 414 (emphasis added).

120. Joseph L. Sax, *Takings and the Police Power*, 74 YALE L.J. 36, 61-67 (1964).

121. *Id.* at 60.

122. Frank I. Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law*, 80 HARV. L. REV. 1165, 1192 (1967) (emphasis added).

consists of two ‘things’—mining rights and surface rights, . . . and that the relevant denominator in testing a regulation which impinges only on mining rights . . . is the value of *those* rights—which the regulation totally destroys?¹²³

Professor Michelman questions any reliance on divided interests in land, such as severed mineral interests.¹²⁴ Of course other scholars, particularly those who advocate for a stronger property rights stance, argue that dividing up the property is appropriate in the takings analysis.¹²⁵

The denominator problem also was famously discussed in *Lucas* itself. Justice Scalia’s majority opinion in *Lucas* briefly touches on the denominator problem when it notes the “inconsistent pronouncements by the Court” in similar cases such as *Mahon* and *Keystone*.¹²⁶ Justice Blackmun’s dissent goes into more detail regarding the issue, pointing out that the issue “cannot be determined objectively.”¹²⁷ Justice Blackmun cites Professor Michelman on the topic: “We have long understood that any land-use regulation can be characterized as the ‘total’ deprivation of an aptly defined entitlement . . . Alternatively, the same regulation can always be characterized as a mere ‘partial’ withdrawal from full, unencumbered ownership of the landholding affected by the regulation.”¹²⁸ Justice Stevens’ dissent goes even further, calling out the “arbitrariness of such a rule” and noting that courts can read property rights broadly, while developers and investors can sell “specialized estates to take advantage of the Court’s new

123. *Id.* at 1193 (emphasis in original).

124. *Id.* at 1230 (“Holmes intimated strongly [in *Mahon*] that the separation in ownership of the mining rights from the balance of the fee, prior to enactment of the restriction, was critically important to the petitioner’s victory. But why should this be so? We can see that if one owns the mining rights only, but not the residual fee, then a regulation forbidding mining totally devalues the owner’s stake in ‘that’ land. But is there any reason why it should matter whether one owns, in addition to mining rights, residuary rights in the same parcel (which may be added to the denominator so as probably to reduce the fraction of value destroyed below what is necessary for compensability) or residuary rights in some other parcel (which will not be added to the denominator)?”).

125. RICHARD A. EPSTEIN, *TAKINGS: PRIVATE PROPERTY AND THE POWER OF EMINENT DOMAIN* (1985).

126. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1016 n.7 (1992). The *Lucas* majority suggested that the “answer to this difficult question may lie in how the owner’s reasonable expectations have been shaped by the State’s law of property” but avoided the issue in that case because the property interest was an interest in land. *Id.* Under the majority’s speculation, the scope of property interest might be based on “whether and to what degree the State’s law has accorded legal recognition and protection to the particular interest in land with respect to which the takings claimant alleges a diminution in (or elimination of) value.” *Id.*

127. *Id.* at 1054 (Blackmun, J., dissenting).

128. Frank Michelman, *Takings*, 1987, 88 COLUM. L. REV. 1600, 1614 (1988); see also *Lucas*, 505 U.S. at 1054 (Blackmun, J., dissenting) (citing Michelman, *supra*).

rule.”¹²⁹

Both the majority and Justice Blackmun’s dissent pointed to the divergent outcomes in *Mahon* and *Keystone* as examples of the indeterminate nature of this inquiry.¹³⁰ Although similar in many respects, the decision in *Keystone* was careful to analyze whether a taking had occurred not based on an analogy to the *Mahon* case, but rather on the “particular facts” of the case.¹³¹ The similarities between the effect of the regulation, which required that some coal not be mined in order to prevent subsidence, created “obvious and necessary reasons for distinguishing” *Mahon*.¹³² The key distinguishing factors highlighted by Justice Stevens were (1) that the “character of the governmental action involved here leans heavily against a finding of a taking[,]” because the regulation was created to prevent “what it perceives to be a significant threat to the common welfare;”¹³³ and (2) there was no evidence to show that the regulation “makes it impossible for petitioners to profitably engage in their business.”¹³⁴ The second of those distinguishing factors is relevant for the denominator problem. The parties in the case below sought to avoid the “complex and voluminous proofs” that would be required to demonstrate the actual impact that the law would have on the coal company, and so the *Keystone* Court simply rejected a facial challenge to the law.¹³⁵ Thus, the key difference between *Mahon* and *Keystone* was that in the earlier case, the Court had found that the mining of “certain coal” was commercially impracticable, while in the latter case there was no evidence of any actual harm to the claimant.¹³⁶ Yet, the Court did implicitly touch on the denominator problem when it faulted the coal company for failing to introduce evidence “that the Act makes it commercially impracticable for them to continue mining their

129. *Lucas*, 505 U.S. at 1065 (Stevens, J., dissenting). Of course, some of those specialized estates already existed, such as severed mineral interests. Combined with the proliferation of local and state regulations or bans on fracking, the severed mineral estate has the potential to create the perfect storm of manipulation that Justice Stevens anticipated. Professor Patrick McGinley has noted that recognition of smaller and smaller severed mineral interests “provides the opportunity to ‘game’ the system to allow manipulation of less than fee simple estates in land to facilitate takings claims.” McGinley, *supra* note 47, at 577.

130. *Lucas*, 505 U.S. at 1016 n.7, 1054.

131. *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 474 (1987).

132. *Id.* at 484.

133. *Id.* at 485. This finding alone is enough to distinguish the cases, and so *Mahon* can be seen not as a case about diminution of property value, specifically the entirety of mining rights for certain coal, but rather as a case where the de facto appropriation of property was not done for a “public purpose.” *Cf. Kelo v. City of New London*, 545 U.S. 469 (2005) (eminent domain could not be used when land was not taken for “public use”).

134. *Keystone*, 480 U.S. at 485.

135. *Id.* at 493.

136. *Id.*

bituminous coal interests in western Pennsylvania” or identifying “a single mine that can no longer be mined for profit.”¹³⁷ This discussion implies that the Court was taking a broad view of what property interest must be used for the denominator.

Ultimately, the denominator problem is still an issue that plagues federal takings law.¹³⁸ State law may shed some light into how the problem is to be resolved in particular states.¹³⁹ However, the Supreme Court has looked beyond state property law to define the relevant property interest more broadly.¹⁴⁰ A few courts have identified some helpful factors for deciding the appropriate scope of the property interest.¹⁴¹ Yet the issue is particularly problematic for the fracking context, where mineral rights, including rights to oil and gas, often are severed from surface rights in land. Fracking-takings thus present an interesting application of takings law to a new context, and one with incredibly high stakes not just for mineral owners, but also for local governments and neighboring residents who would be affected by fracking operations.

4. Temporary Limitations on Property

One final aspect of takings law is important to discuss, given that several governments have taken the step of placing a moratorium on fracking, rather than restricting it outright in a permanent ban. Thus, a moratorium implicates not the geographic scope of property or the rights

137. *Id.* at 495-96.

138. Unsurprisingly, the Court of Federal Claims is the federal court that has most often dealt with the issue. That court has held that a royalty interest in minerals is a compensable interest for Fifth Amendment takings purposes, although it held off ruling whether a takings had occurred in that case. *Cane Tenn., Inc., v. United States*, 44 Fed. Cl. 785, 792 (1999). However, in a later decision in that case the court held that the denominator to be considered was the parcel as a whole, including uses of the surface estate such as for timber. *Cane Tenn., Inc., v. United States*, 54 Fed. Cl. 100, 108 (2002). Even when the property owner owns more than just the mineral estate, however, a taking might still be bound if the regulation involves “the total destruction of all economically viable use.” *See, e.g., Whitney Benefits, Inc. v. United States*, 926 F.2d 1169 (Fed. Cir. 1991). One attorney from the Department of Justice has noted that it remains an open question in the Federal Circuit whether the *Lucas* categorical taking rule applies to a partial interest in property, such as a mineral estate, and has called for clear resolution of this issue. *See* Kristine S. Tardiff, *Closing the Last Lucas Loophole: The Partial Interest Problem*, in *THE 12TH ANNUAL CLE CONF. ON LITIGATING REG. TAKINGS AND OTHER LEGAL CHALLENGES TO LAND USE & ENVTL. REG.* (Vt. L. Sch. 2009).

139. State-specific takings law for New York and Colorado are discussed *infra* Part III.C.

140. *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 500 (1987) (refusing to treat the support estate as a separate parcel even though state law recognized it as a distinct property interest).

141. *See, e.g., District Intown Prop. Ltd. P’ship v. District of Columbia*, 198 F.3d 874, 880 (D.C. Cir. 1999) (identifying factors to include “the degree of continuity, the dates of acquisition, the extent to which the parcel has been treated as a single unit, and the extent to which the restricted lots benefit the unregulated lot.”).

to make particular use of property; rather, a moratorium implicates the temporal dimension of the bundle of rights.

The leading and most recent case on takings based on a temporary taking rejected finding a categorical per se taking, even if the regulation deprives the property owner of all economic use of property, instead affirming the need to apply the balancing test embodied in *Penn Central*.¹⁴² Thus, in the *Tahoe-Sierra* case, the Supreme Court rejected arguments that the categorical rule from *Lucas* should be extended to temporary takings.¹⁴³ Instead of extending the categorical rule, the Court said that the answer to the question of whether a moratorium on development constitutes a taking “is neither ‘yes, always’ nor ‘no, never’; the answer depends upon the particular circumstances of the case.”¹⁴⁴ In support of this determination, the Court explained that the “parcel as a whole” standard from *Penn Central* meant that destruction of one strand in the bundle of rights is not a taking.¹⁴⁵ Thus in this case, the Supreme Court found it to be error that the district court had “disaggregated petitioners’ property rights into temporal segments corresponding to the regulations at issue and then analyzed whether petitioners were deprived of all economically viable use during each period.”¹⁴⁶ Instead, the Court affirmed that the “parcel as a whole” rule applies and that the denominator problem could not be resolved through the “circular” reasoning of defining the property interest affected by the regulation in terms of what portion of the property was affected by the regulation.¹⁴⁷

On the other hand, the temporary nature of the restriction could not act as a shield.¹⁴⁸ An additional justification for rejecting a categorical take rule for moratoria was the “interest in facilitating informed decisionmaking by regulatory agencies[,]” which would be undermined if officials were forced to rush through the planning process for fear of takings liability.¹⁴⁹ Ultimately, the Court found that a 32 month moratorium did not amount to a taking, rejecting calls to set a

142. *Tahoe-Sierra Preserv. Council v. Tahoe Reg. Planning Agency*, 535 U.S. 302, 320-21 (2002). Because the finding of the lower courts based on *Penn Central* was not challenged, the Court was able to dispose the case simply by declaring that *Penn Central* provided the appropriate test for this case. *Id.* at 321 n.16. Notably, this case was argued by the current Chief Justice of the Supreme Court, John Roberts, as the attorney for the Tahoe Regional Planning Agency. *Id.* at 305.

143. *Id.* at 321.

144. *Id.*

145. *Id.* at 327.

146. *Id.* at 331.

147. *Tahoe-Sierra*, 535 U.S. at 331.

148. *Id.* at 337.

149. *Id.* at 339.

presumptive limit for the duration that is allowed.¹⁵⁰

The question still remains: under what circumstances does a moratorium or other temporary limitation amount to a taking? The answer courts have developed is whether the limitation amounts to an “*extraordinary delay*” in governmental decisionmaking.¹⁵¹ However an “*extraordinary delay*” typically must last for a long time, and courts have rejected temporary takings claims where the delay took seven to eight *years*.¹⁵² Some factors that courts look to in determining if an “*extraordinary delay*” has occurred include bad faith by the government, the nature of the permitting process, and the reasons for any delay.¹⁵³

Thus it is now settled law that a moratorium is neither always nor never a taking and must instead be analyzed using the *Penn Central* factors. In those cases where the balancing test leads to a conclusion that a taking has occurred, the court still must determine the appropriate remedy for the takings claim. The remedy question was squarely presented in the *First English Evangelical Lutheran Church of Glendale v. Los Angeles* case, where the Court reviewed a ruling from the California Supreme Court that monetary compensation was not due for the temporary take that occurs from the time a restriction is enacted until the time that it is enjoined as a taking without just compensation.¹⁵⁴ In that case, the Court rejected the idea that claims for a taking are limited to nonmonetary relief, instead holding that landowners are entitled to bring an action in inverse condemnation under the Takings Clause.¹⁵⁵ The Court was clear that it was not passing on the issue of whether a temporary take had occurred,¹⁵⁶ however, on remand, the California courts determined that no take had in fact occurred, and so no compensation was due.¹⁵⁷

If a temporary restriction on property is found to be a taking, the question still remains of how to put a value on the compensation required. The *First English* Court hinted that the value may be based on “the value of the use of the land during this period,” but did not

150. *Id.* at 341-42 (“[W]e could not possibly conclude that every delay of over one year is constitutionally unacceptable,” especially where the district court found 32 months to be reasonable.).

151. *Tabb Lakes, Ltd. v. United States*, 10 F.3d 796, 800 (Fed. Cir. 1993) (emphasis added).

152. *Williamson Cty. Reg’l Planning Comm’n v. Hamilton Bank*, 472 U.S. 172 (1985) (delay of eight years); *Wyatt v. United States*, 271 F.3d 1090 (Fed. Cir. 2001) (delay of seven years).

153. *Bass Enter. Prod. Co. v. United States*, 381 F.3d 1360, 1366 (Fed. Cir. 2004) (citing *Tabb Lakes*, 10 F.3d at 799; quoting *Wyatt*, 271 F.3d at 1098).

154. *First English Evangelical Lutheran Church v. Los Angeles Cty.*, 482 U.S. 304, 311 (1987).

155. *Id.* at 315.

156. *Id.* at 313.

157. *Tahoe-Sierra Preserv. Council v. Tahoe Reg. Planning Agency*, 535 U.S. 302, 329 (2002) (citing *First English Evangelical Church of Glendale v. Cty. of Los Angeles*, 258 Cal. Rptr. 893 (Cal. Ct. App. 1989)).

explicitly say how the compensation should be valued in that case.¹⁵⁸ Yet the Court was equally clear that it was based on an allegation of total denial of use of the property and did not intend to apply to “normal delays in obtaining building permits, changes in zoning ordinances, variances, and the like.”¹⁵⁹ This case however assumed that the lease of the land would be simply for use that would leave the land in the same state as it was prior to the start of the lease. Fracking-takings, particularly temporary takings, will raise entirely distinct issues of valuation.

B. Takings in the Oil and Gas Industry

The law of takings in the oil and gas context is not nearly as well developed as the law is in regards to other mineral interests such as coal, gravel, or sand, nor as developed as takings law with respect to restrictions on development of land for commercial or other economic purposes.¹⁶⁰ The relatively few cases that have examined takings claims in relation to oil and gas development are discussed in this Part, along with analogous cases from other mineral takings cases. Additionally, some of the unique background principles that apply to oil and gas are worth considering, such as the “reasonable use” restrictions on the right of severed mineral interest owners to occupy the surface in order to extract minerals.

The key initial issue for takings of oil and gas is defining the scope of property rights in oil and gas, or the mineral estate more broadly. In New York, Colorado, and many other states, the right to extract minerals from the subsurface can be and often has been severed from ownership of the surface estate, thus creating a related but distinct mineral estate. The severance of the mineral estate often was accomplished by deed which transferred ownership of the surface while explicitly retaining the mineral rights.

Even if severed, the mineral estate includes more than simply the right to extract oil and gas through fracking. As an initial matter, limitations on fracking do not prevent future extraction of minerals by techniques that do not involve fracking. Bans on fracking do not actually take the resource because the oil and gas remains under ground,

158. *First English*, 482 U.S. at 319.

159. *Id.* at 321.

160. One reason for the lack of development in the law in the oil and gas industry may be that historically the industry has been significantly under-regulated. Only recently, as developments in technology and concerns about the health, safety, and environmental impacts from fracking have become better understood, have governments begun enacting strict regulations or even bans on the oil and gas industry.

to be extracted in the future if the ban is lifted or if new technologies are developed. Additionally, in many areas oil and gas were produced without the use of fracking.¹⁶¹ Going even beyond the oil and gas context, mineral rights include rights to mine coal, sand, gravel, and other minerals as well.¹⁶² In Colorado, for example, the Boulder-Weld coalfield overlaps, to a large extent, the Wattenberg field, the most significant area of oil and gas development along the Front Range. To the extent coal was previously extracted from this area, it might provide another barrier to a fracking-takings claim based on the same mineral estates.

A fee simple property interest in the mineral estate might not even be the subject of a takings claim, as mineral rights often are leased. In such a situation, a company which had entered an oil and gas lease has brought a takings claim against Dallas.¹⁶³ Oil and gas leases add several dimensions to a takings claim, particularly where a moratorium may cause a lease to be extinguished before the moratorium ends.¹⁶⁴ Another even smaller slice of the property interest in mineral rights is a royalty interest. “[T]he owner of a mere royalty interest has no present or prospective possessory interest in the land; . . . owns no part of the minerals (as such) in place; . . . does not become a cotenant in the mineral estate; . . . and [the royalty] interest is merely a present vested incorporeal interest in the land.”¹⁶⁵ Similarly, rights to extract oil and gas often are described as a *profit à prendre*, which is “a right to remove a part of the substance of the land.”¹⁶⁶ Another potential complication is that oil and gas historically were viewed as subject to the rule of capture, although the Texas Supreme Court recently found that groundwater, while subject to the rule of capture, still could be owned in place and therefore potentially was subject to a takings claim.¹⁶⁷

161. Dep. of Stuart Ellsworth at 32:1-24, May 8, 2014, *Colo. Oil & Gas Ass’n v. City of Longmont*, No. 2013CV63 (Boulder Cty. Colo.).

162. Mineral rights include metals such as copper, gold, lead, molybdenum, silver, uranium, and zinc, as well as gemstones such as diamonds. See *Mineral Resources*, COLO. GEOLOGICAL SURVEY, <http://coloradogeologicalsurvey.org/mineral-resources/> (last visited Mar. 10, 2015).

163. *Trinity East Energy, LLC v. City of Dallas*, No. DC-14-1443, 2014 WL 631055 (Dallas Cty., Tex. Dist. Ct. filed Feb. 13, 2014).

164. *Beardslee v. Inflection Energy*, 798 F.3d 90 (2d Cir. 2015) (certifying questions to the N.Y. Court of Appeals regarding whether oil and gas leases are extended due to state moratorium, accepted at 23 N.Y.3d 1047 (2014)).

165. Lee Jones, Jr., *Non-Participating Royalty*, 26 TEX. L. REV. 569, 569-70 (1948).

166. See, e.g., *Atlantic Oil Co. v. Los Angeles Cty.*, 446 P.2d 1006, 1011 (Cal. 1986). A *profit à prendre* “is an interest in real property in the nature of an incorporeal hereditament.” *Id.* For a more detailed discussion of the history of property rights in oil and gas minerals, see K.K. Duvivier, *Sins of the Father*, 1 TEXAS A&M J. OF REAL PROP. L. 391, 393-409 (2014).

167. *Edwards Aquifer Auth. v. Day*, 369 SW.3d 814 (Tex. 2012). Under the rule of capture, neighboring landowners are not liable even if they pump so much groundwater that wells on neighboring land dry up. The Texas Supreme Court compared groundwater to oil and gas extensively to

A few states have decided takings claims based on limitations on the ability to mine sand and gravel. These cases have generated mixed results about one of the key issues in takings—the parcel as a whole. Ohio, for example, has denied a takings claim where a county denied a conditional-use permit to allow the owner to mine sand and gravel on his property.¹⁶⁸ There was no taking even though the property was purchased only to mine sand and gravel, because the court was required to look to the “parcel as a whole” which included surface rights.¹⁶⁹ However, an earlier case had found a taking of coal rights, which was deemed to be severable and had in fact been severed in that case.¹⁷⁰ Somewhat reconciling the two decisions, the Ohio Supreme Court stated, as dicta, that a “mineral estate may be considered the relevant parcel for a compensable regulatory taking if the mineral estate was purchased separately from the other interests in the real property.”¹⁷¹ However, other states, such as Colorado, have rejected this view when squarely confronted with the issue, holding instead that the mineral estate must be considered along with the remainder of the bundle of rights.¹⁷² Separating out the mineral estate in this way would open up the courts and our takings jurisprudence to the manipulation that Justice Stevens predicted in *Lucas*¹⁷³ and should be rejected.¹⁷⁴

Thus far, there have been only a handful of cases involving an inverse condemnation claim based on a prohibition of oil and gas drilling or exploration. The earliest of those cases, which found an unconstitutional taking had occurred, has several key flaws. The Court of Appeals of Michigan issued the decision in 1994, before the advent of modern fracking techniques and our growing understanding of its

reach the conclusion that the rule of capture was not inconsistent with ownership of minerals in place. *Id.* at 828-32. In Colorado at least, the rule of capture has been displaced by the statutory scheme of the Oil and Gas Conservation Act, which was enacted in part to protect the correlative rights to a shared common pool resource. COLO. REV. STAT. 34-60-102(1)(a)(III). Therefore, this Article does not wade into the discussion of whether the rule of capture prevents a takings claim.

168. State *ex rel.* Shelly Materials, Inc. v. Clark Cty. Bd. of Comm’rs, 875 N.E.2d 59, 62 (Ohio 2007).

169. *Id.* at 67.

170. R.T.G., Inc. v. State, 780 N.E.2d 998, 1009 (Ohio 2002).

171. *Shelly Materials*, 875 N.E.2d at 67.

172. Animas Valley Sand & Gravel, Inc. v. Bd. of Cty. Comm’rs of the Cty. of La Plata, 38 P.3d 59, 68 (Colo. 2001).

173. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1065 (1992) (Stevens, J., dissenting).

174. Professor McGinley has examined takings of mineral rights in detail, noting the several serious issues with extending the total taking rule to less than fee simple interest in land: “Because severed mineral interests have all the characteristics of personal property to which the *Lucas* categorical taking rule does not apply, the shrunken bundle of property rights inherent in severed coal property interests similarly should disqualify such interests from the per se protection offered by the *Lucas* categorical rule.” McGinley, *supra* note 47, at 577.

impacts.¹⁷⁵ The primary deficiency in the court's analysis was in its resolution of the denominator problem. The court concluded that the prohibition on drilling "completely deprived plaintiffs of all use of at least some portion of their property holdings in the protected area."¹⁷⁶ The court ignored that directional drilling would allow the production of oil and gas beneath at least a portion of the protected area.¹⁷⁷ Furthermore, the court swept aside as "immaterial" the fact that the plaintiffs had extensive property holdings outside of the protected area that were not affected.¹⁷⁸ And the court did not even address the larger issue of whether the "parcel as a whole" could be appropriately narrowed to the mineral interests.¹⁷⁹ Another problem with the decision was the rejection of a nuisance defense by the government on the grounds that the justification was not to prevent harm on adjoining property, but rather to protect the surface owner's property.¹⁸⁰

The final issue presented in the Michigan case was the valuation question. Here, the appellate court found fault with the trial court's finding of over \$71 million as the required just compensation for the taking.¹⁸¹ The court found that the fair market value of the property at the time of the taking was not the appropriate measure of compensation. Instead the compensation value should have been based on the "fair market rental value of the property."¹⁸² However, because of the unique interests in mineral rights, the calculation of the rental value of the property was not simple. Ultimately, the court settled on providing guidance that the value might be something near the "amount of money they could have received in interest on [the] present value of the income stream" and that could have been produced if the oil and gas were extracted.¹⁸³ The court was careful to note the taking was only temporary in nature, because if the prohibition on drilling was lifted in the future, then the plaintiff could extract the resource and a full compensation for taking would amount to a windfall.¹⁸⁴

Additionally, the Michigan Court of Appeals has backed off of the

175. *Miller Bros. v. Dep't of Nat. Res.*, 513 N.W.2d 217, 219 (Mich. Ct. App. 1994).

176. *Id.* at 220.

177. *Id.*

178. *Id.*

179. *Id.*

180. *Miller Bros.*, 513 N.W.2d at 221. This rejection of a nuisance defense was particularly problematic because the surface property was owned by the federal government, and therefore any harm to public lands would impact the public and not just a private landowner. Additionally, if fracking/takings claimants argue that the mineral estate should be treated as a separate property interest, then the surface estate should not be treated differently than neighboring properties.

181. *Id.* at 220.

182. *Id.* at 223.

183. *Id.* at 224.

184. *Id.* at 223.

approach taken in the *Miller Brothers* case in a more recent takings case related to restrictions on drilling for oil and gas. The court was asked to consider takings claims related to the denial of permits to drill oil and gas wells on private property located within a state forest subject to a comprehensive management plan.¹⁸⁵ The court rejected a categorical takings claim because of the remaining value in the land, such as operation of wells in a limited development region or use of horizontal wells, even if the other options would increase costs or not result in a profit.¹⁸⁶ The court then applied the *Penn Central* factors and found that no unconstitutional taking had occurred.¹⁸⁷ Thus, even in Michigan it seems that a fracking-takings claim would face an uphill battle.

One prominent fracking-takings case is pending against the City of Dallas in Texas state court, but the case is complicated by the fact that the city leased the mineral rights before denying drilling permits to the company.¹⁸⁸ A few other cases have raised, but not decided, the takings issue. For example, a case in West Virginia included claims that denials of permits to drill amount to a taking, however, the West Virginia Supreme Court avoided deciding the takings question by holding that a state statute prohibiting drilling in state parks could not be applied retroactively where a deed conveying mineral interests beneath the state parks preceded the statutory prohibition.¹⁸⁹ Similarly, in Pennsylvania, a case was decided where an oil and gas company alleged takings claims related to drilling in a state park, but the Pennsylvania Supreme Court decided the case on other grounds.¹⁹⁰ This case did make several passing references to takings law, although not necessary to the decision of the case.¹⁹¹ Additionally, in other mineral takings cases, the

185. *Schmude Oil, Inc. v. Dep't of Env'tl. Quality*, 856 N.W.2d 84, 86-87 (Mich. Ct. App. 2014) (per curiam).

186. *Id.* at 93.

187. *Id.* at 94.

188. *Trinity East Energy, LLC v City of Dallas*, No. DC-14-1443, 2014 WL 631055 (Dallas Cty., Tex. Dist. Ct. filed Feb. 13, 2014) (trial was set for November 2, 2015, and summary judgment motions were due in August 2015). Because the city leased the mineral rights, this case is not only a takings case but also involves allegations of fraud and breach of contract. Samantha Blons, *Dallas Takings Case Could Affect Future Mineral Development on Municipal Land*, KAY BAILEY HUTCHISON CTR. FOR ENERGY, LAW & BUS. (Apr. 18, 2014), <http://kbhenergycenter.utexas.edu/2014/04/18/dallas-takings-case-could-affect-future-mineral-development-on-municipal-land/>.

189. *Cabot Oil & Gas Corp. v. Huffman*, 705 S.E.2d 806, 814 (W. Va. 2010).

190. *Belden & Blake Corp. v. Dep't of Conserv. & Nat. Res.*, 969 A.2d 528, 532 (Pa. 2009) (this case involved the imposition bonds, fees, and right-of-way requirements). The court decided the case on the grounds that even though the state owned the surface land, it did not have authority to require more than reasonable use of the surface when the oil and gas company was extracting the resources. *Id.* at 532-33.

191. The court did state that "a grant or reservation of minerals and the right to mine them constitute property rights, which the law recognizes, and which may not be taken for public use without compensation." *Id.* (citing *Penn Coal Co. v. Mahon*, 260 U.S. 393, 415 (1922)). The court did not

Pennsylvania Supreme Court has recognized that mineral rights are not to be analyzed alone in all cases, but, rather, under a flexible approach that considers all relevant factors, including reasonable investment-backed expectations.¹⁹²

Although not a takings case, a court in Texas recently found that oil and gas operations near the Parr family's residence in Texas amounted to a nuisance. In the case, which involved a lot of time and expensive litigation, the jury found the oil and gas operator liable for \$3 million in damages for causing a private nuisance.¹⁹³ The same reasoning could be used in other jurisdictions to defend regulations or prohibitions on fracking from takings challenges. The key issue then becomes an evidentiary issue in each particular case. The *Parr* case does at least show, however, that fracking operations in the immediate vicinity of residential areas has been found to be a nuisance. Although the government would bear the burden of establishing that nuisance law limits mineral interest owners' right to extract their oil and gas, this case shows that it is possible for governments to meet that burden, at least in some instances. The large and growing body of scientific literature documenting the risks associated with fracking would bolster these claims and support arguments from governments that they need not wait until their citizens are harmed to protect them from fracking.¹⁹⁴

Another background principle that might apply to fracking-takings is the reasonable use restriction regarding the use of the surface to extract subsurface minerals.¹⁹⁵ For example, "an aggrieved surface owner may

address any of the complexities for the denominator problem, nor did it discuss the *Penn Central* balancing factors or *Lucas* categorical takings. Thus, not much can be predicted based on these passing and conclusory comments that compensation would be required. As if the earlier statement were not overly broad enough, the opinion concluded with the following statement: "a property owner's interests and rights cannot be lessened, nor their reasonable exercise impaired without just compensation, simply because a governmental agency with a statutory mandate comes to own the surface." *Id.* at 533. This again is of course a borderline absurd misstatement of the law, which allows all kinds of lessening of property rights without requiring compensation, so long as the property right is not deprived of all economically beneficial use. Furthermore, the latter part of the conclusion perhaps provides the key to understanding this decision – it was based not on a takings analysis but rather rested on the proposition that a surface owner cannot condition the extraction of minerals, even when the surface owner is the state. That reading of this case would not be as blatantly inconsistent with *Keystone*, *Penn Central*, and numerous other takings precedents.

192. *Machipongo Land & Coal Co. v. Commonwealth*, 799 A.2d 751 (Pa. 2002) (citing the test laid out by the Federal Circuit in *Loveladies Harbor, Inc. v. United States*, 28 F.3d 1171 (Fed. Cir. 1994)).

193. *Parr v. Aruba Petroleum, Inc.*, No. CC-11-1650-E (Dallas Cty. Tex. 2014). The case focused on the toxic air emissions from the oil and gas operations and their effects on the neighboring Parr family. Toxic air emissions are but one impact of fracking on neighbors and the public that might amount to a nuisance.

194. See discussion at *supra* notes 9-13, and accompanying text.

195. The court in *Miller Bros.* did not address this, but instead only focused on nuisance as the only possible background defense. *Miller Bros. v. Dep't of Nat. Res.*, 513 N.W.2d 217, 221 (Mich. Ct.

bring a common law action in tort against an operator who has used the surface in an unreasonable manner.”¹⁹⁶ “The right to use the surface as is reasonably necessary, known as the rule of reasonable surface use, does not include the right to destroy, interfere with or damage the surface owner’s correlative rights to the surface.”¹⁹⁷ The right of reasonable surface use “does not create an ownership interest in the surface estate, or the right to destroy the surface, but merely a right of access.”¹⁹⁸ Mineral interests may not be extracted in such a way that the surface rights are destroyed, even if destruction of the surface is the only practical means of extracting the minerals.¹⁹⁹

The central policy question raised by the background principles issue asks when it is appropriate for government to proactively limit or prohibit industrial activity that threatens the health, safety, and welfare of the public. Must governments and their citizens wait for harm to occur and then seek compensation from the oil and gas industry, as happened in the *Parr* case? Or can governments take preemptive action to protect their citizens by imposing limits on fracking, even if those limitations have significant economic effects? Even if the harm already has occurred, proving harm due to fracking and related activities still can be costly, if not impossible, due to the latent nature of many of the harms²⁰⁰ as well as complex issues of causation related to different lifetime exposures to toxic chemicals. Thus, the only approach which guarantees that the public health and welfare will not be harmed is allowing government to regulate or even prohibit fracking where it deems the risk to the public to be too great. This approach is on especially sound footing when it is applied in densely populated urban and suburban communities where industrial activity has been found to be incompatible with competing land uses such as homes, schools, and parks. Fracking has been proven to be a nuisance in some instances.

App. 1994).

196. *Gerrity Oil & Gas Corp. v. Magness*, 946 P.2d 913, 926 (Colo. 1997). The court further explained that “when a surface owner asserts a claim of trespass based on alleged excessive surface use, the trier of fact must consider whether the operator’s use of the surface was reasonable and necessary.” *Id.*

197. *Id.* (citing *Colo. Fuel & Iron Corp. v. Salardino*, 245 P.2d 461, 464 (Colo. 1952)).

198. *Notch Mountain Corp. v. Elliott*, 898 P.2d 550, 556 (Colo. 1995).

199. *Barker v. Mintz*, 215 P. 534, 535 (Colo. 1923). The court rejected claims that “the only practicable way to mine this coal is to strip off the soil and gravel lying upon it; that it cannot be practically mined by tunnel or shaft because there is no solid rock above it,” instead finding that the right to “use” the surface cannot mean to destroy it. *Id.*

200. *See Colborn et al., supra* note 5. (“The damage may not be evident at the time of exposure but can have unpredictable delayed, life-long effects on the individual and/or their offspring. Effects of this nature would be much harder to identify than obvious impacts such as skin and eye irritation that occur immediately upon contact. Health impairments could remain hidden for decades and span generations.”)

The impacts of fracking are becoming more and more clearly understood by the scientific community, as they already are understood by many residents where fracking takes place. The noise, pollution, and annoyance that fracking inflicts upon its neighbors is more than sufficient to prevent a fracking-takings claim where government has acted to protect the public health, safety, and welfare.

C. State-Specific Takings Law

1. New York Takings Law

Although New York courts have not yet addressed takings claims in connection with mineral rights, they have upheld a variety of laws directed at protecting public interests through protection of the environment. For example, the courts found no unconstitutional taking based on requiring a conservation restriction in exchange for approval of development.²⁰¹ Similarly, denial of variances from setback requirements under tidal wetlands permitting was not an unconstitutional taking.²⁰² Courts in New York typically apply the familiar *Penn Central* test (a New York case, of course) to determine if a taking has occurred, sometimes finding an unconstitutional taking but often times not.²⁰³

Regarding the critical issue of the scope of the property right to be analyzed, New York courts adhere to the “parcel as a whole” rule.²⁰⁴ This rule has been applied in cases challenging regulations designed to protect the environment, such as the wetlands regulations.²⁰⁵ New York courts also have rejected a takings claim when rezoning a property as residential precluded the operation of a crushed-stone quarry on the property because the property still retained some economic value.²⁰⁶

201. *Smith v. Town of Mendon*, 822 N.E.2d 1214, 1220-21 (N.Y. 2004).

202. *Gazza v. N.Y.S. Dep’t of Env’tl. Conservation*, 679 N.E.2d 1035, 1043 (N.Y. 2003).

203. *See, e.g., Friedenborg v. N.Y.S. Dep’t of Env’tl. Conservation*, 767 N.Y.S.2d 451, 460 (N.Y. App. Div. 2003) (finding a taking, under *Penn Central* factors, where a wetlands regulation destroyed “all but a bare residue of the economic value of the property.”).

204. *See Putnam Cty. Nat. Bank v. City of New York*, 829 N.Y.S.2d 661, 663 (N.Y. App. Div. 2007).

205. *Spears v. Berle*, 397 N.E.2d 1304, 1308 (N.Y. 1979) (property owner wished to extract humus, sand, and stone from property subject to wetlands regulation); *Chase Manhattan Bank, N.A., v. State*, 479 N.Y.S.2d 983 (N.Y. App. Div. 1984).

206. *Briarcliff Assocs., Inc. v. Town of Cortlandt*, 708 N.Y.S.2d 421, 424-25 (N.Y. App. Div. 2000).

2. Colorado Takings Law

Colorado has not yet issued any takings decisions in the oil and gas context. However, takings claims in other contexts, particularly those involving mineral rights, as well as cases discussing background principles of law, are useful in predicting the outcome of fracking-takings cases in Colorado. These cases briefly will be presented to provide the final background necessary to analyze fracking-takings in our two case study jurisdictions.

The first key issue is the scope of property rights that would be analyzed in a fracking-takings case in Colorado. Like many other states, Colorado does recognize a severed mineral estate.²⁰⁷ However, when squarely presented with the issue, the Colorado Supreme Court has held that “the appropriate focus of a takings inquiry is the property rights as an aggregate rather than merely the mineral rights.”²⁰⁸ The same court also held that the denominator for assessing the economic impact of a regulation should be “the contiguous parcel of property owned by the landowner, not merely the segment most severely affected.”²⁰⁹ Earlier Colorado cases once could have been read to support a narrower reading, as they had recognized a taking of mineral rights, specifically coal, due to a requirement to provide support for a highway on the surface.²¹⁰ However, that case was decided before the Supreme Court decision in *Keystone* which clarified that enforcing support requirements for coal do not necessarily create a taking.²¹¹ Furthermore, the question of considering separate mineral rights was not squarely presented, as it was in the more recent case discussed above. Therefore, the current state of the law in Colorado is that courts are required to look at the full bundle of rights in land as part of a single contiguous property.

One additional wrinkle to consider is that oil and gas have traditionally been treated differently from coal. Specifically, Colorado courts have applied nuisance as a background principle defense against takings claims. Most prominently, the Colorado Supreme Court rejected claims by the owner of a uranium-contaminated mill site alleging a total regulatory taking of its property by the Colorado Department of Public Health and Environment.²¹² The court held that “a property owner

207. *Russell Coal Co. v. Bd. of Cty. Comm’rs of Boulder County*, 270 P.2d 772, 774 (Colo. 1954).

208. *Animas Valley Sand & Gravel, Inc. v. Bd. of County Comm’rs of the County of La Plata*, 38 P.3d 59, 68 (Colo. 2001). The relevant mineral rights in this case which could be produced from the land were sand and gravel. More broadly, the court stated that “it is inappropriate to limit a takings inquiry solely to one particular right in the land, or, to a particular part of the land.” *Id.* at 61.

209. *Id.* at 68.

210. *Russell Coal*, 270 P.2d at 774.

211. *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 481 (1987).

212. *Colo. Dep’t of Health v. The Mill*, 887 P.2d 993, 997 (Colo. 1994). Notably, this case was

[cannot] reasonably expect to put property to a use that constitutes a nuisance, even if that is the only economically viable use for the property.”²¹³ And the issue of whether a nuisance had occurred expressly was held to be a “question of law” which could be resolved by the appellate courts,²¹⁴ thus indicating that Colorado does not require a great deal of evidence to “prove” that an activity would constitute a nuisance. The basic principles of nuisance law relied on in Colorado are that it applies to both activities and conditions, that a public nuisance is “the doing or failure to do something that injuriously affects the safety, health, or morals of the public or works some substantial annoyance, inconvenience, or injury to the public,” and that uses of land that “cause pollution constitute a nuisance” under Colorado common law.²¹⁵ The application of these broad nuisance principles to fracking-takings will be discussed more fully in Part III.A, *infra*.

Finally, the Colorado constitution protects “inalienable rights” of its citizens. This protection creates another background principle defense in fracking-takings cases in Colorado. The Bill of Rights to the Colorado Constitution states that “[a]ll persons have certain natural, essential and inalienable rights, among which may be reckoned the right of enjoying and defending their lives and liberties; of acquiring, possessing and protecting property; and of seeking and obtaining their safety and happiness.”²¹⁶ These rights were specifically cited in several of the local ballot measures to place moratoria or bans on fracking in local communities.²¹⁷ Although the Colorado Supreme Court declined to reject a preemption claim in the *Longmont* case based on inalienable rights,²¹⁸ the Court did not hold that inalienable rights have no meaning in Colorado, and thus they might still provide a background principle defense against a fracking-takings claim, even going beyond common law nuisance principles.

One final aspect worth mentioning is that the takings clause in the Colorado constitution is somewhat broader than the federal takings clause, in that it protects against not just takings but also “damage” to private property.²¹⁹ Thus, Colorado law protects “property owners who

defended for the state by two prominent conservative lawyers, Gail Norton who was then the Attorney General (and later served as U.S. Secretary of the Interior) and Timothy Tymkovich, the State Solicitor General, who currently sits on the United States Court of Appeals for the Tenth Circuit.

213. *Id.* at 1001.

214. *Id.* at 1002 n.7.

215. *Id.* at 1002.

216. COLO. CONST. art. II, § 3.

217. See discussion at *supra* notes 38-41, and accompanying text.

218. *City of Longmont v. Colo. Oil & Gas Ass’n*, 369 P.3d 573, 585-86 (Colo. May 2, 2016).

219. “Private property shall not be taken *or damaged*, for public or private use, without just compensation.” COLO. CONST. art. II, § 15 (emphasis added). Also worth noting is that the Colorado

have been substantially damaged by public improvements made upon land abutting their lands, but where no physical taking by the government has occurred.”²²⁰ However, outside of the situation where government action to create some public improvement damages private land, the Colorado Supreme Court has interpreted the state takings clause as consistent with the federal takings clause.²²¹ Thus, both state and federal cases interpreting the Takings Clause would be relevant in deciding a fracking-takings claim brought in Colorado.

IV. DOES REGULATION OF FRACKING CAUSE A TAKING OF PRIVATE PROPERTY?

A. Fracking and Background Principles

Regardless of the bundle of rights held, a property owner does not have the right to take one of the sticks from the bundle and poke it in his neighbor’s eye. While the owners of oil and gas mineral interests may sincerely believe that they have an absolute right to extract their property, no court has ever recognized such an absolute right. Rather, as courts have repeatedly emphasized, the definition of property and property owners’ reasonable expectations include both the concept of limitations on property through background principles of law and property such as nuisance. The metaphor often used is that “a nuisance may be merely a right thing in the wrong place – like a pig in the parlor instead of the barnyard.” Thus, the Supreme Court has recognized that takings do not occur when circumstances change such that previously lawful activity is deemed “injurious to the health, morals, or safety of the community,”²²² or when the uses around the property preclude its use in a certain manner, such as for a brickyard,²²³ or when new circumstances arise giving the public interest priority over a private property interest, such as a disease spreading through trees.²²⁴ Fracking,

constitution does not contain a public use requirement, however since one has been found in the federal takings clause, *see* *Kelo v. City of New London*, 545 U.S. 469 (2005), the difference is not material here.

220. *Pub. Serv. Co. of Colo. v. Van Wyk*, 27 P.3d 377, 388 (Colo. 2001) (citing *City of Pueblo v. Strait*, 36 P. 789, 791 (Colo. 1894)). The “damage” in this case was to landowners adjacent to an above-ground electric power line. Other cases applied the “damage” clause where the government constructed a viaduct next to plaintiff’s land, *City of Pueblo*, 36 P. 789, or made improvements to streets abutting private property that caused harm, *Troiano v. Colo. Dep’t of Highways*, 463 P.2d 448, 449 (Colo. 1969); *Harrison v. Denver City Tramway Co.*, 131 P. 409 (Colo. 1913).

221. *Animas Valley Sand & Gravel, Inc. v. Bd. of Cty. Comm’rs of the County of La Plata*, 38 P.3d 59, 64 (Colo. 2001).

222. *Mugler v. Kan.*, 123 U.S. 623, 668 (1887).

223. *Hadacheck v. Sebastian*, 239 U.S. 394 (1915).

224. *Miller v. Schoene*, 276 U.S. 272 (1928).

particularly when conducted in heavily populated areas, implicates many of these background principles.

New York has made a strong showing that fracking amounts to a public nuisance at common law based on the report from the state Department of Health. The nuisance-like impacts of fracking documented include air pollution, water pollution, induced earthquakes, community impacts of boom town economics, and health impacts such as increased cancer risk and premature births.²²⁵ These impacts would qualify as nuisance in New York as they are substantial harms that are unreasonable in nature, particularly in relation to fracking near residences and other highly populated areas.²²⁶

Colorado nuisance law readily can be applied to fracking-takings claims. In Colorado, a “public nuisance is the doing or failure to do something that injuriously affects the safety, health, or morals of the public or works some substantial annoyance, inconvenience, or injury to the public.”²²⁷ Thus, the Colorado Supreme Court has rejected a takings claim based on nuisance background principles because “relevant Colorado common law principles would not permit a landowner to engage in activities that spread radioactive contamination.”²²⁸ Colorado statutory nuisance law also would apply to fracking-takings cases. The Colorado Public Nuisance statute prohibits “[a]ny unlawful pollution or contamination of any surface or subsurface waters in this state, or of the air” as well as “the conduct of persons in or about that place [] such as to annoy or disturb the peace of . . . the residents in the vicinity.”²²⁹ Ample evidence exists that fracking causes or may cause pollution of the air and water, and many unwilling neighbors to fracking sites can testify to how fracking “annoys or disturbs the peace” of their community.²³⁰

225. N.Y.S. DEP’T OF HEALTH, A PUBLIC HEALTH REVIEW OF HIGH VOLUME HYDRAULIC FRACTURING FOR SHALE GAS DEVELOPMENT 5-8 (2014).

226. *Copart Indus., Inc. v. Consol. Edison Co. of N.Y., Inc.*, 362 N.E. 2d 968, 972 (N.Y. 1977). A private nuisance under New York law threatens the use or enjoyment of land by one or relatively few people, while a public nuisance includes actions which “endanger or injure the property, health, safety or comfort of a considerable number of persons.” *Id.* at 971.

227. *Colo. Dep’t of Health v. The Mill*, 887 P.2d 993, 1002 (Colo. 1994).

228. *Id.* The court went on to explain that the property owner’s expectation that he would be able to use his property in a way that would spread contamination was “highly unreasonable.” *Id.*

229. COLO. REV. STAT. 16-13-304(1)(a) and 16-13-305(1)(e) (1995).

230. One cautionary note that might limit the availability of the background principles defense based on nuisance is the hesitancy of courts to impose remedies such as injunctions to prevent an anticipatory nuisance. For example, a decades-old Colorado Supreme Court case held that an injunction should not have issued to prevent the anticipatory nuisance of a quarry, particularly where the operation of the quarry was otherwise lawful and compatible with the area’s zoning regulations. *Green v. Castle Concrete Co.*, 509 P.2d 588, 591 (Colo. 1973). However, this decision emphasized repeatedly that the court was deferring to the legislative judgment of the relevant government authorities, and that factor would weigh on the other side of the scale in a takings challenge, because the relevant legislature would have found a limitation on fracking to be necessary under the circumstances. Still, the concept of

Allowing fracking, a large and disruptive industrial process, in the middle of residential or commercial zoned areas therefore would be prohibited under background principles of nuisance in Colorado. There is no good justification for waiting for communities to suffer harm and then have to sue for damages, like the Parr family was forced to do in Texas.

The Supreme Court essentially has treated the background principles argument as an affirmative defense, placing the burden on the government to prove that nuisance or other background principles prohibit the property owners' use of his property under current circumstances.²³¹ Although this requirement rejects a cautionary approach to protecting public health and welfare, governments often will be able to make the showings required under state nuisance law. It is not a particularly heavy lift to show that fracking, and all of its associated processes, cause pollution, such as diesel exhaust from the heavy trucks, hazardous chemicals released at the wellhead, or the noise and light pollution associated with heavy industrial activity located in residentially-zoned areas, spills, and the risk of groundwater contamination.²³² The poor safety record of the industry²³³ might provide sufficient evidence that fracking causes an unreasonable risk of harm to others, particularly where the fracking operations would be located near homes, schools, or businesses, as is often the case.²³⁴ Evidence of difficulty selling property with nearby fracking operations or of people forced to move from their home to escape the noise, light, vibration, or pollution from fracking operations also likely would rise to the level of a "substantial annoyance, inconvenience, or injury to the public."²³⁵ While it is certainly true that oil and gas extraction has not been considered a nuisance historically, times have changed. When

anticipatory nuisance highlights the burden that government would have to carry to show that nuisance law would impose limits on the ability of the oil and gas industry to conduct fracking operations. For a more detailed discussion of anticipatory nuisance, see George P. Smith, II, *Re-Validating the Doctrine of Anticipatory Nuisance*, 29 VT. L. REV. 687 (2005) (noting judicial hesitancy to restrain conduct before its effects are known).

231. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1031 (1992).

232. *See, e.g., Wilmore v. Chain O'Mines*, 44 P.2d 1024, 1027 (Colo. 1934) (property owner has no right to pollute a stream).

233. An exhaustive accounting of the industry's safety record is beyond the scope of this Article. However, one of the oil and gas operators in Longmont, TOP Operating, had such a poor safety record that it prompted citizens to band together to ban fracking in the community. Leaks at TOP Operating's wells and waste pits have been known since 2006. *See Longmont looks at drilling suggestions*, LONGMONT TIMES-CALL, http://www.timescall.com/ci_20411471/longmont-oil-gas-drilling-suggestions (last visited May 25, 2016).

234. *Moore v. Standard Paint & Glass*, 358 P.2d 33, 36 (Colo. 1960) (holding that nuisance law applies both to conditions and activities on private property which create unreasonable risk of harm to others).

235. *Colo. Dep't of Health v. The Mill*, 887 P.2d 993, 1002 (Colo. 1994).

courts are presented with evidence on the full range of impacts associated with fracking, the risk of harm, pollution, and annoyance caused by modern industry practices stand a good chance of being deemed a nuisance. The likelihood of finding a nuisance increases in densely populated areas or residentially zoned areas where industrial activity is out of place and incongruous with the neighboring land uses such as homes and schools. Although a nuisance defense would be by no means a slam dunk, the realities of modern fracking practices and the severe disturbance and impacts they impose on neighbors in otherwise tranquil areas at least make this a viable defense that could gain traction in court.

Going beyond nuisance law, reasonable use is another background principle that might insulate fracking regulations and bans from takings claims in New York and Colorado. This principle applies most directly to impacts on the surface property, unlike nuisance which focuses more on the neighboring properties. However, because of the use of horizontal drilling in fracking cases, which now means that the oil and gas being extracted may lie under property far from the wellsite, a broader application of the principle may be justified. Reasonable use is a limitation under New York law where courts have found mineral rights do not include the right to take unreasonable actions or actions not necessary to the production of underlying minerals.²³⁶ In Colorado, the law protects surface property owners from mineral owners who use the surface in an unreasonable manner, and the right of reasonable surface use “does not include the right to destroy, interfere with or damage the surface owner’s correlative rights to the surface.”²³⁷ If the only means for extracting the minerals requires unreasonable interference with surface rights, then the mineral owner effectively has no right to extract the minerals.²³⁸ Governments have many factual arguments that large scale fracking operations, and all of their associated activities, amount to an unreasonable use of the surface due to their large footprint, pollution and safety risks at the surface, and the interference with the rights of surface owners by reducing their property value or limiting their ability to sell their property.

Additionally, the public trust doctrine is an inherent aspect of sovereignty, including state sovereignty, which imposes a trust

236. *Miles v. Home Gas Co.*, 316 N.Y.S.2d 908, 910 (N.Y. App. Div. 1970) (disallowing right to store gas from foreign fields on surface property); *see also* *Marvin v. Brewster Iron Mining Co.*, 55 N.Y. 538 (N.Y. 1874); *Frank v. Fortuna Energy, Inc.*, 856 N.Y.S.2d 322 (N.Y. App. Div. 2008) (discussing reasonable use for oil and gas interest).

237. *Gerrity Oil & Gas Corp. v. Magness*, 946 P.2d 913, 926 (Colo. 1997); *see also* *Notch Mountain Corp. v. Elliott*, 898 P.2d 550, 556 (Colo. 1995); *Barker v. Mintz*, 215 P. 534, 535 (Colo. 1923).

238. *Barker*, 215 P. at 535.

responsibility for certain critical natural resources on behalf of the public, and, as such, this constitutes a background principle that can defend against fracking-takings claims.²³⁹ The public trust doctrine has deep historical origins and has been recognized in U.S. law since at least 1892.²⁴⁰ Initially applied to tidal or navigable waters, the public trust doctrine has been expanded to other water resources such as wetlands and groundwater as well as non-water resources such as parks, forests, wildlife, and ecosystems.²⁴¹ Sovereign governments, including New York and Colorado, have obligations to protect these public trust resources. To the extent that fracking harms those resources, the public trust doctrine acts as a background principle defense for any regulation or prohibition on fracking designed to prevent that harm.

New York has taken a relatively broad approach to the public trust doctrine, recognizing that it applies to public park land²⁴² as well as the more traditional application to navigable waters.²⁴³ The public trust doctrine even has been discussed in a takings case in New York based on a challenge to the Long Island Pine Barrens Protection Act, part of the state Environmental Conservation Law.²⁴⁴ The takings claim was rejected, even though it limited development on Long Island, based on the justification that a law designed to conserve drinking water did not amount to a taking because it merely gave expression to the public trust doctrine.²⁴⁵ Although Colorado courts have not expressly applied the public trust doctrine in any of their cases,²⁴⁶ Colorado was admitted to

239. See generally Joseph L. Sax, *The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention*, 68 U. MICH. L. REV. 471 (1970).

240. *Ill. Central R.R. Co. v. Ill.*, 146 U.S. 387, 455 (1892) (finding that public trust responsibilities over navigable waters and the lands beneath them prevented the state from selling submerged lands to a private interest).

241. See Kevin J. Lynch, *Application of the Public Trust Doctrine to Modern Fisheries Management Regimes*, 15 N.Y.U. ENVTL. L.J. 285, 292-93 (2007).

242. *Capruso v. Vill. of Kings Point*, 16 N.E.3d 527, 530 (N.Y. 2014); see also *Williams v. Gallatin*, 128 N.E. 121 (N.Y. 1920) (prohibiting the commissioner of parks from allowing portion of Central Park to be used for non-park purposes).

243. See, e.g., *Adirondack League Club, Inc. v. Sierra Club*, 615 N.Y.S. 788, 792 (N.Y. App. Div. 1994), *aff'd*, 706 N.E.2d 1192 (N.Y. 1998).

244. *W.J.F. Realty Corp. v. State*, 672 N.Y.S.2d 1007, 1012 (Sup. Ct. 1998) (discussing law designed to protect drinking water).

245. “This generation’s duty has been discharged merely by setting aside this land for their use under the doctrine of the Public Trust.” *Id.* at 1012. The court created a broad application of the background principles defense when it stated “conservation laws need no specific scientific justification and admit no rebuttal on the basis of utility. In enacting environmental mandates (as in protecting the right of property), we are merely discharging our obligation under the societal contract” between generations. *Id.*

246. Most cases involving the public trust doctrine in Colorado revolve around attempts by voters to require stricter adherence to the public trust doctrine through ballot measures. See, e.g., *In re Title, Ballot Title, Submission Clause for 2011-2012 No. 3*, 274 P.3d 562 (Colo. 2012). In cases making substantive claims regarding the public trust doctrine, the Colorado courts have declined to reach the

the Union “on an equal footing with the original states” and, therefore, has the same sovereign rights and responsibilities over public trust resources as other states.²⁴⁷ While Colorado has some latitude in defining the scope of the public trust doctrine it will apply, it cannot completely abdicate its public trust responsibilities.²⁴⁸ Thus, the public trust doctrine must be viewed as a potential limitation on mineral owners’ property rights in both New York and Colorado.

Finally, both the Colorado constitution and state statutes authorize regulations that are designed to protect public health, safety, and welfare.²⁴⁹ The inalienable rights provision of the Colorado constitution creates a background principle that affirmatively authorizes all citizens, including when acting through their government, to protect their “right of enjoying and defending their lives and liberties; of acquiring, possessing and protecting property; and of seeking and obtaining their safety and happiness.”²⁵⁰ The owners of mineral rights do not have a property interest in extracting their oil and gas in a manner that threatens those inalienable rights like fracking threatens to do. Additionally, the Colorado Oil and Gas Conservation Act requires that the state ensure that production of oil and gas is “consistent with protection of public health, safety, and welfare, including protection of the environment and wildlife resources.”²⁵¹ This state statute embodies several background principles such as nuisance, reasonable use, inalienable rights, and the police power of government as a valid pre-existing limitation on mineral

merits. *See City of Steamboat Springs v. Johnson*, 252 P.3d 1142, 1148 (Colo. Ct. App. 2010) (case involved construction of a highway on greenbelt area and claim that public trust required dedication of additional open space to replace the lost greenbelt land); *Aspen Wilderness Workshop, Inc. v. Colo. Water Cons. Bd.*, 901 P.2d 1251, 1263 (Colo. 1995) (Mullarkey, J., dissenting) (finding that state agency, in complying with relevant statutory provision, had “satisfied whatever public trust responsibilities it may have”).

247. *Shively v. Bowlby*, 152 U.S. 1, 26-28 (1894).

248. *See, e.g., Ill. Central R.R. Co. v. Ill.*, 146 U.S. 387, 460-61 (1892).

249. Colorado courts have said remarkably little on the status of the public trust doctrine in that state. The court has acknowledged that the public trust has been used in other contexts, but failed to explain why it does not apply to the specific case before it. *See People v. Emmert*, 597 P.2d 1025, 1027-28 (Colo. 1979) (basing the decision on a narrow reading of a state constitutional provision setting up the prior appropriate system for water rights). The public trust doctrine has been criticized in a few dissents from the Colorado Supreme Court as well. *See, e.g., Aspen Wilderness Workshop, Inc. v. Colo. Water Conserv. Bd.*, 901 P.2d 1251, 1263 (Colo. 1995) (Mullarkey, J., dissenting); *In re Title, Ballot Title, Submissions Clause for 2011-2012 No. 3*, 274 P.3d 562, 572-74 (Colo. 2012). Most of the cases in Colorado discussing the public trust doctrine deal with attempts to amend the state constitution by explicitly defining the scope of the public trust doctrine as it applies to water in Colorado, rather than cases where the court discusses the meaning of existence of the public trust doctrine directly. Thus, it is not correct to state that the public trust doctrine does not exist in Colorado. Rather, the courts in Colorado simply have not applied the public trust doctrine substantively to any cases or taken any opportunity to define its scope, particularly as it might apply to resources other than water.

250. COLO. CONST. art. II, § 3.

251. COLO. REV. STAT. § 34-60-102(1)(a)(I) (2014).

estates such as oil and gas.

B. Defining the Scope of the Property Right for a Total Take

If courts determine that no background principles would support the regulation being challenged, the next step in a takings analysis would be to define the scope of the property analyzed. Based on the guidance provided by the Supreme Court, the industry claimant would seek to argue for a narrow scope, limited to only mineral rights or to an oil and gas lease, perhaps. In contrast, government defendants would argue that the full scope of property, up to a fee simple interest in land, should be the relevant property interest based on the “parcel as a whole” rule. The outcome would depend on the specific facts of each case, state property law, and how willing the particular court is to find a taking.

The most defensible definition for the scope of the property right is a fee simple estate in land. If this approach is adopted, then proving the occurrence of a total take would be nearly impossible. The surface likely would retain at least some value, even if oil and gas development was prohibited. This is particularly the case in cities and towns in New York and Colorado, where much of the proposed development would be beneath existing uses on the surface such as homes, schools, parks, etc. Many Supreme Court cases support this approach, based on the parcel as a whole rule.²⁵² No Supreme Court case after *Lucas* has applied the total take rule to anything less than a fee simple interest in land.

After a fee simple in the land as a whole, a severed mineral estate is the property that has the most likely chance of being recognized as the appropriate basis for takings purposes. This argument is unlikely to succeed where the surface estate and the mineral estate both have the same owner,²⁵³ but may have some chance of success if the mineral estate is owned separately from the surface. This is often the case in many states, including New York and Colorado. However, even if the only focus is on the mineral estate, it still will be difficult to prove that a total take has occurred. A fracking ban would affect only oil and gas, so any value in the mineral estate in coal, sand and gravel, or other minerals would defeat a total takings claim.

Even if oil and gas are the only minerals that have economic value in a particular parcel, a total take claim still faces several obstacles. First, oil and gas previously may have been produced from the parcel using

252. Most notably, the Supreme Court rejected attempts to break apart the bundle of rights in a fee simple interest in land, particularly with regard to air development rights, which are analogous to mineral rights. *Penn Central Transp. Co. v. City of New York*, 438 U.S. 125, 130 (1978).

253. *See, e.g.,* *District Intown Prop. Ltd. P’ship v. District of Columbia*, 198 F.3d 874, 880 (D.C. Cir. 1999) (giving limited value to subdivision of property where all lots held by the same owner).

traditional drilling and completion techniques, or perhaps fracking itself.²⁵⁴ This historical production would preclude a total take.²⁵⁵ Second, it may be possible to produce oil and gas without using fracking. Even if this would result in less oil and gas being produced, and thus less profit to industry, it nevertheless would defeat a total takings claim. Third, even if no oil and gas could be economically produced without using fracking, the mineral estate may still have some remaining value. Circumstances often change in the industry. Not only might a ban on fracking be lifted if politics change, or if the impacts of fracking can be reduced enough to be deemed “safe” by the government, but new technologies might come along that would allow the resource to be produced without using fracking.²⁵⁶ Thus, assertions that the value of the mineral estate is zero without the ability to frack should be treated with skepticism by the court.²⁵⁷ Finally, the claimant must be able to prove that he or she actually would produce the oil and gas in the absence of a fracking ban. This must be more than a mere assertion, particularly given the rapidly evolving technological and economic conditions. When oil and gas prices were riding high, it would have been much easier for takings plaintiffs to prove that they actually could produce oil and gas at a profit. At currently low prices for both oil and gas, these claims are much less credible.²⁵⁸

254. Recent news reports have indicated at least some examples of oil and gas companies that are currently operating producing wells in New York from a formation other than the Marcellus Shale, which would preclude a total take finding even if only the mineral estate was examined. See Anya Litvak, *Uncommon Legal Concept May Surface in New York After Fracking Ban*, PITTSBURGH POST-GAZETTE (Dec. 23, 2014, 1:00 AM), <http://powersource.post-gazette.com/powersource/policy-powersource/2014/12/23/Uncommon-legal-concept-may-surface-in-New-York-after-fracking-ban/stories/201412230015> (discussing how Talisman Energy has 70 wells producing from a limestone formation below the Marcellus Shale).

255. Historical production would most clearly preclude a total take where ownership of the property had not changed. However, it may be tempting to think that if historical production predated the current owner’s interest in the mineral estate, then a total take might still be allowed. This reasoning should be rejected by courts, because it would create an untenable and unfair system where a longtime owner cannot bring a takings claim but a new owner could. This would invite mineral interest owners to game the system by simply selling the mineral estate to a new owner in order to bring a takings claim based on a total take categorical claim. Public liability for takings claims should not be subject to the whims of such gamesmanship.

256. Although flawed in many ways, the Michigan Court of Appeals decision in *Miller Bros.* did at least recognize the temporary nature of restrictions on oil and gas development, because the oil and gas remains in place so that it may be extracted in the future if the ban is lifted, for example. See *Miller Bros. v. Dep’t of Nat. Res.*, 513 N.W.2d 217, 222-23 (Mich. Ct. App. 1994).

257. The Supreme Court had recognized a reduction of over 93% as not amounting to a total take. See, e.g., *Palazzolo v. R.I.*, 533 U.S. 606, 630-31 (2001). It is not difficult to imagine that someone might be willing to purchase mineral rights at 7% of their value in order to have the option of producing if the law changes to allow fracking, or the technology allows production without fracking.

258. See, e.g., U.S. ENERGY INFO. ADMIN., *SHORT-TERM ENERGY OUTLOOK* 29 tbl.2 (Mar. 10, 2015) (projecting average price of West Texas Intermediate crude oil to be \$52.15 for 2015, compared to \$93.26 in 2014, for a decline of 44 percent). Of course, oil and gas prices may well go up again in the

Colorado law on takings of mineral interests, like federal law, is mixed. The Colorado courts have not addressed takings in the oil and gas context, but they have for other mineral interests such as sand and gravel or coal. In a sand and gravel takings case, the Colorado Supreme Court affirmed the “parcel as a whole” rule, holding that “the appropriate focus of a takings inquiry is the property rights as an aggregate rather than merely the mineral rights.”²⁵⁹ The court explicitly discussed the U.S. Supreme Court’s decisions in *Penn Central* and *Keystone* which rejected attempts to conceptually sever the airspace development rights and the support estate in coal respectively.²⁶⁰ Thus Colorado has rejected the severed estate approach suggested by states such as Ohio.²⁶¹ A regulatory taking might still be found when analyzing the effect of fracking regulations on the parcel as a whole, but not a *Lucas* total.²⁶²

Coal takings cases in Colorado should not be read to support choosing the oil and gas estate or the mineral estate as the denominator for the total takings test. First, any Colorado cases finding a taking of coal interests are over half a century old,²⁶³ much less recent than the *Animas Valley Sand & Gravel* decision in 2001 which squarely ruled on this question. Second, the only coal takings case which came after *Lucas* was decided actually found no unconstitutional taking, whether total or otherwise.²⁶⁴ While coal takings cases are interesting because

future. But they may also go down. Reliance on “economics” as a factor in the takings analysis is called into question by the oil and gas example, due to the wild fluctuations in a market driven largely by speculation. But even assuming that reliance on economics is good policy, the economics of fracking in many areas are not good currently. The weekly rig count in the United States has been dropping precipitously in recent months, indicating declining interest in drilling new oil and gas wells. See, e.g., Angela Chen, *U.S. Rig Count Falls to 922 in Latest Week*, WALL ST. J. (Mar. 6, 2015, 1:33 PM), <http://www.wsj.com/articles/u-s-rig-count-falls-to-922-in-latest-week-1425666810> (noting the thirteenth straight week of declines, with the number of all oil and gas rigs at 1,192, down from 1,792 a year ago). Additionally, industry reports indicate that many wells which have been drilled have not been completed, i.e. fracked, because it would not be profitable to do so with oil and gas prices so low. Dan Murtaugh & Lynn Dolan, *Introducing Fracklog, the New-Fangled Oil Storage System: Energy*, WASH. POST/BLOOMBERG, (Mar. 6, 2015, 2:11 PM), <http://www.bloomberg.com/news/articles/2015-03-06/introducing-fracklog-the-new-fangled-oil-storage-system-energy> (citing Continental Resources CEO as saying 85% of wells are not being completed currently). Additionally, the breakeven price for many areas is near or even above current prices. *FACTBOX-Breakeven Oil Prices for U.S. Shale: Analyst Estimates*, REUTERS (Oct. 23, 2014) (noting many areas where the breakeven price for oil is above the current oil price of around \$50/bbl; estimates for the Niobrara, which includes the areas in the Colorado case study, range from \$46.10-\$72.75).

259. *Animas Valley Sand & Gravel, Inc. v. La Plata County*, 38 P.3d 59, 68 (Colo. 2001).

260. *Id.*

261. See *State ex rel. Shelly Materials, Inc. v. Clark Cty. Bd. of Comm’rs*, 875 N.E.2d 59, 67 (Ohio 2007).

262. *Animas Valley Sand & Gravel*, 38 P.3d at 65 (noting that a regulatory taking might be proven under a fact-specific inquiry even if a total take was not established).

263. See, e.g., *William E. Russell Coal Co. v. Boulder Cty.*, 270 P.2d 772 (Colo. 1954).

264. *City of Northglenn v. Grynberg*, 846 P.2d 175, 181-82 (Colo. 1993) (noting that severance of

they also involve mineral interests, they are also readily distinguishable, because any cases that found a taking have relied on a permanent requirement to leave coal in place in order to support the surface, which is different from regulations or prohibitions on fracking based on the adverse public health, safety, and environmental impacts associated with that particular technology.²⁶⁵

One final policy issue is relevant regarding the scope of the property for fracking-takings in Colorado based on the current legal disputes over fracking bans. In order for a taking to be found based on a fracking ban, Colorado courts (specifically the Colorado Supreme Court) first would have to find that local bans on fracking are not preempted by state law. Only then would a takings claim even arise.²⁶⁶ Yet a decision which does not involve preemption of local regulations would lay the groundwork for a finding of no unconstitutional taking. A finding of no preemption likely would be based on one of two findings: (1) fracking is a matter of local concern, because the impacts fracking has on the local community outweighs any state interest in promoting oil and gas development; or (2) regulation including a ban on fracking is consistent with the state interest which in turn requires oil and gas development to be consistent with protection of public health and the environment. Thus, it is difficult to imagine the Colorado Supreme Court finding an unconstitutional taking had occurred after first ruling that state law does not preempt a ban. Essentially, a local fracking ban likely only survives if the courts recognize that fracking creates a nuisance in local communities. Thus, the prospect for takings claims in Colorado is particularly dim, given the context of its bans and the nature of state preemption law.

So what is the takeaway then regarding the scope of the property right? In large part this is unknown, particularly in New York and Colorado, as the issue has not yet been squarely presented. However, for basically every plausible fact pattern, it would be difficult, if not

the mineral estate included a duty to support the surface and rejecting a physical occupation claim based on a “single, transitory physical invasion” through drilling of a test well). The court further rejected a claim that information from the test well which showed that coal mining on the subject property was not commercially feasible. *Id.* at 184.

265. The effect of the more permanent requirements for coal to support the surface estate are discussed more fully at *infra* Part IV.D.

266. There is a possibility of a “temporary takings” claim based on the time between when a ban was enacted and when it might be invalidated as preempted. However, such a claim is unlikely, as for the most part industry has not demonstrated that it would actually be fracking in the particular jurisdictions with bans currently. In fact, in Longmont the principal operator has agreed not to bring any takings claims until after the preemption issue is decided. Complaint of Intervenor TOP Operating Company ¶ 15, June 21, 2013, Colo. Oil & Gas Ass’n v. City of Longmont, No. 2013CV63, (Boulder Cty. Colo.) (“TOP has agreed not to assert, either directly or indirectly (through another party), any takings claim or claim for damages against Longmont in this action.”).

impossible, to prove that a total take had occurred. First, a finding of a total take would require a very narrow interpretation of Supreme Court precedent that would focus on a narrowly defined mineral estate. Second, the claimant would have to prove at least the following facts: (1) no oil and gas had been produced previously from that mineral estate; (2) no oil and gas could be produced in the future without the use of fracking; (3) oil and gas could be produced, under current economic and technical conditions, using fracking; and (4) the remaining value of the mineral estate, with a fracking ban in place, was zero. This appropriately has been described as an uphill battle and one that is unlikely to succeed.

C. Regulation of Fracking under the Penn Central Factors

The most likely test to be applied in a fracking-takings case—assuming no background principle defense was shown—would be the familiar *Penn Central* balancing test. As this is a highly fact-specific test and the ultimate outcome of any weighing by courts is largely indeterminate, this Article will not attempt to predict with any certainty how cases would come out under this test. However, a few general observations again indicate the difficulty that a claimant would face under this approach.

The character of the government action likely would weigh strongly against finding a taking. A prohibition on fracking does not physically invade any private property. Rather, it is aimed at securing the common good by preventing the externalities associated with extracting oil and gas through the use of fracking. This factor recognizes that the government has a role in protecting the public health. In the face of any uncertainty about whether fracking is consistent with the protection of public health and welfare, courts should be extremely hesitant to overrule the decisions of legislative bodies. Where those legislative bodies have concluded that the public should not have to bear even the uncertainty of risks, it is appropriate for courts to defer to this conclusion unless it can be shown by a fracking-takings claimant that the government's action is clearly erroneous.

In New York, the state has gone to extraordinary lengths to document the uncertainty surrounding fracking and whether it can be done safely. Because fracking poses a serious risk to the common good, the character of the government action strongly supports a finding of no taking. In contrast to the nuisance background principle defense, here the government need not prove fracking constitutes a nuisance, but rather that a prohibition on fracking is necessary to support the common

good.²⁶⁷ Because the harms of fracking are concentrated greatly on the areas in the immediate vicinity of fracking operations, and the benefits often flow to distant oil and gas companies, the market cannot be relied upon to reduce these externalities and, thus, government regulation is necessary and appropriate.

In Colorado, where fracking bans or regulations are relatively limited in geographic scope and focused on relatively dense urban and suburban areas, the character of the government action would support regulation to reduce or limit those harms. The local laws in Colorado should be seen as valid exercises of zoning authority²⁶⁸ or as necessary actions by government to protect the inalienable rights of all citizens to protect their lives, liberty, safety, and their own property rights.²⁶⁹ Thus, the character of the government action, designed at protecting broad public interests and preventing harm, should weigh heavily against a taking in most, if not all, fracking-takings cases.

The economic impact of the regulation largely would depend upon the resolution of the denominator problem, discussed more fully in the previous section. This factor could range from minimal impact to a very significant impact, depending on the unique facts and circumstances of each case. However, where the diminution in value is less than 100%, even very large impacts of regulations have been found not to amount to an unconstitutional taking under the *Penn Central* factors.²⁷⁰ Thus, even if this factor supports finding an unconstitutional taking, it is far from conclusive.

The final factor, interference with distinct investment-backed expectations, also would be highly fact-specific, thus making conclusions difficult to draw from this analysis. However, one issue for claimants to overcome would be the likelihood that the profits made from fracking largely would be a windfall, particularly if they have held ownership of the mineral interests for more than a decade or so. Before the development of modern fracking techniques along with horizontal drilling, the resources being extracted today were seen as “not recoverable” and of limited to no value. For most oil and gas companies, mineral interest owners, or royalty owners, these

267. The *Penn Central* balancing factors are only reached if the government could not prove that the regulation merely prevented activity which would be deemed a public nuisance. Thus, the character of government action may still support a finding of no taking even if the government cannot prove that fracking would be a nuisance. Courts have been repeatedly instructed to look at the totality of circumstances under the *Penn Central* test, including specifically the public purposes served by the regulation in question. *Palazzolo v. R.I.*, 533 U.S. 606, 633-34 (2001).

268. Particularly if local regulations or bans are not preempted under state law.

269. COLO. CONST. art. II, § 3.

270. See, e.g., *Palazzolo*, 533 U.S. at 630-31 (finding that \$200,000 remaining value out of a total value of \$3,150,000, for a take of over 93%).

developments were not due to their own investments. Rather, these changes converted previously worthless mineral interests into ones that could make tremendous windfall profits if companies and owners are allowed to frack wherever they please. Absent a showing that a fracking-takings plaintiff has reasonably invested significant amounts of capital in the expectation it could utilize fracking, this factor is unlikely to support a takings claim.

D. Temporary Restrictions on Fracking: The Case of Moratoria

If an outright ban on fracking found in New York state or some local jurisdictions in Colorado is unlikely to be found to constitute an unconstitutional taking, then a moratorium on fracking designed to give government officials a chance to catch up to the rapid pace of change in the oil and gas industry is even less likely to be found a taking. All of the same reasons why a ban would not be a taking apply in this situation—already a very difficult hill for fracking-takings plaintiffs to climb. Additional arguments against temporary takings will make takings claims based on moratoria nearly impossible.

A good example of a moratorium is the one enacted through a ballot measure by the citizens of Fort Collins, Colorado. Concerned that their city council was not responding to the will of the voters, a group of community members organized to place a five year moratorium on the ballot, and this moratorium was approved at the ballot box in November 2013.²⁷¹ The stated purpose of the moratorium was to “protect property, property values, public health, safety and welfare” while providing time for the city “to study the impacts of the process [of fracking] on the citizens of the City of Fort Collins.”²⁷² This express purpose fits well with the Supreme Court’s reasoning for rejecting a taking in the *Tahoe-Sierra* case, because the additional time allows city regulators to study the impacts and devise an appropriate regulatory response, thus “facilitating informed decisionmaking” by the city.²⁷³

Although the length of the moratorium in Fort Collins is longer than the moratorium at issue in *Tahoe-Sierra*, there is no bright line rule for when a moratorium lasts too long. Instead, courts must ask whether the moratorium amounts to an “extraordinary delay in governmental

271. See City of Fort Collins, Special Election held in conjunction with the Larimer County General Election (Nov. 5, 2013), <http://www.fcgov.com/cityclerk/elections2013nov.php> (the moratorium was adopted with 57% in favor).

272. Proposed Citizen Ordinance, Nov. 5, 2013, <http://www.fcgov.com/cityclerk/ballotlangfull-2013nov.php>.

273. *Tahoe-Sierra Preserv. Council v. Tahoe Reg. Planning Agency*, 535 U.S. 302, 339 (2002).

decisionmaking.”²⁷⁴ In the case of Fort Collins, there is a strong argument from the city that the delay was reasonable under the circumstances and necessary based on pending studies, the results of which were expected to become available during the course of the moratorium. Specifically, the ballot measure through which the moratorium was adopted explicitly refers to a health impact assessment expected to be conducted by the State of Colorado.²⁷⁵ Additionally, proponents of the moratorium cited to additional studies to explain why they chose a five year moratorium period.²⁷⁶ These facts should be more than sufficient to preclude a takings claim based on this five year moratorium, especially since courts have declined to find an unconstitutional taking based on even longer delays of up to seven to eight years.²⁷⁷

E. Valuation of Any Takings Found

Even assuming that a takings could be proven, and no affirmative defense is available, the tricky question of valuation remains. Fracking-takings present several difficult questions with no simple answers. Unlike a fee simple interest in land, which has a reasonably clear market value, mineral interests are highly speculative. Often the value of the interest is not known until the oil and gas actually is produced and sold. Additionally, because the value in mineral interests is not in owning or using them, but, rather, in producing and selling the resource, the property interest is in many ways more akin to personal property than to real property. Yet the minerals are not actually taken—they remain under ground to be potentially produced at some time in the future. Finally, the oil and gas industry is a notoriously boom and bust industry, not just because of the quick declines in production, but also due to large and unpredictable swings in the market price for the resource. As a result of all of these factors, court valuation of fracking-takings claims is tremendously difficult.

One thing can be said with relative confidence, however: the valuation of a takings claim should not be based on lost profits, despite the industry’s common assertion.²⁷⁸ Even the one questionable decision

274. *Tabb Lakes, Ltd. v. United States*, 10 F.3d 796, 800 (Fed. Cir. 1993).

275. Proposed Citizen Ordinance, *supra* note 272.

276. *Aff. of Elizabeth Giddens, Colo. Oil & Gas Ass’n v. City of Fort Collins*, No 2013CV31385 (Larimer Cty. Colo.) (citing studies by the National Science Foundation and Environmental Protection Agency as well as the state, expected to be released between 2016 and 2019).

277. *See, e.g., Williamson Cty. Reg’l Planning Comm’n v. Hamilton Bank of Johnson City*, 472 U.S. 172 (1985) (delay of eight years); *Wyatt v. United States*, 271 F.3d 1090 (Fed. Cir. 2001) (delay of seven years).

278. *See, e.g., TOP Operating Company’s Amended Response to Citizen Intervenors’ Motion for*

which found a taking in the oil and gas context did not agree that this valuation was appropriate.²⁷⁹ The production of oil and gas is a risky business. Sometimes wells do not produce oil and gas or do not produce the quantities expected. It is not uncommon for operators to lose money on individual wells. Paying the value of the presumed resource or for speculative “lost profits” would take all of the risk away and create a windfall for the claimant at the expense of the public.

Another reason to avoid paying for the value of the resource or for lost profits is that the government is not actually taking the oil and gas. Governments have not condemned mineral rights or oil and gas interests and, therefore, unless the court finds a permanent taking occurred and transfers the taken property interest to the government, the owner still retains the right to extract the minerals if the regulations change to allow fracking or if a new technique comes along that allows production without fracking. Oil and gas prices might also go up so much in the future that alternate means to produce oil and gas, which are not economical under today’s standards, could allow mineral rights owners to extract value from their resource even if existing regulations and bans remain in place.

The dramatic swings in the price of oil and gas raise an additional issue. Even if fracking could be proven to be the only means of producing oil and gas from a particular mineral estate, delays in producing the resource actually might work to the advantage of the mineral interest owner. This would be relevant for any “temporary takings” claims that might occur, particularly as the price of oil and gas have dropped dramatically in recent months. If the price rebounds in the future, it may be that the restrictions on fracking either had no economic impact or could lead to increased profits for claimants who weren’t producing during periods of low prices. If the price declines for an extended period of time, then many fracking-takings plaintiffs may not even be able to show that their mineral interests have any value.

These considerations call into question whether recognition of a taking is even appropriate. Let us imagine a hypothetical world where the price of oil drops to \$20/bbl and remains there for an extended period of time. This price for oil would preclude most if not all potential takings claims related to fracking bans or regulations. Yet if

Stay Pending Appeal at 3, Colo. Oil & Gas Ass’n v. City of Longmont, No. 2013CV63 (Boulder Cty., filed Oct. 2, 2014) (arguing based on an apparent back of the envelope calculation that it could make over \$215M by drilling 13 wells in Longmont immediately, and therefore that a bond of nearly \$20M should be posted to stay judgment while an appeal could be pursued) The court rejected this argument, and set a bond of \$100, which was 0.0005% of the requested \$20M. Order: Reply in Support of Stay Pending Appeal, Colo. Oil & Gas Ass’n v. City of Longmont, No. 2013CV63 (Boulder Cty. Oct. 14, 2014).

279. Miller Bros. v. Dep’t of Nat. Res., 513 N.W.2d 217, 222 (Mich. Ct. App. 1994).

the price ten years from now increases to \$150/bbl, perhaps due to disruptions in supply in unstable regions like the Middle East or Nigeria, could a takings claim be brought at that time? Why should the determination of an unconstitutional taking be so dependent on issues utterly outside the control of state or local governments? Might governments then have an incentive to restrict fracking when the price of oil and gas is low in order to protect against the harms of fracking on their communities, yet if the price of oil and gas rises, they should then decide that protecting the health, safety, and welfare of the community is not worth potentially crippling takings judgments against them?²⁸⁰ Or instead does takings law provide the same incentives to governments to game the system as it would to mineral interest owners? Should governments—now that they know new resources are recoverable but only in ways that greatly upset their communities—initiate eminent domain proceedings to formally take mineral interests when the prices are low, because they cannot be extracted economically at that time? Surely the Takings Clause of the Fifth Amendment was not intended to create such perverse incentives.

A simple example, based on realistic numbers for the price of oil and the cost of producing it, is helpful to understand the dramatic change that can occur in very short timeframes. Let us assume that an oil and gas development project has the potential to produce 200,000 barrels of oil (gas excluded for simplicity). Assume further that the cost to produce that oil amounts to \$45/bbl,²⁸¹ or \$9,000,000. Let us assume the price for oil goes from \$95/bbl to \$50/bbl.²⁸² Assuming all the oil was produced in a year, a company could invest \$9 million to make a \$10 million profit at \$95/bbl, but would only make \$1 million profit on the investment of \$9 million at \$50/bbl. Thus, a potential takings claim based on the value of lost profits could vary by an order of magnitude if a fracking-takings case was filed in 2014 instead of 2015. Thus, any just compensation awards that are based on estimated value of the oil and gas are highly arbitrary.

No court has yet announced a consistent and justifiable system for putting a valuation on a takings claim in the oil and gas context. In the only case to actually find a taking, the Michigan Court of Appeals reversed the lower court on the valuation issue.²⁸³ The court held that

280. For a critique of putting a dollar value on human life and health, see generally Liza Heinzerling & Frack Ackerman, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553 (2002).

281. See *supra* note 258, explaining that breakeven costs for the Niobrara shale, which includes the Wattenberg field beneath Longmont, Colorado, range from \$46.10-\$72.75.

282. See *id.*, discussing how EIA predicts oil prices to average barely above \$50/bbl in 2015, after averaging over \$90/bbl in 2014.

283. *Miller Bros.*, 513 N.W.2d at 221.

an award of \$71,479,000—determined to be the fair market value of the property found to be taken—should not have been equated with the just compensation that was owed.²⁸⁴ After walking through some of the difficulties in determining the market value in this type of case,²⁸⁵ the court instead proposed that just compensation should be based instead on the “fair market *rental* value.”²⁸⁶ The court found that the rental value, rather than the cash value of the entire mineral interest at that time, was the appropriate measure, because the plaintiffs were not “permanently” deprived of the use of their property, but instead that their use was “indefinitely delayed.”²⁸⁷ However, even the fair market rental value approach has serious, insurmountable flaws.

First, there is no actual market for rental of the right to extract resources that cannot be extracted.²⁸⁸ Who would rent the right to extract oil and gas that he or was prohibited from extracting? The court focused too much on what the owner would want to be paid in order to delay development, rather than what a prospective renter would pay for the right to do nothing. The better way to approach this issue would be to attempt to determine how much someone would pay to acquire speculative mineral interests in the hope of sometime being able to extract the minerals in the future due to changes in law, technology, or economics. However, this is another way of saying that some value remains in the mineral estate, despite the impact of the regulation being challenged and, thus, no taking should be found in the first place.

The second problem with the fair market rental value approach is that it is based on the admittedly problematic determination of the “pretaking cash value of the plaintiff’s property.”²⁸⁹ Although converting the market value to a rental value by applying market interest rates does reduce the taking award, it does not address the underlying difficulties in calculating the market value. For instance, how are changes in the price of oil and gas to be accounted for? If the prices go up, shouldn’t the property owner be entitled to more compensation? If the prices go down, shouldn’t the government have to pay less? Why should the

284. *Id.* at 220-21.

285. The court noted that “it is impossible to know whether there is oil and gas under the protected area without drilling wells” but found it persuasive that the plaintiffs “almost certainly would have discovered some oil and gas had they been allowed to drill in the protected area.” *Id.* at 222. Whether the plaintiffs had proven they would “almost certainly” produce enough oil and gas to justify at \$70 million award against the government was not discussed.

286. *Id.* at 223 (emphasis added).

287. *Miller Bros.*, 513 N.W.2d at 222-23. This distinction was intended to prevent either the public from being enriched at the expense of the property owner, or the property owner from being enriched at the expense of the public. *Id.* at 223.

288. Even the *Miller Bros.* court recognized that “there is almost certainly no true rental market to look to for guidance.” *Id.* at 223.

289. *Id.* at 222.

prices used in the determination of the value be set at one particular time, the time when a takings claim ultimately was decided? This would open takings law to significant manipulation, and plaintiffs would attempt to time their fracking-takings claims with periods of high oil and gas prices. However, if the court attempts to correct this by requiring repeated reevaluations, this would create large bureaucratic processes or expensive and continued court oversight. Creating a fair system for ongoing determination of a fair market rental value would be, I suggest, unworkable and impractical.

One final point is that fracking-takings are distinguishable from the closest available analogy of regulatory takings of coal by requirements for supporting the surface. Leaving coal in place to support the surface is far more permanent than simply prohibiting fracking, which is the currently preferred completion method in the oil and gas industry. While surface uses might change or new technology might be developed to allow for future extraction of the coal without causing surface subsidence, it is much more plausible to assume that the coal must always remain in order to support the surface. In stark contrast, it is much easier to imagine a future where developments in technology or our understanding of the impacts of fracking mean that restrictions on fracking to protect public health, safety, or welfare may be lifted. Or new completion techniques might be developed that would allow the oil and gas at issue to be produced without fracking. Or the price of oil and gas might go so high that even if relatively less amounts of oil and gas could be produced without fracking, production would nevertheless be economical. Thus, courts should resist calls to simply analogize to the very different circumstances that surround regulatory takings of coal required to support the surface.

V. CONCLUSION

Despite common claims by many oil and gas companies, regulation of fracking likely would not amount to a taking except in limited circumstances. Many fracking-takings claims would be defensible as restrictions based on background principles of law such as nuisance, particularly those cases where industry seeks to operate in densely populated areas near homes and schools. Even if background principles do not preclude a taking, oil and gas companies or royalty owners would have a difficult time proving a total take under the parcel as a whole rule. Thus, most fracking-takings would be analyzed under the *Penn Central* factors, where again, the purpose of regulations or prohibitions designed to prevent harm to neighbors and the public likely would preclude a taking. Temporary restrictions on fracking such as moratoria

are even less likely to be deemed a taking under existing caselaw. Finally, even if a taking could be proven, the numerous issues in putting a value on speculative amounts of oil and gas that might be extracted in the future create serious policy reasons that further argue against a taking. Thus, absent unusual circumstances, most courts should reject fracking-takings claims and allow state and local laws regarding fracking to remain in force without requiring potentially crippling “just compensation” awards, which, in effect, give governments the ability to respond to the public demand that public health, safety, and welfare be protected, even it requires the oil and gas industry not to have free reign to frack as it pleases.