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INVERSE CONDEMNATION AND FRACKING DISASTERS: GOVERNMENT LIABILITY FOR THE ENVIRONMENTAL CONSEQUENCES OF HYDRAULIC FRACTURING UNDER A CONSTITUTIONAL TAKINGS THEORY

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Abstract: The practice of hydraulic fracturing, more commonly known as fracking, risks a number of dangerous environmental consequences. Notably, fracking operations can contaminate the underlying water table. Contamination of groundwater can disrupt the access of a nearby property to both potable drinking water and viable commercial irrigation. Usually, when a fracking operation results in this kind of groundwater contamination, affected plaintiffs sue the operator of the rig. This Note proposes that similarly situated plaintiffs also name a new defendant in these actions: the state agency that granted the fracking permit. The governmental actor could bear liability under a constitutional theory of inverse condemnation. Where contamination interferes with an individual's use and enjoyment of property, the government actor bears responsibility for orchestrating the activity that caused the interference. In short, the government should be more discerning when granting permits to frack, because it can be held financially responsible for the fallout.

INTRODUCTION

In the last decade, hydraulic fracturing, colloquially known as “hydrofracking” or “fracking,” has prompted an energy revolution.¹ This technique, used to extract fossil fuel from the earth, ballooned in popularity over the last decade, and that popularity has generated significant national controversy.² Proponents of fracking point to its potential to create jobs and reduce United States depend-

* Senior Articles Editor, BOSTON COLLEGE ENVIRONMENTAL AFFAIRS LAW REVIEW, 2016–2017.

¹ See John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas as a Case Study in Innovation Policy*, 64 EMORY L.J. 955, 957, 966 (2015); Roderick M. Hills, Jr., *Hydrofracking and Home Rule: Defending and Defining an Anti-Preemption Canon of Statutory Construction in New York*, 77 ALB. L. REV. 647, 647 (2014); Shawn Tully, *The Shale Oil Revolution is in Danger*, FORTUNE (Jan. 9, 2015), <http://fortune.com/2015/01/09/oil-prices-shale-fracking/> [<https://perma.cc/QF9Z-WNTX>].

² Barbara H. Garavaglia, *Hydraulic Fracturing: Sources of Law and Information*, MICH B.J., Sept. 2013, at 58, 58; Golden & Wiseman, *supra* note 1, at 966.

ence on foreign oil as reasons for their support.³ Environmental opponents of the practice decry hydrofracking because of the risk of dangerous environmental consequences.⁴ They highlight evidence that fracking rigs contribute to greenhouse gas emissions, create toxic air and water contamination, and trigger dangerous seismic events.⁵ Environmentalists have had mixed success using legal techniques to block fracking operations around the country because of numerous political and legislative obstacles.⁶ Since 2014, a sustained drop in the price of oil on the global market has stalled the fracking boom; however the method remains state-of-the-art and is likely here to stay.⁷

Despite widespread concerns about the public health risks and environmental harms caused by hydrofracking, opponents of the practice find themselves with a limited legal toolkit.⁸ To some extent, opponents achieved success with new legislation banning fracking at the state level in New York and Vermont, and at more local levels in Colorado and California.⁹ These efforts are likely difficult to duplicate in many other parts of the country, where vocal political support for fracking precludes the success of such aggressive legislation.¹⁰

³ W. McDonald Plosser, Note, *Into the Fracking Fray: A Balanced Approach to Regulating Hydraulic Fracturing in Tennessee*, 44 U. MEM. L. REV. 667, 673 (2014); Amanda Skalski, Note, *Regulating Hydraulic Fracturing in Michigan: The Protection of Our Waters and Our People Hits Another Roadblock*, 14 J. L. SOC'Y 277, 278 (2013); Matt Willie, Comment, *Hydraulic Fracturing and "Spoty" Regulation: Why the Federal Government Should Let States Control Unconventional Onshore Drilling*, 2011 BYU L. REV. 1743, 1749.

⁴ Hannah Coman, Note, *Balancing the Need for Energy and Clean Water: The Case for Applying Strict Liability in Hydraulic Fracturing Suits*, 39 B.C. ENVTL. AFF. L. REV. 131, 135 (2012).

⁵ Coman, *supra* note 4, at 135; Mike Malfenttone, Comment, *A Nation Fractured: Drilling into the Debate over Fracking*, 2 ARIZ. J. ENVTL. L. & POL'Y 1039, 1041 (2012); Carlos Romo & Colin Cox, Developments, *Natural Resources*, 45 TEX. ENVTL. L.J. 401, 402 (2015).

⁶ See William S. Friedlander, *Poisoned Wells*, TRIAL, Mar. 2011, at 16, 17, 20 (outlining petroleum industry carve-outs in the Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act, and Comprehensive Environmental Response, Compensation, and Liability Act).

⁷ See Shalanda Helen Baker, *Is Fracking the Next Financial Crisis? A Development Lens for Understanding Systemic Risk and Governance*, 87 TEMP. L. REV. 229, 254 (2015); Leslie Carothers, *Options for Regulating the Environmental Impacts Hydraulic Fracturing*, [2015] 45 Env'tl. L. Rep. (Env'tl. Law Inst.) 10,752, 10,754 n.19; Inessa Abayev, Note, *Hydraulic Fracturing Wastewater: Making the Case for Treating the Environmentally Condemned*, 25 FORDHAM ENVTL. L. REV. 275, 275 (2013); David Wethe, *Half of U.S. Fracking Companies Will Be Dead or Sold This Year*, BLOOMBERG NEWS (Apr. 22, 2015, 12:21 PM), <http://www.bloomberg.com/news/articles/2015-04-22/half-of-u-s-fracking-companies-will-be-dead-or-sold-this-year> [<https://perma.cc/YAK7-E3CM>].

⁸ Friedlander, *supra* note 6, at 17, 20.

⁹ Colin C. Deihl et al., *Tug of War over Colorado's Energy Future: State Preemption of Local Fracking Bans*, [2014] 44 Env'tl. L. Rep. (Env'tl. Law Inst.) 10,524, 10,524; Edward S. Renwick, *California*, 2 TEX. A&M L. REV. 43, 48–49 (2015); Alexander T. Maur, Note, *Let's Not Frack This Up: State-Based Solutions for the Regulation of Hydraulic Fracturing and the Disposal of Flowback Water*, 48 SUFFOLK U. L. REV. 151, 160 (2015).

¹⁰ See Brian Weeks, Survey, *New Jersey*, 1 TEX. A&M L. REV. 185, 192–93 (2014) (printed in a separately paginated fifty state survey on hydraulic fracturing). For example, in 2011, the New Jersey state legislature passed an outright fracking ban similar to that of New York, but the law was vetoed by Republican Governor Chris Christie. See *id.*

Even when hydrofracking triggers environmental degradation and threatens public welfare, impacted communities can struggle to find success in the courtroom.¹¹ In 2009, a group of lawsuits were filed in Dimock, Pennsylvania after a fracking accident caused widespread groundwater contamination.¹² These suits are archetypical of how arduous and protracted litigation can be for communities impacted by fracking.¹³

Dimock is a picturesque rural town in Susquehanna County.¹⁴ It is a town of wooded family homesteads, verdant forests, and a wildlife sanctuary.¹⁵ In 2009, however, a hydrofracking operation disrupted this idyllic image, and the once-picturesque town became synonymous with images of flaming tap water.¹⁶ A water well explosion caused by methane buildup in the wellhead spurred the first Dimock suit.¹⁷ A subsequent investigation by the Pennsylvania Department of Environmental Protection revealed dangerous levels of other chemicals also present in the Dimock groundwater and soil.¹⁸

Nearly forty families sought redress by filing suit against Cabot Oil and Gas Corp. (“Cabot”), the operator of nearby gas well drilling and hydrofracking rigs.¹⁹ The plaintiffs alleged that Cabot’s fracking operation caused the contamination, and asserted causes of action including strict liability, negligence, private nuisance, breach of contract, fraudulent misrepresentation, and gross negligence.²⁰ Over the next seven years, all but two of the original plaintiffs settled with Cabot.²¹ The two remaining plaintiffs pushed along to trial and in early 2016 their case, *Ely v. Cabot Oil & Gas Corp.*, became one of the first hydro-

¹¹ See Friedlander, *supra* note 6, at 17, 20.

¹² David Dekok, *Pennsylvania Fracking Trial Begins, Pitting Families Against Driller*, REUTERS (Feb. 23, 2016, 1:46 PM), <http://www.reuters.com/article/us-pennsylvania-fracking-idUSKCN0VW296> [<https://perma.cc/8N4Q-NW8C>].

¹³ See *Ely v. Cabot Oil & Gas Corp.*, No. 3:09-CV-2284, 2016 WL 590370, at *1 (M.D. Pa. Feb. 12, 2016) (“This case has been pending for 2276 days.”); Amended Complaint at 3–7, *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F. Supp. 506 (M.D. Pa. 2010) (No. 3:09-cv-02284-TIV), 2010 WL 931974 (listing numerous plaintiffs, residents of Dimock, in the Amended Complaint against Cabot Oil & Gas Corp.); Dekok, *supra* note 12 (stating that nearly forty plaintiffs had sued over contaminated drinking water and nearly all had settled out of court).

¹⁴ Ellen Cantarow, *Shale-Shocked*, HUFFINGTON POST (Mar. 24, 2012), http://www.huffingtonpost.com/ellen-cantarow/marcellus-shale-fracking_b_1223903.html [<https://perma.cc/Y99U-ATHJ>].

¹⁵ See Cantarow, *supra* note 14; SUSQUEHANNA CTY., PA., *101 Things to Do in Susquehanna County*, <http://susqco.com/tourism/101-things-to-do-in-susquehanna-county/> [<https://perma.cc/3USD-BQJT>].

¹⁶ *Judge Denies Lone Pine Order in Dimock Fracking Case* *Roth v. Cabot Oil & Gas Corp.*, 33 WESTLAW J. ENVTL. *1, *1 (2012); Cantarow, *supra* note 14.

¹⁷ Tom Wilber, *\$4.2M Fracking Verdict in Pennsylvania Favors Families Against Driller*, PRESS & SUN BULL. (Mar. 11, 2016, 2:03 PM), <http://www.pressconnects.com/story/news/2016/03/10/pa-families-win-4-million-verdict-against-gas-driller/81605868/> [<https://perma.cc/8Q53-4DJP>].

¹⁸ See Amended Complaint, *supra* note 13, at 16.

¹⁹ See *id.*

²⁰ *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F. Supp. 2d 506, 508 (M.D. Pa. 2010).

²¹ Dekok, *supra* note 12.

fracking suits alleging water contamination to reach a jury.²² The lengthy and difficult narrative of the *Ely* litigation showcases the obstacles facing those who seek justice following a hydrofracking disaster.²³

This Note will suggest an additional avenue of redress for plaintiffs, like those in Dimock, against fracking operations.²⁴ Plaintiffs who suffered harm by fracking operations may be able to succeed in suing the government for its role in allowing the various harms caused by fracking.²⁵ Though such a strategy has not yet been utilized in a fracking contamination case, the government—specifically the state government and the administrative body that issues hydrofracking permits—faces potential liability under an inverse condemnation theory.²⁶

The doctrine of inverse condemnation arises out of the Fifth Amendment to the U.S. Constitution, which states that no property may be taken by the government without compensation.²⁷ If a government action is deemed to rise to the level of a taking, then the affected individual can file an inverse condemnation suit, compelling the government to provide recompense for the impact of the action.²⁸ This is potentially useful in a groundwater contamination case, like the one in Dimock because it provides a new, untested avenue of redress for those injured by a fracking operation.²⁹

In such a case, where the groundwater contamination interrupts an individual's ability to consume well water or irrigate a commercial farm, the plaintiff could logically allege that the government interfered with the plaintiff's property rights by granting a permit to operate a hydrofracking rig.³⁰ Although the government was not the direct cause of the interference with the plaintiff's property rights, case law suggests that the government's role in permitting such activity is a sufficient link and thus rises to the level of a compensable taking.³¹

Part I of this Note presents a background on the practice of hydraulic fracturing, including a historical overview and a breakdown of the technical process.³² It then explores the myriad environmental risks associated with this fossil

²² Dekok, *supra* note 12; Wilber, *supra* note 17.

²³ See *Fiorentino*, 750 F. Supp. 2d at 508; Dekok *supra* note 12. In 2016, after seven years of litigation, the remaining Dimock plaintiffs won a four million dollar judgment; however, this kind of trial victory is exceedingly rare. See David Dekok, *Pennsylvania Families Win \$4.2 Million Damages in Fracking Lawsuit*, REUTERS (Mar. 10, 2016, 2:19 PM), <http://www.reuters.com/article/pennsylvania-fracking-idUSL1N16I1VC> [<https://perma.cc/GW7B-PMHS>].

²⁴ See *infra* notes 224–273 and accompanying text.

²⁵ See *infra* notes 224–273 and accompanying text.

²⁶ See *infra* notes 224–273 and accompanying text.

²⁷ U.S. CONST. amend. V; see *infra* notes 105–155 and accompanying text.

²⁸ See *infra* notes 105–155 and accompanying text.

²⁹ See *infra* notes 224–273 and accompanying text.

³⁰ See *infra* note 275 and accompanying text.

³¹ See *infra* notes 189–215 and accompanying text.

³² See *infra* notes 43–75 and accompanying text.

fuel extraction technique.³³ Part II provides a legal background.³⁴ First, it examines the laws that enable hydrofracking, including state-run permitting programs.³⁵ Second, it analyzes how hydrofracking fits in a broader web of federal environmental statutes and highlights the explicit loopholes in environmental statutes that make it more difficult for an individual harmed by a fracking operation to seek redress in a court.³⁶ Part II then introduces the Takings Clause of the Fifth Amendment of the U.S. Constitution and provides background on inverse condemnation jurisprudence.³⁷ Part II concludes with an examination of the requirements of standing, focusing on the three elements established by the Supreme Court in *Lujan v. Defenders of Wildlife*.³⁸

Part III of this Note proposes that individuals impacted by a hydrofracking disaster sue the government permitting agency for its role in allowing the placement of the hydrofracking operation.³⁹ Part III examines the likelihood that such a case would succeed in court.⁴⁰ It first examines standing and then discusses the merits of an inverse condemnation claim.⁴¹ Finally, Part IV explores the potential impact that a successful inverse condemnation suit would have on the hydrofracking industry.⁴²

I. INTRODUCTION TO THE MECHANICS AND CONSEQUENCES OF HYDRAULIC FRACTURING

A. What Is Fracking?

Hydraulic fracturing (“hydrofracking” or “fracking”) was developed in the 1940s and for the last seventy years has been utilized to some extent by energy companies across the globe to extract natural gas from deep beneath the surface of the earth.⁴³ The technique did not assume its modern form until the 1990s with the development of horizontal drilling.⁴⁴ By directing wells laterally after first drilling straight down to the target depth, hydrofracking operations are able to fracture a much larger area of shale rock, and therefore are able to procure

³³ See *infra* notes 51–75 and accompanying text.

³⁴ See *infra* notes 76–223 and accompanying text.

³⁵ See *infra* notes 76–85 and accompanying text.

³⁶ See *infra* notes 86–104 and accompanying text.

³⁷ See *infra* notes 105–155 and accompanying text.

³⁸ See *infra* notes 156–223 and accompanying text.

³⁹ See *infra* notes 224–273 and accompanying text.

⁴⁰ See *infra* notes 224–273 and accompanying text.

⁴¹ See *infra* notes 224–273 and accompanying text.

⁴² See *infra* notes 274–286 and accompanying text.

⁴³ Emily C. Powers, Note, *Fracking and Federalism: Support for an Adaptive Approach That Avoids the Tragedy of the Regulatory Commons*, 19 J. L. & POL’Y 913, 919 (2011); Lauren Etter, *No Fracking Way: Towns Across the Country Are Stopping the Big Energy Industry from Its Controversial Effort to Dig for Natural Gas*, AM. B. ASS’N J., Nov. 2014, at 47, 48.

⁴⁴ Powers, *supra* note 43, at 919.

more natural gas.⁴⁵ With each rig made more productive by this technological advancement, hydrofracking is more profitable than ever before resulting in the rapid proliferation of fracking operations across the United States.⁴⁶

The modern hydrofracking process begins by drilling a well down into the earth.⁴⁷ Typically, the drillers direct the well horizontally and then inject the well with highly pressurized fluid; this fluid causes the surrounding subsurface rock to crack and release natural gas that has been trapped beneath the earth's surface.⁴⁸ The driller then injects the well with chemically treated sand or clay—known as proppants—to physically keep the newly formed fractures open, allowing the escaping gas to flow freely.⁴⁹ The natural gas flows out with immense pressure back up through the wellhead, where it is collected.⁵⁰

B. The Environmental Consequences of Fracking

Though supporters praise hydrofracking as the future of American energy, its viability comes at a severe environmental cost.⁵¹ Every step in the life cycle of a fracking operation risks triggering environmental disasters, such as radiation leaks, exploding water wells, poisoned groundwater, and earthquakes.⁵² The very act of drilling the well produces a potentially dangerous waste product.⁵³ The drill cuttings, along with a lubricating chemical mud, can contain unsafe levels of radioactive material.⁵⁴ Despite this danger, fracking operations often collect and store waste in open ponds or truck them to ordinary landfills.⁵⁵

⁴⁵ See *id.* at 921.

⁴⁶ See Monika Ehrman, *The Next Great Compromise: A Comprehensive Response to Opposition Against Shale Gas Development Using Hydraulic Fracturing in the United States*, 46 TEX. TECH L. REV. 423, 425 (2014); Golden & Wiseman, *supra* note 1, at 957–58; Powers, *supra* note 43, at 921.

⁴⁷ Coman, *supra* note 4, at 134.

⁴⁸ *Id.*

⁴⁹ Ehrman, *supra* note 46, at 433; Coman, *supra* note 4, at 134.

⁵⁰ Ehrman, *supra* note 46, at 433; Coman, *supra* note 4, at 134.

⁵¹ See Ehrman, *supra* note 46, at 427, 468; Coman, *supra* note 4, at 135; David Giller, Note, *Implied Preemption and Its Effect on Local Hydrofracking Bans in New York*, 21 J. L. & POL'Y 631, 631 (2013).

⁵² See Coman, *supra* note 4 at 135; Steve Krejci, Note, *Is the Human Right to Water in Pennsylvania Fracked? An Analysis of the Pennsylvania Right to Water in the Hydraulic Fracturing Context and a Proposal for Reform Based on French and Ontario Environmental Rights Statutes*, 8 APPALACHIAN NAT. RES. L.J. 175, 175–76 (2014); Samuel C. Stephens, Comment, *Poison Under Pressure: The EPA's New Hydraulic Fracturing Study and the Case for Rational Regulation*, 43 CUMB. L. REV. 63, 68, 70 (2013); Jeff McMahon, *Fracking Truck Sets Off Radiation Alarm at Landfill*, FORBES (Apr. 24, 2013, 2:44 PM), <http://www.forbes.com/sites/jeffmcmahon/2013/04/24/fracking-truck-sets-off-radiation-alarm-at-landfill/#37e3fe403fb3> [<https://perma.cc/SW48-EM9S>]; Peter Moskowitz, *Utah Fracking Fine Highlights Wastewater Pond Threat*, AL JAZEERA AM. (Aug. 31, 2014, 5:00 AM), <http://america.aljazeera.com/articles/2014/8/31/fracking-wastewaterutah.html> [<https://perma.cc/79HZ-Y52U>].

⁵³ Stephens, *supra* note 52, at 71; McMahon, *supra* note 52.

⁵⁴ McMahon, *supra* note 52. “Drill cuttings” are a mixture of lubricating mud and the physical waste brought up from the underlying strata as the drill cuts into the earth. Austin C. Whitmore, Note,

In 2013, for example, a disposal truck carrying drill cuttings from a hydrofracking facility in Pennsylvania triggered a radiation alarm at a local landfill.⁵⁶ The landfill could accept some amount of slightly radioactive material, but the truck's contents exceeded that threshold by a factor of ten.⁵⁷ Further inspection revealed the cuttings emitted gamma radiation from radium 226 at a rate eighty-four times higher than the Environmental Protection Agency (EPA) standard for harmful air pollution.⁵⁸ Inhalation of radium 226, a naturally occurring isotope, is known to increase the risk of cancer in all tissues and organs, even at low levels of exposure.⁵⁹ Radium 226 is especially prevalent in the drill cutting byproducts taken from the Marcellus shale region, a 104,000 square mile natural gas deposit stretching across New York, Pennsylvania, Ohio, and West Virginia.⁶⁰

Hydrofracking also creates a very real possibility of water contamination.⁶¹ Many of the compounds used in injection fluids and proppants are toxic or carcinogenic.⁶² Likewise, methane and natural gas can be released from the rock after fracturing and escape uncontrolled.⁶³ These toxins have the potential to leach into and contaminate groundwater.⁶⁴ Though proponents of hydrofracking often diminish the likelihood of groundwater contamination, such occurrences are not uncommon.⁶⁵

For instance, in 2006, a blown hydrofracking gas well in Clark, Wyoming released over seven million cubic feet of methane, contaminating nearby

Oilfield Recycling in Texas: Why Command and Control Regulations are Stifling the End Goal, 44 TEX. ENVTL. L.J. 287, 290 (2014).

⁵⁵ McMahon, *supra* note 52; Moskowitz, *supra* note 52.

⁵⁶ McMahon, *supra* note 52.

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Elisabeth N. Radow, *Homeowners and Gas Drilling Leases: Boon or Bust?*, N.Y. ST. B. ASS'N J., Nov.–Dec. 2011, at 10, 12; McMahon, *supra* note 52; Susan Phillips, *Fracking's Other Danger: Radiation*, NAT'L PUB. RADIO (Jan. 25, 2013, 7:43 PM), <https://stateimpact.npr.org/pennsylvania/2013/01/25/frackings-other-danger-radiation/> [<https://perma.cc/BB8T-U785>].

⁶¹ Coman, *supra* note 4, at 135, 137; Jacqueline Quarré, Comment, *Defending Water Against a Fractured Body of Law: A Case Study of California's Monterey Shale Formation*, 29 J. ENVTL. L. & LITIG. 443, 444, 447 (2014).

⁶² See Coman, *supra* note 4, at 135, 137; Quarré, *supra* note 61, at 447.

⁶³ Derrick Howard, *Hydraulic Fracturing in the Appalachian Basin: Incorporating Environmental Justice to Regulate Natural Resource Exploration*, 7 APPALACHIAN NAT. RES. L.J. 113, 131 (2013).

⁶⁴ See *id.*

⁶⁵ See Blake A. Watson, *Fracking and Cracking: Strict Liability for Earthquake Damage Due to Wastewater Injection and Hydraulic Fracturing*, 11 TEX. J. OIL GAS & ENERGY L. 1, 3 (2016) (asserting hydrofracking's "relatively low risk to water supplies"); Quarré, *supra* note 61, at 444, 447 (describing the frequency of water contamination caused by fracking in California, highlighting a massive spill in excess of ninety-six million gallons).

groundwater with benzene and other hydrocarbons.⁶⁶ A similar tragedy befell Dimock, Pennsylvania in 2009, when high levels of combustible gas leaked into groundwater and caused a water well to explode.⁶⁷ Investigators found that the leaking fracking rig also contaminated the drinking water with threatening levels of arsenic, barium, glycol compounds, manganese, phenol, methane, and sodium.⁶⁸

Hydrofracking operations also have the potential to contaminate surface water, either from accidental spills or by intentional discharge of waste fluid.⁶⁹ Surface pollution can leach into the soil and potentially travel to the subsurface water table, compounding the risk of compromising drinking water.⁷⁰

There is also a growing concern about fracking's contribution to seismic activity.⁷¹ The fracturing process itself can trigger a seismic event, though these events are usually insignificant.⁷² Of greater concern is the disposal of fracking wastewater through underground injection, a common technique whereby drillers deposit wastewater into underground strata of porous rock or soil.⁷³ Researchers linked one such disposal well to a five-point-seven magnitude Oklahoma earthquake in 2011, the largest in the state's history.⁷⁴

Other environmental concerns from hydrofracking include air pollution from methane and volatile organic compounds, high emissions of greenhouse gases that contribute to climate change, worker exposure to volatile compounds,

⁶⁶ *Timeline for Cleanup from Clark Gas Well Blowout Accelerated*, CASPER STAR TRIB. (Feb. 27, 2008), http://trib.com/news/breaking/timeline-for-cleanup-from-clark-gas-well-blowout-accelerated/article_b86afdb7-38e1-55df-972f-341122197a5f.html [<https://perma.cc/YG9Q-5F4Z>].

⁶⁷ See Tom Wilber, *The Promise of Fracking: Lessons from Pennsylvania*, PRESS & SUN BULL., <http://www.pressconnects.com/story/news/local/fracking/2015/11/23/promise-fracking-lessons-pennsylvania/76052604/> [<https://perma.cc/67LC-GC8R>].

⁶⁸ See Memorandum from Richard M. Fetzer, On-Scene Coordinator, E. Response Branch, U.S. Evtl. Prot. Agency to Dennis P. Carney, Assoc. Div. Dir., Hazardous Site Cleanup Div. (Jan 19, 2012), [https://www.epaosc.org/sites/7555/files/dimock-action-memo-01-19-12\[1\].pdf](https://www.epaosc.org/sites/7555/files/dimock-action-memo-01-19-12[1].pdf) [<https://perma.cc/4D7V-VQT3>].

⁶⁹ See Howard, *supra* note 63, at 131 n.91, 134; Alex Wayne & Katarzyna Klimasinsk, *Public Health Effects of Fracking Need Study, CDC Scientist Says*, BLOOMBERG BUS. (Jan. 5, 2012, 12:01 AM), <http://www.bloomberg.com/news/articles/2012-01-04/health-effects-of-fracking-for-natural-gas-need-study-says-cdc-scientist> [<https://perma.cc/VVV4-EGK5>].

⁷⁰ See Howard, *supra* note 63, at 134; Moskowitz, *supra* note 52.

⁷¹ See Howard, *supra* note 63, at 136–37.

⁷² See *id.*

⁷³ See Ehrman, *supra* note 46, at 462; *Underground Injection Control (UIC)*, ENVTL. PROT. AGENCY, <https://www.epa.gov/uic/general-information-about-injection-wells> [<https://perma.cc/RC3F-3XCH>].

⁷⁴ See Katie Keranen et al., *Potentially Induced Earthquakes in Oklahoma, USA: Links Between Wastewater Injection and the 2011 Mw 5.7 Earthquake*, 41 GEOLOGY 699, 699 (2013); Michael Wines, *Oklahoma Recognizes Role of Drilling in Earthquakes*, N.Y. TIMES (Apr. 21, 2015), <http://www.nytimes.com/2015/04/22/us/oklahoma-acknowledges-wastewater-from-oil-and-gas-wells-as-major-cause-of-quakes.html> [<https://perma.cc/LGL2-9N6N>].

and the clear-cutting of trees by developers preparing a site for rig construction.⁷⁵

II. LEGAL BACKGROUND

A. Legislation and Laws Enabling Fracking

Hydraulic fracturing (“hydrofracking” or “fracking”) is mostly regulated at the state level.⁷⁶ Most states follow a standard base model involving drilling permits issued by a state-level regulatory authority, whereas other states take a different approach and regulate at a more local level.⁷⁷ These jurisdictional variations have created a veritable patchwork of regulation.⁷⁸

The most common version of the permitting process requires an operator to first apply for and receive a preliminary permit to drill an exploration well.⁷⁹ If the site is viable, then the initial permit can be converted into a full mineral well permit, and the operator can complete construction of the rig onsite.⁸⁰ Generally, this process cuts out public participation and requires no public notice.⁸¹ In fact, in some states, the permit itself omits details about the placement and operation of the gas well, ostensibly to protect the trade secrets of the driller.⁸² Under these circumstances, the surrounding community is left unaware that a fracking operation is planned until the drillers commence construction of the rig.⁸³ Though most states allow for appeal of a permitting decision before a board, they limit the right to appeal to owners and operators of hydrofracking rigs; third parties,

⁷⁵ See Valerie J. Brown, *Putting the Heat on Gas*, 115 ENVTL. HEALTH PERSP. A 76, A 76 (2007); Michael Goldman, *Drilling into Hydraulic Fracturing and Shale Gas Development: A Texas and Federal Environmental Perspective*, 19 TEX. WESLEYAN L. REV. 185, 239 (2012); Christopher S. Kulander, *Common Law Aspects of Shale Oil and Gas Development*, 49 IDAHO L. REV. 367, 370 (2013); Eric Esswein et al., *Worker Exposure to Crystalline Silica During Hydraulic Fracturing*, NIOSH SCIENCE BLOG: CTRS. FOR DISEASE CONTROL & PREVENTION (May 23, 2012), <http://blogs.cdc.gov/niosh-science-blog/2012/05/23/silica-fracking/> [https://perma.cc/7XLC-AKY3].

⁷⁶ See JAMES T. O'REILLY, *THE LAW OF FRACKING* § 6.5 (2016); Aileen Hooks, *Recent Developments, Barnett Shale Under Pressure: Will Congress Enact Further Restrictions?*, 40 TEX. ENVTL. L.J. 135, 142 (2009); see, e.g., Susan Hlywa Topp, *Deep Shale Natural Gas Production in Michigan: Opportunities, Problems, and a Shot in the Dark*, MICH. B.J., Jan. 2011, at 32, 33–34 (describing the permit application process in Michigan).

⁷⁷ See Baker, *supra* note 7, at 255–56. The most notable exception to the national model is New York, which categorically banned hydrofracking in 2015. Glenn Coin, *New York State Officially Bans Fracking*, SYRACUSE MEDIA GROUP (June 29, 2015, 1:54 PM), http://www.syracuse.com/news/index.ssf/2015/06/new_york_officially_bans_hydrofracking.html [https://perma.cc/PJ4T-CWHW].

⁷⁸ See Baker, *supra* note 7, at 255–56; Coin, *supra* note 77.

⁷⁹ Topp, *supra* note 76, at 33–34.

⁸⁰ *Id.*

⁸¹ See *id.*

⁸² O'REILLY, *supra* note 76; John D. Furlow & John R Hays, Jr., *Disclosure with Protection of Trade Secrets Comes to the Hydraulic Fracturing Revolution*, 7 TEX. J. OIL GAS & ENERGY L. 289, 319 (2012); Topp, *supra* note 76, at 33–34.

⁸³ O'REILLY, *supra* note 76.

like affected community members, have no standing to challenge a board's decision to grant a permit.⁸⁴ This further blocks the public's ability to intervene in the early stages of hydrofracking, limiting it to after-the-fact litigation.⁸⁵

B. Statutory Exemptions and Legal Challenges to Fracking

Ordinarily, an industry that utilizes hazardous compounds and produces hazardous waste would fall within the regulatory web of environmental statutes in the United States.⁸⁶ The "iron triangle" of friendly lawmakers, however, has carved out a haven, for the oil and gas industry.⁸⁷ In fact, many of the flagship environmental protection statutes explicitly exempt hydrofracking and other petroleum extraction operations from their respective purviews.⁸⁸ These exemptions, paired with political industry pressure, make it exceedingly difficult to bring a hydrofracking operation to task.⁸⁹

The loopholes stem from the Energy Policy Act of 2005 ("EPAAct"), which amended a number of existing environmental statutes.⁹⁰ The most critical amendment was to the Safe Drinking Water Act ("SDWA"), a law passed to pro-

⁸⁴ See Topp, *supra* note 76, at 33–34.

⁸⁵ See O'REILLY, *supra* note 76; Topp, *supra* note 76, at 33–34.

⁸⁶ See William J. Brady, *Fracturing Regulation in the United States: The Laissez-Faire Approach of the Federal Government and Varying State Regulations*, 14 VT. J. ENVTL. L. 39, 43 (2012); see, e.g., Clean Water Act, 33 U.S.C. § 1342 (2012) (requiring mineral mining operations to acquire a permit to discharge polluting waste); Safe Drinking Water Act, 42 U.S.C. § 300f (2012) (prohibiting a mining operation from injecting waste into groundwater reservoirs).

⁸⁷ See ZYGMUNT PLATER ET AL., ENVIRONMENTAL LAW AND POLICY: NATURE, LAW, AND SOCIETY 239 (Vicki Been et al. eds., 4th ed. 2009); Brady, *supra* note 86, at 3–4. The iron triangle is a term that refers to web of private and public sector interests that surround a regulated industry and present an obstacle to environmentalist actions. See PLATER ET AL., *supra*. Iron triangle is more specifically defined as the "the interlocking structure and political process linking private construction and industrial interests, government agencies that service the industry, and congressional delegations that want to attract particular public expenditures into their backyards." *Id.*

⁸⁸ See 33 U.S.C. § 1342(l)(2) (exempting runoff from oil and gas exploration from the permitting requirement of the Clean Water Act); 42 U.S.C. § 300h(d)(1)(B)(ii) (explicitly exempting fracking activity from the Safe Drinking Water Act ("SDWA") definition of "underground injection"); Brady, *supra* note 86, at 43–44 (discussing the legal background and motivations of the fracking exemptions in the SDWA).

⁸⁹ See Friedlander, *supra* note 6, at 17, 20. See generally, Brady, *supra* note 86, at 6–7 (discussing the numerous legal hurdles presented by the legislative framework).

⁹⁰ See Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 694 (codified as amended in scattered sections of 7 U.S.C., 10 U.S.C., 15 U.S.C., 16 U.S.C., 22 U.S.C., 26 U.S.C., 30 U.S.C., 40 U.S.C., 42 U.S.C.); Adam Kron, *EPA's Role in Implementing and Maintaining the Oil and Gas Industry's Environmental Exemptions: A Study in Three Statutes*, 16 VT. J. ENVTL. L. 586, 610 (2015). Critics dubbed the amending statute the "Halliburton loophole" and refer to it as part of a series of "Halliburton amendments," alluding to Vice President Dick Cheney's involvement in its passing. Joshua Dorner, *Cheney's Culture of Deregulation and Corruption: How Bush Administration Inaction Created the BP Disaster*, CTR. FOR AM. PROGRESS (June 9, 2010, 9:00 AM), <https://www.americanprogress.org/issues/green/news/2010/06/09/7900/cheney-culture-of-deregulation-and-corruption/> [<https://perma.cc/3RRJ-7LEA>].

tect public drinking water and both surface and ground sources of water.⁹¹ Significantly, the SDWA contains the Underground Injection Control Program, which regulates the operation of underground injection wells through a permitting scheme.⁹² The EAct carried a targeted amendment for the SDWA, specifically excluding the injection of fluids during a hydrofracking operation from the definition of “underground injection.”⁹³

The EAct amendments also carved out petroleum industry protections in the National Environmental Policy Act (“NEPA”), the legislation that requires federal agencies to conduct an environmental assessment before engaging in any major action that could affect the environment.⁹⁴ NEPA further requires an agency to prepare an environmental impact statement, if the first assessment indicates any potential environmental consequences.⁹⁵ The EAct, however, created a rebuttable presumption that certain activities conducted by the oil and gas industry are categorically exempt from NEPA and do not require an environmental impact statement.⁹⁶

The EAct amendments also included an attempt to exempt certain petroleum activities from coverage under the Clean Water Act (“CWA”), which outlaws the unpermitted discharge of pollutants into waterways.⁹⁷ Specifically, language in the EAct exempted oil and gas construction activities from the CWA’s permitting scheme that regulates storm water runoff.⁹⁸ The National Resource Defense Council successfully limited this exemption in 2008 by challenging a rule promulgated by the Environmental Protection Agency (EPA) supporting the exemption.⁹⁹

Additionally, pro-petroleum exemptions protect hydrofracking operations from other statutes.¹⁰⁰ The Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”), for example, explicitly excludes natural gas liquids from its definition of hazardous waste.¹⁰¹ Other loopholes are more implicit.¹⁰² For instance, hydrofracking has avoided coverage under the Emergency Planning and Community Right-to-Know Act (“EPCRA”) by staying off

⁹¹ See 42 U.S.C. § 300h(d)(1)(B)(ii) (explicitly exempting fracking activity from the SDWA definition of “underground injection”); Kron, *supra* note 90, at 610 (describing the legal background and mechanics of the fracking exemptions of the SDWA).

⁹² 42 U.S.C. § 300h(b)(1).

⁹³ *Id.* § 300h(d)(1)(B)(ii); Coman, *supra* note 4, at 138–39.

⁹⁴ 42 U.S.C. § 15942 (2012).

⁹⁵ *Id.*; Brady, *supra* note 86, at 10.

⁹⁶ 42 U.S.C. § 15942; see Brady, *supra* note 86, at 10.

⁹⁷ See 33 U.S.C. § 1251 (2012); Brady, *supra* note 86, at 7–8.

⁹⁸ 33 U.S.C. § 1342(l)(2); Nat. Res. Def. Council v. Envtl. Prot. Agency, 526 F.3d 591, 594 (9th Cir. 2008).

⁹⁹ Nat. Res. Def. Council v. Envtl. Prot. Agency, 526 F.3d at 594.

¹⁰⁰ See 42 U.S.C. § 9601(14) (2012).

¹⁰¹ See *id.*

¹⁰² See Brady, *supra* note 86, at 6–7.

the list of covered industries.¹⁰³ If included on the coverage list, EPCRA would compel a hydrofracking operation to inform the public of the presence of hazardous chemicals in the community, and establish an emergency plan in the instance of contamination.¹⁰⁴

C. Inverse Condemnation Law

Inverse condemnation is rooted in the Takings Clause of the Fifth Amendment of the U.S. Constitution, which prohibits state and federal governments from taking private property for public use without just compensation.¹⁰⁵ The Fifth Amendment acts as a limit on the government's inherent police power.¹⁰⁶ While the government has the power to seize privately owned property and convert it for public use, the Takings Clause of the Fifth Amendment guarantees that the property owner must be fairly compensated for the seizure.¹⁰⁷ This principle is also known as the doctrine of eminent domain.¹⁰⁸ The Takings Clause protects not only physical property, but also private economic interests or advantages.¹⁰⁹ If a governmental body has taken property, physically or otherwise, but has not compensated the property owner for the taking, the owner may bring an action for inverse condemnation in an effort to compel the government to provide compensation.¹¹⁰

Inverse condemnation also extends to government actions that do not rise to the level of a physical seizure.¹¹¹ If government action is so onerous that it

¹⁰³ See *id.*

¹⁰⁴ See *id.*; Michael A. Rosenhouse, Annotation, *Construction and Application of Emergency Planning and Community Right-to-Know Act of 1986 and Regulations Promulgated Thereunder*, 9 A.L.R. Fed. 2d 711, 723–25 (2006).

¹⁰⁵ See U.S. CONST. amend. V. The Takings Clause of the Fifth Amendment dictates that “private property [shall not] be taken for public use, without just compensation.” *Id.*

¹⁰⁶ See U.S. CONST. amend. V; *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1022 (1992) (holding that power of the state to regulate is limited by the Fifth Amendment when that regulation amounts to severance of a private property right). Police power refers to “a state’s Tenth Amendment right, subject to due-process and other limitations, to establish and enforce laws protecting the public’s health, safety, and general welfare, or to delegate this right to local governments.” *Police Power*, BLACK’S LAW DICTIONARY (10th ed. 2014).

¹⁰⁷ See U.S. CONST. amend. V; *Lucas*, 502 U.S. at 1019, 1022.

¹⁰⁸ *Eminent Domain*, BLACK’S LAW DICTIONARY (10th ed. 2014). Eminent domain is defined as “the inherent power of a governmental entity to take privately owned property, esp. land, and convert it to public use, subject to reasonable compensation for the taking.” *Id.*

¹⁰⁹ See *United States v. Willow River Power Co.*, 324 U.S. 499, 502–03 (1945) (finding that economic interest in use of a body of water constitutes a protected right under the Takings Clause).

¹¹⁰ See U.S. CONST. amend. V; *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 441 (1982) (requiring the government to compensate a property owner for a taking of property).

¹¹¹ See *First English Evangelical Lutheran Church of Glendale v. Cty. of Los Angeles*, 482 U.S. 309, 322 (holding that a government’s request to have a church retreat center relocate out of a flood zone to be a compensable taking); Robert Keith Johnston, Comment, *Federal Regulatory Takings Jurisprudence and Missouri Inverse Condemnation Proceedings*, 58 UMKC L. REV. 421, 430 (1990) (“[T]he Supreme Court has, in effect, established an overriding federal inverse condemnation remedy

amounts to a physical taking of one's property, then the affected individual is still due just compensation.¹¹² The government action in this type of inverse condemnation case is often characterized as a "regulatory taking."¹¹³ The concept was first established in the early twentieth century in the landmark United States Supreme Court case *Pennsylvania Coal Co. v. Mahon*.¹¹⁴ In *Pennsylvania Coal*, the Court struck down a Pennsylvania law that prohibited subsurface coal mining that triggered subsidence of surface land.¹¹⁵ The Court held that the regulation effectively made it illegal to mine coal in the manner that the plaintiff coal company envisioned because the mine in question was only suitable for extraction that triggered land subsidence.¹¹⁶ The Court in *Pennsylvania Coal* did not create an explicit test, but rather framed the issue as a broader question of degree, asking if the regulation goes "too far."¹¹⁷

Since the Court in *Pennsylvania Coal* first recognized inverse condemnations as a cause of action in 1922, courts and scholars have struggled to establish a clear rule for when a government action rises to the level of compensable taking.¹¹⁸ Despite the lack of an explicit standard, the Supreme Court has adopted a series of tests and considerations to determine when a regulation goes too far so as to become a taking.¹¹⁹

Government actions are per se takings under the Fifth Amendment, and thus automatically warrant compensation, where the action in question requires the property owner to suffer a permanent physical invasion of the property.¹²⁰ The Court established this rule in *Loretto v. Teleprompter Manhattan CATV Corp.*, reasoning that permanent invasions of property rights resemble physical seizures of property, regardless of the economic impact on the individual.¹²¹

for temporary regulatory takings which requires courts that do find a taking to compensate the landowner.").

¹¹² See *Lingle v. Chevron U.S.A. Inc.*, 544 U.S. 528, 539–40 (2005) (articulating that the government owes compensation to an individual whose property rights are harmed by a regulation when that regulation is so onerous that it amounts to a taking).

¹¹⁵ See *id.* at 539.

¹¹⁴ 260 U.S. 393, 415 (1922).

¹¹⁵ *Id.* at 412, 416.

¹¹⁶ See *id.* at 416.

¹¹⁷ *Id.* at 415–16.

¹¹⁸ See *id.*; Johnston, *supra* note 111, at 423 ("Defining exactly what constitutes a regulatory taking and when one has occurred has been one of the most difficult and problematic issues for the courts to resolve.").

¹¹⁹ See *Loretto*, 458 U.S. at 426 (1982) (establishing a rule that a permanent physical invasion of property amounts to a compensable taking); *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978) (establishing a four-part test to assess when a regulation goes so far as to encumber an individual's property rights and trigger compensation).

¹²⁰ See *Loretto*, 458 U.S. at 426.

¹²¹ See *id.*

In 1978, in *Penn Central Transportation Co. v. City of New York*, the Supreme Court addressed this question of economic denial directly.¹²² The Court held that a reviewing court should consider: (1) the economic impact of the government action on the landowner; (2) the extent to which the action interferes with investment-backed expectations; (3) the character of the action; and (4) the extent to which the interference can be characterized as a *physical* invasion by the government.¹²³ Under *Penn Central*, government action may also amount to a per se taking where it completely deprives an owner of all economic beneficial use of the property.¹²⁴ Actions that impact a landowner but leave some economic use are not per se takings, but may still rise to the level of compensability if they meet certain criteria.¹²⁵ As a result, the Court has established that a land use regulation warrants compensation when it denies a landowner economically viable use of the property.¹²⁶

No single *Penn Central* factor is controlling.¹²⁷ Instead, courts consider the four factors in totality, and then weigh the individual's interest against that of the government.¹²⁸ Though the *Penn Central* test is mathematically imprecise, its factors allow courts to tackle the broad question of when a government action goes too far.¹²⁹

For a court reviewing a government action under the first *Penn Central* factor, the mechanics of the economic impact inquiry are self-explanatory.¹³⁰ Generally, a court will assess the extent to which the plaintiff was monetarily harmed.¹³¹ Put simply, the greater the economic impact of a governmental action, the greater likelihood of success of a takings claim.¹³² A government action that eliminates all beneficial use of a property is a per se taking, and automatically warrants compensation.¹³³ Something short of a total taking would be subject to an economic calculation to determine the magnitude of the loss, comparing the value that has been taken with the value remaining in the land.¹³⁴

For the second factor in a *Penn Central* analysis, the question of investment-backed expectations overlaps significantly with an inquiry into the eco-

¹²² *See id.*

¹²³ *See id.*

¹²⁴ *See Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1017 (1992).

¹²⁵ *See Penn Cent.*, 438 U.S. at 124, 143–44.

¹²⁶ *See id.*

¹²⁷ *See Palazzolo v. Rhode Island*, 533 U.S. 606, 634–36 (2001); *Penn Cent.*, 438 U.S. at 123.

¹²⁸ *See id.*

¹²⁹ *See id.* at 617, 634.

¹³⁰ *See John Echeverria, Making Sense of Penn Central*, [2009] 39 *Envtl. L. Rep.* (Envtl. Law Inst.) 10,471, 10,474.

¹³¹ *Id.*

¹³² *See Lucas*, 505 U.S. at 1019 n.8; Echeverria, *supra* note 130, at 10,474.

¹³³ *See Lucas*, 505 U.S. at 1017; Echevarria, *supra* note 130, at 10,474.

¹³⁴ *See Echeverria, supra* note 130, at 10,474.

conomic impact on the property owner.¹³⁵ The question of expectations bolsters the economic question.¹³⁶ In other words, the economic impact will be more significant if the plaintiff's expectations of maintaining property rights were reasonable.¹³⁷

The third *Penn Central* factor, the nature of the action, or character of the action, explores the government's interest.¹³⁸ This factor essentially weighs the policy behind the government action against the damage it has done to the individual.¹³⁹ If the government has a weighty interest compelling its action, the court is less likely to find a compensable taking.¹⁴⁰ What constitutes a weighty interest is up for debate and often political.¹⁴¹

In 1987, the United States Supreme Court in *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, found in favor of compensation when a county ordinance required a church to move its campground out of a floodplain.¹⁴² While the state conservation interest in *Bragg* was fairly typical, the government's interest in *First English Evangelical* illustrates the outer bounds of the *Penn Central* test.¹⁴³ In *First English Evangelical*, the Court held that the government's interest in protecting disabled children from drowning still did not outweigh the economic impact to the church that had to relocate its camp.¹⁴⁴ The holding reflects a strong reluctance by the judiciary to interrupt a private property interest without compensation, even when the motivation for the government's action is significant.¹⁴⁵

Similarly, in *Edwards Aquifer Authority v. Bragg*, the Texas Court of Appeals found that the state interest in preserving water during a drought was not significant enough to overcome the economic impact to an individual farmer.¹⁴⁶ *Bragg* presents an archetypical fact pattern of a modern regulatory takings ac-

¹³⁵ See William W. Wade, *Sources of Regulatory Takings Economic Confusion Subsequent to Penn Central*, [2011] 41 *Envtl. L. Rep. (Envtl. Law Inst.)* 10,936, 10,937.

¹³⁶ See *id.*

¹³⁷ See *Palazzolo*, 533 U.S. at 633; Echevarria, *supra* note 130, at 10,486.

¹³⁸ See *Palazzolo*, 533 U.S. at 634; Echeverria, *supra* note 130, at 10,478.

¹³⁹ See Echeverria, *supra* note 130, at 10,478; Wade, *supra* note 135, at 10,936.

¹⁴⁰ See Echeverria, *supra* note 130, at 10,478.

¹⁴¹ See Mark Fenster, *The Stubborn Incoherence of Regulatory Takings*, 28 *STAN. ENVTL. L.J.* 525, 528 (2009). Courts have no strict benchmark for determining the significance of an economic impact, and this has led to inconsistent application of the *Penn Central* test. See 438 U.S. at 124. Compare *Hadacheck v. Sebastian*, 239 U.S. 394, 405, 414 (1915) (reasoning that compensation was not warranted even though the property in question decreased in value by approximately eighty-five percent), with *Hallco Tex., Inc. v. McMullen Cty.*, 221 S.W.3d 50, 55 (Tex. 2007) (reasoning that twenty-five percent diminution in value is sufficiently impactful).

¹⁴² See *First English Evangelical*, 482 U.S. at 322.

¹⁴³ See *id.*

¹⁴⁴ See *id.*

¹⁴⁵ See *id.*

¹⁴⁶ See *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 124–26 (Tex. App. 2013).

tion.¹⁴⁷ In *Bragg*, the Edwards Aquifer Authority, a Texas state agency, implemented a water-permitting scheme to combat drought conditions.¹⁴⁸ They issued water-use permits to well owners, capping the volume one could pump from the eponymous aquifer.¹⁴⁹ The plaintiffs, husband and wife pecan farmers in Central Texas, contested their water use permit.¹⁵⁰ The Braggs argued that the cap amount, based on one's previous maximum water use, was inappropriate because pecan trees require more and more water as they mature.¹⁵¹ When the Edwards Aquifer Authority denied their request for an increased cap, the Braggs filed suit alleging an invalid regulatory taking of their pecan orchards.¹⁵² In 2013, the court found for the Braggs, holding that the partial denial of the requested water permit amounted to a compensable taking of property and ordered the Edwards Aquifer Authority to compensate the Braggs for the loss of their orchard.¹⁵³ Applying *Penn Central*, the court in *Bragg* found that the economic impact of a water use regulation warranted compensation partly because the plaintiff's expectations of unencumbered access to groundwater were reasonable.¹⁵⁴ The court found that these expectations were reasonable because the plaintiff farmer had a graduate degree in agriculture.¹⁵⁵

D. Standing

As a threshold matter, for an action to succeed, the plaintiff must have standing to sue.¹⁵⁶ Generally speaking, standing is a question of whether the litigant is entitled to have the dispute heard and decided by a court.¹⁵⁷ The standing requirement arises out of broad constitutional principles.¹⁵⁸ Though the U.S. Constitution makes no explicit mention of standing, the Supreme Court has used the language of Article III to limit the jurisdiction of federal courts to cases and controversies.¹⁵⁹ This requirement prevents the judiciary from offering un-

¹⁴⁷ *Id.* at 146, 153.

¹⁴⁸ *Id.* at 124–25.

¹⁴⁹ *Id.* at 125.

¹⁵⁰ *Id.* at 140.

¹⁵¹ *Id.*

¹⁵² *Id.* at 126.

¹⁵³ *Id.* at 146, 153. *Bragg* is also illustrative of how difficult it can be for courts to navigate the mire of takings jurisprudence. *See id.* *See generally* Joseph Belza, Comment, *A Texas Takings Trap: How the Court in Edwards Aquifer Authority v. Bragg Fell into a Dangerous Pitfall of Takings Jurisprudence*, 43 B.C. ENVTL. AFF. L. REV. 211 (2016) (criticizing the Texas Court of Appeals for fatally misapplying the crucial *Penn Central* test).

¹⁵⁴ *See Bragg*, 421 S.W.3d at 144.

¹⁵⁵ *Id.* at 143–44.

¹⁵⁶ *See Warth v. Seldin*, 422 U.S. 490, 498 (1975).

¹⁵⁷ *Id.*

¹⁵⁸ Bradford C. Mank, *Informational Standing after Summers*, 39 B.C. ENVTL. AFF. L. REV. 1, 7 (2012).

¹⁵⁹ *Id.*

prompted advisory opinions that might encroach on the enumerated powers of the other branches of government.¹⁶⁰

In *Lujan v. Defenders of Wildlife*, the Supreme Court articulated the specific requirements for standing.¹⁶¹ Writing for the majority, Justice Scalia outlined three elements of standing that a plaintiff must show in order to have the right to make a legal claim and seek judicial enforcement.¹⁶² First, the plaintiff must have suffered an injury in fact.¹⁶³ This injury in fact must be a “concrete and particularized” invasion of a legally protected interest.¹⁶⁴ Moreover, the injury must be actual or imminent, and not merely hypothetical.¹⁶⁵ Second, there must be a link of proximate causation between the plaintiff’s injury and the allegedly wrongful conduct by the defendant.¹⁶⁶ In other words, there can be no standing to sue for the actions of a third party not before the court.¹⁶⁷ Third, it must be likely that a favorable holding by the court will redress the injury alleged.¹⁶⁸

In the complaint, standing needs only to be supported by generally alleged facts.¹⁶⁹ By the summary judgment phase, the presumption of validity shifts, and plaintiff must show specific evidence to support assertions of standing.¹⁷⁰ When challenging a government action, a plaintiff may have standing even if the plaintiff is not the object of that action.¹⁷¹ Though, as a rule, standing is still available in such a case, it is not easy to meet the standing requirement in that situation.¹⁷²

1. Injury in Fact

In *Lujan*, the Court held that the plaintiffs could not show a sufficient concrete injury in fact and thus dismissed the case for lack of standing.¹⁷³ The plain-

¹⁶⁰ *Id.*

¹⁶¹ *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560–61 (1992). These standing requirements existed prior to *Lujan v. Defenders of Wildlife*, but were not articulated as succinctly. See *Dir., Office of Workers’ Comp. Programs v. Perini N. River Assocs.*, 459 U.S. 297, 305 (1983) (listing actual injury and redressability as requirements of standing); *Simon v. E. Ky. Welfare Rights Org.*, 426 U.S. 26, 38, 42, 58 (1976) (naming injury-in-fact and redressability as standing requirements and discounting speculative injuries). The Court in *Lujan* is responsible for condensing these requirements into the modern three-part test for standing. See 504 U.S. at 560–61.

¹⁶² *Lujan*, 504 U.S. at 560–61.

¹⁶³ *Id.* at 560.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

¹⁶⁶ *Id.* at 561; Brian Reagan, Note, *Aransas Project v. Shaw: The Fifth Circuit’s Incorrect and Attenuated Proximate Cause Analysis on What Killed the Whooping Crane*, 40 WM. & MARY ENVTL. L. & POL’Y REV. 943, 947–48 (2016).

¹⁶⁷ *Lujan*, 504 U.S. at 561.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.*

¹⁷¹ *Id.* at 562.

¹⁷² *Id.*

¹⁷³ See *id.*

tiffs sought to challenge a decision by the Secretary of the Interior (“the Secretary”) not to extend the purview of Endangered Species Act to foreign nations.¹⁷⁴ The plaintiffs asserted that the Secretary’s actions would increase the rate of extinction of endangered species around the globe.¹⁷⁵ Plaintiffs further argued that this injured them because they had studied and observed certain endangered species abroad in the past and would potentially study other endangered species abroad in the future.¹⁷⁶ The Court held that this alleged injury to their hypothetical intentions was insufficient because it was too speculative and unspecific.¹⁷⁷ Likewise, the Court dismissed their assertions of an “ecosystem nexus”—that connected and granted standing to all parts of a contiguous ecosystem—because it was overbroad.¹⁷⁸ The Court further clarified that for an injury to be sufficient for standing it must be concrete and either actual or imminent.¹⁷⁹

Concrete, as used in this context, does not necessarily mean physical or tangible, and many things can constitute an injury in fact.¹⁸⁰ The stigma of reputational harm, for example, is inherently abstract and intangible, yet courts consistently hold that it is concrete enough to satisfy the this standing requirement.¹⁸¹ In contrast with *Lujan*, such an intangible harm satisfies the injury in fact requirement because its effects are presently real.¹⁸² Conversely, the environmental nexus harm proposed in *Lujan* was hypothetical and speculative and because it had not yet occurred the Court found that there was no injury.¹⁸³

In an environmental case where an actual injury has *already occurred*, the court is far more likely to find an injury in fact sufficient to create standing.¹⁸⁴ For example, in *Friends of the Earth, Inc. v. Laidlaw Environmental Services (TOC), Inc.*, the Court found that an environmental group had standing to sue a

¹⁷⁴ *Id.* at 558–59.

¹⁷⁵ *Id.* at 562.

¹⁷⁶ *See id.* at 563.

¹⁷⁷ *See id.* at 564.

¹⁷⁸ *See id.* at 565.

¹⁷⁹ *See id.* at 560.

¹⁸⁰ *See Meese v. Keene*, 481 U.S. 465, 473 (1987) (holding that the accusation of disseminating political propaganda was sufficiently injurious to movie theater proprietor to create standing); *Parsons v. U.S. Dep’t of Justice*, 801 F.3d 701, 712 (6th Cir. 2015) (holding that the Department of Justice’s labeling of a music group as a gang was sufficiently injurious to establish standing); *Nat’l Collegiate Athletic Ass’n v. Governor of N.J.* 730 F.3d 215, 220 (3d Cir. 2013) (holding that reputational harm that the National Collegiate Athletic Association would suffer as a result of legal sports gambling was sufficient to create standing).

¹⁸¹ *See Parsons*, 801 F.3d at 705, 710–12; *Nat’l Collegiate Athletic Ass’n*, 730 F.3d at 220–22.

¹⁸² *Compare Lujan*, 504 U.S. at 560–61 (finding interference with hypothetical environmental enjoyment too speculative to create standing), *with Parsons*, 801 F.3d at 712 (finding that the Department of Justice’s labeling of a music group as a gang was sufficiently injurious to establish standing), and *Nat’l Collegiate Athletic Ass’n*, 730 F.3d at 220–22 (finding that reputational harm to the NCAA as a result of legal sports gambling was sufficient to create standing).

¹⁸³ *See Lujan*, 504 U.S. at 560–62.

¹⁸⁴ *See Friends of the Earth, Inc. v. Laidlaw Env’tl. Servs. (TOC), Inc.*, 528 U.S. 167, 182, 189 (2000).

wastewater facility because its members suffered a concrete injury.¹⁸⁵ In *Friends of the Earth*, the defendant wastewater facility had been discharging mercury into the nearby North Tyger River, and the plaintiffs alleged that this discharge impacted their ability to use and enjoy the waterway.¹⁸⁶ The defendant asserted that the plaintiffs had suffered no medical harm, and had no physical injuries; in fact, the only harm the plaintiffs alleged was an interference with their ability to fish, swim, picnic, and watch birds by the river.¹⁸⁷ Nonetheless, the Court found that these injuries were concrete enough to create standing because, although they were intangible, they were not overly speculative because they had already occurred.¹⁸⁸

2. Causation Fairly Traceable to Defendant

In *Lujan*, the Court established a second standing requirement: that the causation of a plaintiff's alleged injury be fairly traceable to the defendant's actions.¹⁸⁹ The fairly traceable standard allows standing even when the defendant did not directly trigger the injury in question.¹⁹⁰ Inverse condemnation suits that arise out of airplane flight paths near residential property are illustrative of this idea.¹⁹¹ For example, in *Thornburg v. Port of Portland*, the plaintiffs owned a home approximately one mile from the end of a runway at Portland International Airport.¹⁹² Though the plaintiffs did not live directly under the flight paths of arriving and departing aircraft, their proximity to the airport caused them to hear significant noise and in their suit they claimed that the noise from the planes amounted to a taking of their property.¹⁹³ Thus, they filed suit seeking compensation for the taking.¹⁹⁴ The Oregon Supreme Court held in favor of the plaintiffs, finding that the city government direction of the airport amounted to a compensable taking under the Fifth Amendment.¹⁹⁵

In *Thornburg* the court made three main points.¹⁹⁶ First, the court held that regular and continuous airplane noise can constitute a nuisance, even absent

¹⁸⁵ *Id.* at 189.

¹⁸⁶ *Id.* at 182.

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* at 189.

¹⁸⁹ *See Lujan*, 504 U.S. at 560.

¹⁹⁰ *See Griggs v. Allegheny Cty.*, 369 U.S. 84, 89 (1962).

¹⁹¹ *See Griggs*, 369 U.S. at 89; *Baker v. Burbank-Glendale-Pasadena Airport Auth.*, 705 P.2d 866, 869 (Cal. 1985); *Aaron v. City of Los Angeles*, 40 Cal. App. 3d 471, 493 (Ct. App. 1977); *Long v. City of Charlotte*, 293 S.E.2d 101, 108 (N.C. 1982); *Thornburg v. Port of Portland*, 376 P.2d 100, 110 (Or. 1962); *Gissel v. Kenmare Twp.*, 512 N.W.2d 470, 473, 478 (N.D. 1994).

¹⁹² *Thornburg*, 376 P.2d at 101.

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ *Id.* at 102–03.

¹⁹⁶ *Id.*

physical trespass over the plaintiff's property.¹⁹⁷ Second, the court reasoned that unchallenged nuisance activity can ripen into an easement granting the offending party the right to continue that activity indefinitely.¹⁹⁸ Finally, the court held that the creation of an easement is, on its face, a taking of property.¹⁹⁹ Thus, the court reasoned that the noise from arriving and departing planes rose to the level of a physical taking by the government.²⁰⁰

The court in *Thornburg* relied on a United States Supreme Court decision issued earlier that year, *Griggs v. Allegheny County*.²⁰¹ In *Griggs*, the Court held that the invasion of property rights—specifically, a plane flying over an individual's home—could ripen into an easement to continue that activity and that the government actor, and not the airline, was the appropriate defendant in a takings suit.²⁰² In *Thornburg*, a private third-party actor—a private airline—caused the direct interference—the noise nuisance—with the plaintiffs' use of their land.²⁰³ The government actor, the city through its the public airport, merely facilitated and oversaw the placement of the contested activity, the flight patterns.²⁰⁴ Yet, the court in *Thornburg* imputed liability to the city government and found that the disturbances to plaintiff's property amounted to a compensable taking.²⁰⁵ The court held that a nuisance persistently committed by a private party, could ripen into a prescription, and when a government actor maintains that nuisance, it amounts to the taking of an easement.²⁰⁶

Likewise, in *Litz v. Maryland Department of the Environment*, the Court of Appeals of Maryland, the highest state court in Maryland, found a sufficient causal link between state and county governments and water contamination to grant county residents standing in an inverse condemnation suit.²⁰⁷ In *Litz*, the plaintiff, Gail Litz, owned a parcel of lakefront land that she used to operate a commercial campground.²⁰⁸ The nearby town lacked a dedicated sewer system, so residents relied on individual septic systems.²⁰⁹ Over time, seventy to eighty

¹⁹⁷ *Id.* at 102.

¹⁹⁸ *See Id.* A nuisance occurs when activity disrupts the plaintiff's ability to use and enjoy property in a way that is unreasonable and because of this disruption the plaintiff suffers harm. *Raymond v. S. Pac. Co.*, 488 P.2d 460, 462–63 (1971). Property use can ripen into an easement when the use is (1) continuous and uninterrupted for the prescriptive period, (2) adverse to the rights of the owner, and (3) open and notorious. *Wels v. Hippe*, 347 P.3d 788, 805 (Or. App. 2015).

¹⁹⁹ *Thornburg*, 376 P.2d at 103.

²⁰⁰ *Id.* at 102, 110.

²⁰¹ *Id.* at 103 (citing *Griggs*, 369 U.S. 84 (1962)).

²⁰² *Griggs*, 369 U.S. at 89.

²⁰³ *Thornburg*, 376 P.2d at 101.

²⁰⁴ *Id.*

²⁰⁵ *Id.* at 103, 110.

²⁰⁶ *Id.* at 102.

²⁰⁷ *See Litz v. Md. Dep't of the Env't*, 131 A.3d 923, 925, (Md. 2016); *Thornburg*, 376 P.2d at 110.

²⁰⁸ *Litz*, 131 A.3d at 925.

²⁰⁹ *Id.* at 926.

percent of these septic systems failed, and human waste drained into the lake abutting the plaintiff's land.²¹⁰ This contamination diminished the plaintiff's ability to derive income from her campground, she subsequently fell on difficult financial times, and her property was foreclosed.²¹¹

Litz, brought an inverse condemnation action against the state environmental regulatory agency and the county health department, asserting that their failure to regulate the septic system cut off her ability to use and enjoy her property.²¹² The trial court dismissed the case, and the appellate court affirmed the dismissal, in part because the government took no affirmative action that could be linked to contamination.²¹³ On appeal, the Court of Appeals of Maryland reversed and remanded, holding that mere government inaction may be enough to create a taking.²¹⁴ As this case law demonstrates indirect involvement, like the flight path orchestration in *Thornburg*, or even inaction, as in *Litz*, may be sufficient.²¹⁵

3. Redressability

The third *Lujan* standing requirement, redressability, mandates that a court can only grant standing if it is likely that a plaintiff's injury will be remedied by a favorable decision of the court.²¹⁶ This is a practical inquiry that considers the remedies available in a given action.²¹⁷ Simply put, the redressability requirement asks if the remedies available to the plaintiff would actually ameliorate the alleged harms.²¹⁸ The plaintiffs in *Lujan* failed on this requirement; the Court reasoned that the injunction requested would not solve the plaintiff's alleged problems and therefore the plaintiffs' injuries were not likely to be redressed.²¹⁹

In contrast with the holding in *Lujan*, a court is more likely to find the redressability requirement satisfied when a plaintiff employs a cause of action more clearly related to his or her injury.²²⁰ For example, in *National Collegiate Athletic Ass'n v. Governor of New Jersey*, the United States Court of Appeals for the Third Circuit found that the National Collegiate Athletic Association ("NCAA") had standing to bring an action to block a proposed New Jersey statute that would expand legalized sports gambling.²²¹ As applied in *NCAA*, the

²¹⁰ *Id.*

²¹¹ *Id.* at 927.

²¹² *Id.*

²¹³ *Id.*

²¹⁴ *See id.* at 931, 939.

²¹⁵ *See id.* at 932; *Thornburg*, 376 P.2d at 110.

²¹⁶ *Lujan*, 504 U.S. at 561.

²¹⁷ *See id.*

²¹⁸ *See id.*

²¹⁹ *See id.* at 571.

²²⁰ *See Nat'l Collegiate Athletic Ass'n*, 730 F.3d at 219–20.

²²¹ *Id.* at 214–15.

redressability inquiry is a common sense question: does the proposed remedy actually solve the plaintiff's alleged problem?²²² The court held that the redressability requirement was satisfied because the proposed remedy—an injunction against the wagering statute—logically solved the reputational injury alleged.²²³

III. INVERSE CONDEMNATION IN A FRACKING GROUNDWATER CONTAMINATION CASE

In Dimock, Pennsylvania, a hydraulic fracturing (“hydrofracking” or fracking”) rig operated by Cabot Oil and Gas (“Cabot”) caused a dangerous leak of methane gas.²²⁴ This combustible gas bubbled into the substrate and permeated the surrounding aquifer where local residents of Dimock draw their drinking water.²²⁵ By 2009, Dimock’s well water was so contaminated with methane that it could be ignited with a match.²²⁶ After a water well explosion and an investigation by the Pennsylvania Department of Environmental Protection, approximately forty residents filed suit against Cabot, asserting a bevy of common law tort and contract claims.²²⁷ Over the next seven years of litigation nearly all of the plaintiffs settled out of court.²²⁸ Their struggle begs the question: could they, and other similarly situated plaintiffs, have increased their odds of success by adding another cause of action to their arsenal and another defendant to their complaint?²²⁹ Would it have been useful for the Dimock plaintiffs—and useful for future hydrofracking groundwater contamination plaintiffs—to sue the gov-

²²² See *id.*

²²³ See *id.* at 219–20.

²²⁴ See Dekok, *supra* note 12; Wilber, *supra* note 17.

²²⁵ See Wilber, *supra* note 17.

²²⁶ See Dekok, *supra* note 12; Wilber, *supra* note 17; *Judge Denies Lone Pine Order in Dimock Fracking Case*, *supra* note 16.

²²⁷ See *Fiorentino v. Cabot Oil & Gas Corp.*, 750 F. Supp. 2d 506, 508 (M.D. Pa. 2010); Amended Complaint, *supra* note 13, at 16.

²²⁸ See Dekok, *supra* note 12.

²²⁹ See U.S. CONST. amend. V. See generally *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc.*, 528 U.S. 167 (2000) (finding that the disruption of plaintiffs’ ability to swim, fish, and picnic by river was a sufficient injury in fact to create standing); *Lujan v. Defs. of Wildlife*, 504 U.S. 555 (1992) (outlining the three-part test for Article III standing); *Griggs v. Allegheny Cty.*, 369 U.S. 84 (1962) (finding that the invasion of one’s property rights could ripen into an easement to continue that activity and that the government actor, and not the airline, was the appropriate defendant in a takings suit); *Nat’l Collegiate Athletic Ass’n v. Governor of N.J.*, 730 F.3d 208 (3d Cir. 2013) (finding that reputational harm is sufficiently concrete to create standing); *Litz v. Md. Dep’t of the Env’t*, 131 A.3d 923 (Md. 2016) (finding that government inaction is enough to establish inverse condemnation liability); *Thornburg v. Port of Portland*, 376 P.2d 100 (Or. 1962) (finding a public airport liable for property disruption caused by third party airline under an inverse condemnation theory).

ernment body that granted the fracking permit under an inverse condemnation theory?²³⁰

A. Standing

In potential litigation resulting from groundwater contamination, like the litigation that followed the Dimock fracking disaster, a plaintiff is likely to satisfy the requirements for standing.²³¹ First, the plaintiffs must show injury in fact.²³² If the intangible harm of a losing one's picnicking grounds was concrete enough to satisfy the first standing requirement in *Friends of the Earth, Inc. v. Laidlaw Environmental Services (TOC), Inc.*, then the significant physical injury of exploding wellheads or poisoned drinking water is likely to pass, as well.²³³ Moreover, the injury in a well water contamination case impacts property values.²³⁴ This financial harm is likely to constitute an injury in fact because it is quantifiable, and not hypothetical.²³⁵ Similarly, the requirement of redressability is easily satisfied because the injury is largely based on financial impact to property values, it is redressable via remuneration.²³⁶

At first glance, the requirement that the injury be fairly traceable to the defendant seems more problematic for an inverse condemnation suit filed after a hydrofracking rig contaminates groundwater.²³⁷ The governmental defendant—for instance, the state government and the body that issues hydrofracking permits—would likely argue that because these entities did not directly trigger the harm, the link between its actions and the injury are too tenuous.²³⁸ In other words, the government may assert that it should not be held responsible because

²³⁰ See U.S. CONST. amend. V; *Friends of the Earth, Inc.* 528 U.S. at 182, 189; *Lujan*, 504 U.S. at 560–61; *Griggs*, 369 U.S. at 89; *Nat'l Collegiate Athletic Ass'n*, 730 F.3d at 219–20; *Litz*, 131 A.3d at 925; *Thornburg*, 376 P.2d at 110.

²³¹ See U.S. CONST. amend. V; *Friends of the Earth, Inc.* 528 U.S. at 182, 189; *Lujan*, 504 U.S. at 560–61; *Griggs*, 369 U.S. at 89; *Nat'l Collegiate Athletic Ass'n*, 730 F.3d at 219–20; *Litz*, 131 A.3d at 925; *Thornburg*, 376 P.2d at 110.

²³² See *Friends of the Earth, Inc.*, 528 U.S. at 182; *Lujan*, 504 U.S. at 560.

²³³ See *Friends of the Earth, Inc.*, 528 U.S. at 182 (reasoning that the harm of damaged recreational value of land constituted sufficient injury in fact); *Lujan*, 504 U.S. at 560 (reasoning that hypothetical decrease in wildlife population and the resulting damage to the ability to observe animal species was too intangible to constitute injury in fact); *Trades Council of Buffalo v. Downtown Devel., Inc.*, 448 F.3d 138, 146 (2d. Cir. 2006) (reasoning that allegations that plaintiffs were exposed to pollutants by drinking water from public water supplies drawn from contaminated lake were “sufficiently concrete” to allege injury in fact).

²³⁴ See *Friends of the Earth, Inc.*, 528 U.S. at 182 (indicating that diminution of property value is considered in the analysis of injury in fact); *Lujan*, 504 U.S. at 560 (suggesting that harm without any quantifiable financial impact is less likely to constitute injury in fact).

²³⁵ See *Friends of the Earth, Inc.*, 528 U.S. at 182; *Lujan*, 504 U.S. at 560.

²³⁶ See *Lujan*, 504 U.S. at 561.

²³⁷ See *id.* at 560.

²³⁸ See *id.*; *Ely v. Cabot Oil & Gas Corp.*, 38 F. Supp. 3d 518, 532 (M.D. Pa. 2014); *Thornburg*, 376 P.2d at 110.

a private third-party actor caused the direct interference with plaintiff's enjoyment of the property.²³⁹ The government actor merely facilitated and oversaw the placement of that private actor's activity.²⁴⁰

This argument is implicitly dispatched in the common law.²⁴¹ An analogous fact pattern exists in a string of inverse condemnation cases arising out of public airport activity.²⁴² If a court overlays the facts of a groundwater contamination case, like the one in *Dimock*, to the reasoning in *Thornburg v. Port of Portland*, it should reach a parallel conclusion.²⁴³ In *Thornburg*, a private third-party actor, a private airline, caused the direct interference, the noise nuisance, with the plaintiffs' use of their land.²⁴⁴ The government actor, the city through the public airport, merely facilitated and oversaw the placement of that activity, the flight patterns, that created the noise.²⁴⁵ Nonetheless, the Supreme Court of Oregon in *Thornburg* imputed liability to the city government and found that the disturbances to plaintiff's property amounted to a compensable taking.²⁴⁶ In *Dimock*, the fracking operation caused the direct interference with plaintiff's property use, but the government through the permitting board, facilitated and oversaw the placement of that activity.²⁴⁷ Thus, the *Thornburg* court's reasoning could logically extend from airport noise inverse condemnation to hydrofracking inverse condemnation.²⁴⁸

Alternatively, the government may argue that it cannot be held responsible, because granting a permit is not an affirmative enough action to warrant liability.²⁴⁹ Additionally, the government may assert that it was not in a position to foresee the contamination because it was a passive actor.²⁵⁰ These defenses, however, hold little water.²⁵¹ In *Litz v. Maryland Department of the Environment*, the Court of Appeals of Maryland held that even government inaction

²³⁹ See *Lujan*, 504 U.S. at 560; *Griggs*, 369 U.S. at 89.

²⁴⁰ See *Lujan*, 504 U.S. at 560; *Griggs*, 369 U.S. at 89.

²⁴¹ See *Thornburg*, 376 P.2d at 110.

²⁴² See *Griggs*, 369 U.S. at 89; *Baker v. Burbank-Glendale-Pasadena Airport Auth.*, 705 P.2d 866, 869 (Cal. 1985); *Aaron v. City of Los Angeles*, 40 Cal. App. 3d 471, 493 (Ct. App. 1977); *Long v. City of Charlotte*, 293 S.E.2d 101, 108 (N.C. 1982); *Gissel v. Kenmare Twp.*, 512 N.W.2d 470, 472-73, 478 (N.D. 1994); *Thornburg*, 376 P.2d at 110.

²⁴³ See *Thornburg*, 376 P.2d at 110.

²⁴⁴ See *id.* at 101.

²⁴⁵ See *id.*

²⁴⁶ See *id.* at 110.

²⁴⁷ See *Ely*, 38 F. Supp. 3d at 532; *Thornburg*, 376 P.2d at 110.

²⁴⁸ See *Thornburg*, 376 P.2d at 110.

²⁴⁹ See *Griggs*, 369 U.S. at 89 (holding that the invasion of one's property rights could ripen into an easement to continue that activity and that the government actor, and not the airline, was the appropriate defendant in a takings suit); *Litz*, 131 A.3d at 925 (holding that in some circumstances government inaction is enough to establish inverse condemnation liability).

²⁵⁰ See *Griggs*, 369 U.S. at 89.

²⁵¹ See *Litz*, 131 A.3d at 925 (reasoning that in some circumstances government inaction is enough to establish inverse condemnation liability).

could carry inverse condemnation liability.²⁵² Moreover, the court in *Litz* found the question of foreseeability off-point and did not entertain it.²⁵³ This, paired with the clear injury in fact, redressability, and the causal link supported by the analogy of airport inverse condemnation law establishes standing for the plaintiff, even in a stricter federal venue.²⁵⁴ Though *Litz* and *Thornburg* are state court cases, the constellation of law they create would be persuasive in other jurisdiction because they are a proper readings of Supreme Court case law and consistent with public policy.²⁵⁵

B. Government Liability Under an Inverse Condemnation Theory

In determining if the government action was greater than is constitutionally permissible, a court will apply the *Penn Central* test.²⁵⁶ The precise application of this test is fact-specific and thus is often difficult to predict in a hypothetical scenario.²⁵⁷ Using the Dimock facts—where a hydrofracking rig contaminated groundwater with methane and other chemicals, causing a wellhead to explode—an action for inverse condemnation could have the potential for success.²⁵⁸

It is possible that fallout from a hydrofracking catastrophe would not deny a resident all use of his or her property, and thus it would not qualify as a total taking.²⁵⁹ Instead, the economic impact of these injuries would be subject to a financial calculation to determine the magnitude of the loss by comparing the value that has been “taken” with the value remaining in the land.²⁶⁰ If groundwater contamination prevents an individual from using the land as a commercial farm, the economic loss is likely significant.²⁶¹ Whether it is significant enough to warrant compensation is difficult to predict because application of the test has been inconsistent.²⁶² For example, the Court’s decision in *Hadacheck v. Sebastian*, held compensation was not warranted even though the property in question

²⁵² *See id.*

²⁵³ *See id.*

²⁵⁴ *See Lujan*, 504 U.S. at 560–61. It is worth noting that *Thornburg* and *Litz* are both state court decisions, and as such, they hold persuasive, but not binding, authority in a federal jurisdiction. *See Litz*, 131 A.3d at 932–33; *Thornburg*, 376 P.2d at 110.

²⁵⁵ *See Litz*, 131 A.3d at 932–33.

²⁵⁶ *See Palazzolo v. Rhode Island*, 533 U.S. 606, 618 (2001); *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124, 143–44 (1978).

²⁵⁷ *See Palazzolo*, 533 U.S. at 618.

²⁵⁸ *See id.*; Dekok, *supra* note 12; Wilber, *supra* note 17.

²⁵⁹ *See Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1019 (1992); Echevarria, *supra* note 130, at 10474.

²⁶⁰ *See Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 497 (1987); Echevarria, *supra* note 130, at 10474.

²⁶¹ *See Keystone Bituminous Coal Ass’n*, 480 U.S. at 497; *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 143–44 (Tex. App. 2013); Echevarria, *supra* note 130, at 10474.

²⁶² *See Belza*, *supra* note 153, at 215; Wade, *supra* note 135, at 10936.

decreased in value by approximately eighty-seven percent, but in a similar case the Supreme Court of Texas decided that twenty-five percent diminution in value is sufficiently impactful to require compensation.²⁶³ The success of a plaintiff in a groundwater contamination suit will be very dependent on the specific facts of the case.²⁶⁴

The analysis of a plaintiff's investment-backed expectations is also very fact-sensitive.²⁶⁵ Considering again a commercial farm, if the plaintiff could assert that he or she reasonably expected to be able to continue using groundwater to irrigate the property's commercial crops, the plaintiff might also be able to support the reasonableness of that expectation with evidence of an agricultural degree, years of farming experience, or a written business plan for her operation.²⁶⁶

The third *Penn Central* factor, the nature of the government action, is likely the most problematic for a plaintiff in a groundwater contamination case.²⁶⁷ This factor essentially weighs the individual's private property rights against the government's interest in acting as it did.²⁶⁸ This might pose an obstacle in a hydrofracking groundwater contamination case, considering the iron triangle of politics and industry money surrounding hydrofracking in many states.²⁶⁹ In most states, the government defendant would assert that it had a vital economic interest in supporting the hydrofracking industry.²⁷⁰ That being said, the importance of the government's interest has been increasingly eroded over the years of *Penn Central* jurisprudence.²⁷¹ Thus it is plausible—if not likely—that a court would not place great weight on the government interest behind the character of the regulation in a hydrofracking water contamination case.²⁷² This, paired with the clear, severe economic impact on the plaintiff and the interference with investment-backed expectations, make it equally plausible that a plaintiff would suc-

²⁶³ Compare *Hadacheck v Sebastian*, 239 U.S. 394, 405, 414 (1915) (finding that compensation was not warranted even though the property in question decreased in value by approximately eighty-five percent), with *Hallco Tex., Inc. v McMullen Cty.*, 221 S.W.3d 50, 55 (Tex. 2007) (finding that compensation was warranted when the property in question decreased in value by approximately twenty-five percent).

²⁶⁴ See *Hadacheck*, 239 U.S. at 405, 414; *Hallco Tex., Inc.*, 221 S.W.3d at 55.

²⁶⁵ See *Bragg*, 421 S.W.3d at 143–44.

²⁶⁶ See *id.*

²⁶⁷ See *Echeverria*, *supra* note 130, at 10478; Robert Meltz, *Takings Law Today: A Primer for the Perplexed*, 34 *ECOLOGY L.Q.* 307, 341–42 (2007).

²⁶⁸ See *Echeverria*, *supra* note 130, at 10478; Meltz, *supra* note 267, at 341–42.

²⁶⁹ See *PLATER ET AL.*, *supra* note 87, at 239.

²⁷⁰ See *Plosser*, *supra* note 3, at 673; *Willie*, *supra* note 3, at 1747, 1749.

²⁷¹ See Meltz, *supra* note 267, at 342 (“*Lingle* suggests that the character factor . . . is to be given less weight than the previous two *Penn Central* factors . . . [implying] that the nature of the underlying government purpose, part of the character factor, has been downgraded in the regulatory takings calculus.”).

²⁷² See *id.*

ceed in characterizing the damage to the property as a taking, securing compensation for the harm.²⁷³

IV. IMPLICATIONS

There is a general danger that a successful inverse condemnation case in the context of hydraulic fracturing (“hydrofracking” or “fracking”) could expand the availability of inverse condemnation actions.²⁷⁴ Through this cause of action, government actors could theoretically be held liable for the effects that permitting activities have on communities, not just the applicant.²⁷⁵ As takings actions become more prevalent, the government’s ability to govern and regulate effectively is undermined by the repeated need to defend its actions in court.²⁷⁶ This general theoretical risk does not outweigh the potential impact inverse condemnation liability would have on the hydrofracking industry.²⁷⁷

The fact that state actors may potentially face liability for permit granting activity has enormous implications, both long term and immediate.²⁷⁸ First, the chance (or the fear) of paying for a fracking operation gone wrong will immediately influence the permit granting procedure.²⁷⁹ With the threat of liability, a state regulatory agency that issues permits will likely be more discerning in making permit determinations.²⁸⁰ The specter of liability may compel these agencies to conduct more thorough investigations into company practices and performance history.²⁸¹ In order to avoid liability, proactive agencies might adopt more robust monitoring activities to curb risky behavior and prevent contamination.²⁸²

²⁷³ See *Palazzolo*, 533 U.S. at 633; *First English Evangelical Lutheran Church of Glendale v. Cty. of Los Angeles*, 482 U.S. 309, 322 (1987); *Penn Cent.*, 438 U.S. at 124, 143–44; *Bragg*, 421 S.W.3d at 124–26.

²⁷⁴ See John D. Echeverria, *The Costs of Koontz*, 39 VT. L. REV. 573, 573, 606 (2015).

²⁷⁵ See U.S. CONST. amend. V; *Palazzolo v. Rhode Island*, 533 U.S. 606, 633 (2001); *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc.*, 528 U.S. 167, 182, 189 (2000); *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560–61 (1992); *First English Evangelical Lutheran Church of Glendale v. Cty. of Los Angeles*, 482 U.S. 309, 322 (1987); *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124, 143–44 (1978); *Griggs v. Allegheny Cty.*, 369 U.S. 84, 89 (1962); *Nat’l Collegiate Athletic Ass’n v. Governor of N.J.*, 730 F.3d 208, 219–20 (3d Cir. 2013); *Litz v. Md. Dep’t of the Env’t*, 131 A.3d 932, 925 (Md. 2016); *Thornburg v. Port of Portland*, 376 P.2d 100, 110 (Or. 1962); *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 124–26 (Tex. App. 2013).

²⁷⁶ See Echeverria, *supra* note 274, at 573, 606.

²⁷⁷ See *id.*; Paul Stanton Kibel & Jonathan R. Shultz, *Rio Grande Designs: Texans’ NAFTA Water Claim Against Mexico*, 25 BERKELEY J. INT’L L. 228, 248 (2007); Carl Kirk, Note, *First Church Decides Compensation is Remedy for Temporary Regulatory Takings—Local Government are ‘Singing the Blues,’* 21 IND. L. REV. 901, 910–11 (1988).

²⁷⁸ See Kirk, *supra* note 277, at 910–11.

²⁷⁹ See *id.*

²⁸⁰ See *id.*

²⁸¹ See *id.*; Joyce Yeager, Note, *No Remedy for Lust: An Implied Cause of Action and RCRA*, 64 UMKC L. REV. 637, 658 (1996).

²⁸² See Kirk, *supra* note 277, at 910–11; Yeager, *supra* note 281, at 658.

This external regulation, in turn, incentivizes petroleum companies to proactively police themselves, which in turn could raise the standard of fracking safety in the United States.²⁸³ Alternatively, if a state chooses not to respond affirmatively with regulation and oversight, it may simply grant fewer—if any—permits.²⁸⁴

The cost of compliance, paired with the overall chilling effect of states not granting permits, would cut into the industry's bottom line.²⁸⁵ This would worsen the already tenuous position of hydrofracking gas in a market flooded with cheaper Middle Eastern crude oil.²⁸⁶

CONCLUSION

Communities impacted by the environmental and public health consequences of hydraulic fracturing find themselves with a limited legal toolkit. They cannot utilize landmark environmental statutes, like the Safe Drinking Water Act or the Clean Water Act, because a powerful web of industrial and political interests has undercut the citizen enforcement provisions of these laws. Common-law tort actions against hydrofracking operations likewise find little success. Potential plaintiffs could increase their likelihood of victory, however, if they also leveled an attack on the government. State regulatory agencies could face liability for granting a fracking permit to a rig that ends up contaminating the surrounding groundwater under an inverse condemnation theory. In short, the government's act of granting a permit, and thus orchestrating the placement of the fracking rig, interfered with residents' use and enjoyment of their property. Though there is a causal gap between the government's actions and the direct interruption of property rights, specifically water contamination, courts have found agencies liable under comparable circumstances. Thus, the government could be Constitutionally compelled to compensate the individuals for the damage done to their property interests.

Regulatory agencies that fear liability for granting a permit would increase monitoring and regulation, and they would likely grant fewer permits overall. This oversight could very likely decrease the chance of an environmental hydrofracking disaster, and also have the side effect of chilling the growth of an industry that is already on economically thin ice.

²⁸³ See Timothy Fitzgerald, *Frackonomics: Some Economics of Hydraulic Fracturing*, 63 CASE W. RES. L. REV. 1337, 1355 (2013); Kirk, *supra* note 277, at 910–11; Yeager, *supra* note 281, at 658.

²⁸⁴ See Kirk, *supra* note 277, at 910–11; Yeager, *supra* note 281, at 658.

²⁸⁵ See Xochitl Torres Small, Note, *Water Use and Recycling in Hydraulic Fracturing: Creating a Regulatory Pilot for Smarter Water Use in the West*, 55 NAT. RES. J. 409, 423 (2015); Spencer Salmon, Comment, *Booms and Busts: Preserving Mother Nature While Staring into the Abyss of Bankruptcy*, 16 TEX. TECH ADMIN. L.J. 465, 476–77 (2015).

²⁸⁶ See Salmon, *supra* note 285, at 483; Andy Rowell, *Half of U.S. Fracking Industry Could Go Bankrupt as Oil Prices Continue to Fall*, ECOWATCH (Jan. 18 2016, 2:29 PM), <http://ecowatch.com/2016/01/18/fracking-industry-bankrupt/> [<https://perma.cc/ZA3E-QTUE>].