The Journal of Private Enterprise 34(2), 2019, 43–64

Surface and Subsurface Property Rights in Minerals: The Continuing Conflict

Calvin A. Kent*
Marshall University

Abstract
The conflicts between owners of surface and subsurface mineral rights as well as the conflicts among subsurface rights owners are continuing issues. Mineral rights usually are severed from surface rights, creating conflicting real property rights: those to the surface and those to the subsurface. The owners of the subsurface mineral rights have the legal right to extract the minerals even if extraction involves the use of the surface owner's land. Different owners of subsurface mineral rights in the same reservoir also are often in conflict regarding the right to extract the mineral in the common pool. This paper investigates the sources of these conflicts, the remedies in both common and statutory law, and how these remedies impact and define property rights in oil and natural gas development. Comment is provided on whether these conflicts could have been avoided or reduced if the United States had followed a market-oriented philosophy.

JEL Codes: D92, H23, K11, P14, Q48
Keywords: property rights, government policy, property law, externalities, intertemporal firm choice

"Secure private property rights have long been demonstrated as the key for sustained and prosperous economic growth."
—Shogren and Parkhurst 2012, p. 196

I. Introduction

Property rights define capitalism and market economies (Alchian 2008; Davis and North 1971). What differentiates nations that prosper from those that do not depends on a guarantee of property

* This paper was presented at the fortieth annual meeting of the Association for Private Enterprise Education, Cancun, Mexico, April 14, 2015. Portions of this research were completed while the author was a David C. Lincoln Fellow at the Lincoln Institute of Land Policy. The entire work, "State and Local Ad Valorem Taxation of Mineral Interests," working paper WP15CK1, can be downloaded from the institute's website.

rights (Deaton 2015; Acemoglu 2012; Leeson 2008). But property rights are limited since the use by one party of a property right they possess may interfere with the enjoyment and use of property rights held by another (Yandle 2003).

This conflict of property rights has a long history that in recent years has been heightened by concern over water and air rights (Anderson and McChesney 2003; Cole and Ostrom 2012). One major area where the controversy continues is mineral rights for oil and gas. Traditionally, property ownership relies on the *ad coelum* doctrine,[1] which states that ownership rights include the surface and extend above and below the surface. "Ownership of minerals then depends on boundary lines drawn on the surface of the land," writes Pierce (n.d., p. 41). When a reservoir of oil or gas exists, defining it by legal description is inadequate, as the mineral exists in an interconnected reservoir crossing surface boundaries. Oil and gas move within the reservoir with no respect for surface boundaries. Oil and gas law accepts surface ownership for the subsurface minerals unless severed (Pierce 2015, pp. 41–42; Lamarre 2011, p. 467).

With real property, usually the mineral rights to the subsurface were severed from the surface rights at the time the property was sold, inherited, or otherwise transferred (Fambrough 1996). The result is a wide diffusion of subsurface rights among multiple owners. As Alchian notes, "The complexities and varieties of [these] circumstances render impossible a bright-line definition of a person's set of property rights with respect to resources" (Alchian 2008).

Two issues arise from the conflict of property rights in oil and gas. The first concerns the competition between holders of surface rights to the land and holders of subsurface rights to mineral deposits under the surface of that land. The second revolves around the competition among those different owners holding subsurface rights in the same oil or gas pool.

The owners of the subsurface mineral rights have the legal right to extract the oil and gas even if the extraction involves the use of the surface owner's land (Wilkerson, n.d.; Texas Railroad Comission, n.d.; Goldstein and Thompson 2006, pp. 232–45). In addition, the oil

[1] The term refers to the Latin principal of law "*Cuius est solum, eius est usque ad coelum et ad infernos*": loosely translated, the owner of the surface also owns everything below and above the land up to the sky, and below the earth to its core. While still applicable to coal and other hard rocks, it is less relevant to oil and gas. See Lamarre (2011, pp. 461–62). While established law, this doctrine has its critics, as discussed later (Bradley 1996).

and gas reservoir usually has several owners of the subsurface rights, which causes property rights conflicts regarding extraction from the common pool (Lamarre 2011). These differences have been exacerbated by the recent rapid expansion of horizontal drilling for natural gas and oil (Kent 2015). This paper investigates the sources of these conflicts, the remedies in both common and statutory law, and how these remedies impact and define property rights as they pertain to oil and natural gas development.

II. Subsurface Property Rights versus Surface Property Rights

In legal terms, land is an estate in real property with all the legal rights of ownership (McCarty and Bagby 1993). When specifically applied to mineral rights, Cole and Ostrom (2012) conclude that those rights consist of entry: the right to enter and find a resource; withdrawal: the right to harvest and take the resource out of the resource system; management: the right to change the physical structures in a resource system; exclusion: the right to determine who can use the resource and what their specific rights would be; and alienation: the right to sell one or more of the first four rights permanently or for a given period (Cole and Ostrom 2012, p. 40). The Texas Supreme Court found, "The mineral estate is composed of five severable rights: 1) the right to develop, 2) the right to lease, 3) the right to receive bonus payments, 4) the right to receive delay rentals, and 5) the right to receive royalty payments" (*French v. Chevron USA Inc.* 1995, p. 797, quoted in Burney 2014).[2]

When minerals are severed, more than a single property estate exists. For the purposes of this study, the rights in real property are separated into surface interests and subsurface interests. The latter are also designated as mineral interests or mineral rights. These mineral rights allow for the surface property to be used for the exploration and extraction of minerals harbored beneath it. As defined in the Illinois Code: "Severed mineral interest is any whole or fractional interest in any or all minerals which have severed from the surface estate by grant, exception, reservation or other means" (Severed Mineral Interest Act, 765 ILCS 515[a]).

---

[2] Severable rights are sometimes called "sticks" in the bundle of property rights. Bonus payments are given at the time the lease is signed by the parties and do not depend on any extraction or production of the mineral (Cordiet 2014). Delay rentals are paid to the mineral owner during the term of the primary lease even if no extraction has commenced (Rokisky & Associates, n.d.).

In many countries, the subsurface rights are retained by the government, which can dispose of them or lease them. This is the case for government-owned land in the United States (McChesney 2003). For private property in the United States, subsurface rights originally convey with the surface land, in which case the surface owner has complete ownership rights known as "fee simple" (International Association of Assessing Officers 1997, p. 56; Goldstein and Thompson 2006, p. 235).

For a separate mineral right to be established, there must be some form of conveyance or reservation (usually a deed) that clearly delineates what interests are being transferred. If there is no conveyance, the mineral rights are not severed and "run" with the land. To avoid litigation, the document must be clear as to what minerals are being conveyed ("all minerals known or unknown," or mention a specific mineral such as coal, oil, gas, or gold) and the premises being conveyed (Matthews and Carleton 2008; Morgan 2008).

From a legal standpoint, there is a difference between a "mineral interest" and a "royalty interest." In numerous cases, these terms are used interchangeably, or one is used when the other was meant. Burney (2014, pp. 182–83) explains the difference: "A mineral interest is a cost-bearing interest that entitles the owner to a proportionate share of lease benefits, including bonus, rentals and landowner's royalty. A royalty interest . . . is a non-cost-bearing interest devoid of the mineral-estate sticks, except the right to share in proceeds from the sale of production."

The sheer number of individual mineral-rights owners (because severed mineral interests may be divided among heirs and assignees) usually means that individually, they have little or no capacity to develop the subsurface. As a result, the common practice is to lease or sell their rights to an "operator" for the purposes of development (Matthews and Carleton 2008; Morgan 2008). The leases create an additional legal estate in property known in law as "chattels real."[3]

When the owner of subsurface mineral rights transfers the mineral interest to an operator, the right remaining with the owner is the royalty interest, which allows the owner to receive a prorated portion of the income (royalty) when the mineral is extracted and

[3] "Chattels are divided into chattels real and chattels personal; chattels real being interests in land which devolve after the manner of personal estate, as leaseholds. . . . as being interests in real estate, they are called 'chattels real.'" *Black's Law Dictionary - Free Online Legal Dictionary*, 2nd ed.

sold. The operator extracting the mineral holds the "working interest." Typically, the working interest receives 87.5 percent of the proceeds from the operation (but bears all the expenses) while the royalty holder receives 12.5 percent and is not responsible for any costs (Morgan 2008, p. 9).

This division of interests between royalty owners and operators may create a "timing externality" (Brätland 2012). The parties' interests as to when to develop the mineral may diverge: "The surface owner is always entitled to a percentage share of the *gross sales proceeds* . . . once the resource is produced . . . the surface owner and the extractive enterprise have mutually incompatible objectives. Because expedited production is to the advantage of the royalty owner, a managerial decision to delay activities . . . diminishes the capitalized value of the surface owner's royalty interests" (Brätland 2012, p. 62, italics original).[4]

Operators making decisions about exploration and development need flexibility to determine the timing of extraction to respond to market changes. Court decisions and provisions in most royalty contracts encourage early and rapid development, which is in the royalty owner's short-term interest (Goldstein and Thompson 2006; Daintith 2010, p. 222). The operator's ability to adjust development to the market may be curtailed or restricted. As a result, the "net present value" of the deposit is not maximized,[5] creating the timing externality.[6]

A. Rule of Capture

From the beginning of the mining of oil and gas in the United States, extraction has been under the legal principle of the "rule of capture" (Kramer and Anderson 2005; Daintith 2010; Flannery and Morgan 2011). This rule allows the owner or operator who has the mineral rights to access from adjoining land oil or gas that flows into the owner's well bottom.[7] This old doctrine was established to determine

[4] Brätland's analysis assumes that the surface owner and the royalty owner are the same. While this is not the usual case, the analysis is not affected.

[5] From an investment standpoint, the net present value (NPV) is the difference "between the present value of all expected benefits and the present value of the capital outlays expressed in current dollars" (Appraisal Institute 2008). Projects with the highest positive NPV are the most desirable. Any restrictions that minimize the NPV of a project are considered suboptimal.

[6] The timing problem would not exist if homestead assignment of first title (discussed later) was in place.

[7] The rule of capture is also known as the "rule of first possession" (Lueck 1998).

who owned groundwater, oil, gas, and wild animals when they "wandered" onto someone's land (*Acton v. Blundell* 1843; *Pierson v. Post* 1805; Grover and Mann 1990–91).

The state courts have used two different theories regarding the rule of capture, explain Goldstein and Thompson (2006, p. 236): "Under the *Ownership-in-place* theory . . . a landowner holds title to any oil and gas underneath his land, but loses title to it if it migrates to beneath someone else's property. Under the alternative *exclusive-right-to-take* theory no one holds title to the oil [and gas] when it sits underground: landowners gain title . . . only by pumping it from the ground and thus 'capturing' it."

Most state courts, but not all, have used the ownership-in-place theory. Since the oil or gas "migrates" into the producer's well bottom, it belongs to the producer as the one who "captured" it and therefore has "exclusive ownership" (Harder 2014). In such a case, the holder of the mineral right has no legal obligation toward any adjacent mineral owner, as it is impossible to determine the original source of the mineral. The US Supreme Court decided that mineral rights "belong to the owner of the land . . . so long as they are on it or in it . . . but when they escape or go into other land, or come under another's control, the title of the former owner is gone" (*Brown v. Spillman* 1895). Legal scholars call this interpretation the "pure" rule of capture (Hunker 1964; Kramer and Anderson 2005). It is worth noting, "The rule of capture is a common-law rule . . . its authority as a rule of law derives from its adoption as a basis of decision by American courts involving property rights in petroleum. No legislature has ever intervened to frame the rule in statutory terms . . . the courts plucked from the air a fanciful analogy with wild animals and set the industry ineluctably on its wasteful course" (Daintith 2010, pp. 13, 16).

Problems with the pure rule of capture developed. The only way an adjacent owner could capture value from the mineral under their land was to drill their own wells ("self-help doctrine"), resulting in a significant number of excess wells almost touching each other along property borders (Flanery and Morgan 2011; Bradley 1996, p. 67). This "forest of wells" led to an early depletion of pressure in the reservoir, which severely limited future production, created "waste," and flooded the current market, driving down prices (Daintith 2010, pp. 8, 197; Flanery and Morgan 2011, p. 460).

This result is like the problems of overuse of pasture land arising from the tragedy of the commons, where overgrazing resulted when

anyone could graze their livestock on communal property without cost (Harden 1968). But problems with mineral rights stem not from the absence of property rights, but from the presence of conflicting property rights embodied in the rule of capture (Goldstein and Thompson 2006, p. 239).

B. Homestead "First Title"

This conflict would have been avoided had American property law not "uncritically adopted the notion that possession of the surface also entailed ownership of the sky above it and the ground below it," writes Bradley (1996, p. 70). The alternative would have been "homestead assignment of first title." Under this approach, "mineral rights would not automatically accompany surface rights. Minerals would be unowned until homesteaded by the act of discovery and the intent to possess . . . initial ownership would occur when oil or gas entered the well bore and was formally claimed by the driller. . . . Under a homestead theory of subsurface rights, the first finder of a mineral area would have claim to the entire recognized deposit" (Bradley 1996, pp. 71–72). This approach was the way mining law developed in California and other mineral states during the gold rush: "The miners . . . have generally adopted as being best suited to their particular wants, the main principles of the mining laws of Spain and Mexico, by which the right of property in mines is made to depend upon *discovery* and *development,* that is *discovery* is made the source of title, and *development*, or working the continuance of that title" (Halleck 1860, quoted in Clay and Wright 2012, p. 71, italics original). Rothbard summarized this approach as being the "second libertarian principle" of "just" property: "everyone has an absolute property right over previously unowned natural resources (land) which he first occupies and brings into use" (Rothbard 1982, p. 145).

If this approach had been accepted, many of the problems resulting from the rule of capture would have been avoided. Violations of the mineral owner's interest by others would be handled under trespass law, as discussed later.

C. Correlative Rights

The pure rule of capture has been modified in many states by the doctrine of correlative rights.[8] "Correlative rights" has been applied in law and by the courts since its acceptance by the United States Supreme Court (*Ohio Oil Co. v. Indiana* 1900). Under correlative rights doctrine, each mineral owner in the pool is subject to a "mutual right-duty" obligation.[9] This is in addition to the waste prevention approach applied in most legislation, under which "the primary duty consisted for the public to protect valuable natural resources by prohibiting wasteful operations. Under the correlative rights approach the duty is owned to adjoining landowners. The difference is attributable to the emphasis placed on ownership. Where waste prevention statutes emphasize the public interest over private ownership, the correlative rights approach recognizes that co-ownership between private interests is the crucial relationship" (Strong 1967, p. 213).

Correlative rights theory rejects the traditional use of surface boundaries as a starting point for developing appropriate law by recognizing when mineral structures extend beyond a single owner's surface boundary rights. "Principles must be established to govern use of the common reservoir," writes Pierce (2015, p. 8). "This means the right to do what an owner pleases on his own land is restricted, but at the same time he has rights in the entire reservoir that can impact his portion. The rights are correlative."

If correlative rights were to dominate legal practice, individual property rights would be altered. Under correlative rights, "each owned 'more' property rights because they also possessed rights in the reservoir at large, which also gave them rights in the properties of their neighbors . . . each owned 'less' rights because the portion of the reservoir within their property lines [was] connected to surrounding properties," writes Pierce (n.d., p. 83). Correlative rights advocates contend, "This collective interest is greater than that of any individual owner" (Strong 1967, p. 211) As discussed later, correlative rights are part of the justification for pooling or unitizing a reservoir (Pierce 2009).

[8] The doctrine of correlative rights is also known as the American rule, the reasonable use rule, and the beneficial use rule.

[9] Explained later.

III. Conflicts on the Use of the Surface Land

If the owner of the surface land also has the mineral rights, there is no problem, as the owner holds fee simple and can control whatever surface activity relates to mineral extraction. However, when there has been a severance, mineral rights predominate (Topp 1999). When severed mineral interests are present, the use of the surface land is limited by the subsurface rights. The presence of rigs, roads, ponds, pipeline, gathering stations, and other encroachments limits the use and possibly the market value of the surface land.

How extensive the rights of mineral owners and their lessees are was summarized for Texas: "Lessees have broad rights to use the surface for the purpose of exploring and producing . . . These rights include the right to conduct seismic tests, drill wells at locations they select, to enter and exit well sites and other facilities, to build, maintain and use roads for access, . . . to build and use pipelines . . . to use surface and subsurface water to operate injection wells and to dispose of lease-produced water" (Texas Railroad Commission, n.d.).

While the best solution is for the surface owner to obtain an agreement with the mineral owner, operator, or lessee, often this is not possible. Mineral rights usually become fragmented among numerous heirs and assignees, creating the problem of transaction costs (Coase 1960). This negotiation is best accomplished with the operator. Some mineral rights leases now contain indemnity provisions, where the developer must compensate the surface owner for the cost of "unreasonable" damages (Saxowsky 2014).

A. Accommodation Doctrine

In the absence of an agreement, surface owners have some legal rights to protect their property interests. The surface owner's recourse for damages is provided by the accommodation doctrine, under which the use of the surface by the operator is limited to what is necessary and reasonable.

Even though an oil and gas lessee is entitled to enjoy "reasonable surface use" as is necessary or convenient for exploration and development operations, this right does not entitle the lessee to have unfettered use of the surface. If the mineral owner's or mineral lessee's use of the surface is not "reasonable and necessary," the surface owner may protect himself through an action in trespass or an appeal to equity for an injunction (Topp and Horn 2012, p. 12).

Courts in most mineral-producing states have adopted the accommodation doctrine (Massone 2011; McManus 2009). The

surface owner can restrict the lessee's use if it can be shown that the mineral-rights developer had other means of producing the mineral that would be less disruptive and that would be reasonable for the mineral producer to use (Siegal and Bryce, n.d.). Factors considered by the courts have included (1) whether the use existed prior to the extraction activity, (2) whether the use of the surface property will be substantially impaired, and (3) whether the leaseholder's use is not reasonably necessary because alternatives exist, and (4) failure to remediate the land to its original condition (Massone 2011). But it is rare for a court to find that a lessee's activity was unreasonable (Morgan 2008) since in these cases, the burden of proof rests with the surface owner.

B. Common Law Provisions

The common law provides limited protection for surface owners regarding the use of the surface. There are two tort remedies, negligence and trespass, which can cause claims against the operator.

"Negligence by operator" occurs when the surface owner may be able to collect damages in cases where the developer of the mineral interest was negligent and caused damage to the surface holder's land. This is part of the "common law" accepted in all states. Negligence arises when the operator "failed to exercise reasonable and ordinary care with construction operations on the plaintiff's property" (Topp and Horn 2012, p. 12).

The specific causes of negligence include "the failure to inspect, failure to warn, failure to properly maintain and most importantly, failure to remove and dispose of certain substances, and failure to communicate the known or suspected hazards" (Smith 2009, p. 890). Examples include oil spills and leaks, abandoned pipe and equipment, and unnecessary erosion related to construction (Topp and Horn 2012). Other examples where various courts found operators to be negligent are damaging surface property by operating broken equipment, allowing a saltwater disposal pit to overflow, failing to advise a surface owner in advance of development plans, denying a surface owner a chance to fence livestock, failure to guard against escaping gas, and contamination of the surface due to unreasonable use (Massone 2011).

"Trespass by operator" occurs when one enters "another's property without permission of the owner or his/her agent and caus[es] damage no matter [how] slight. Any interference with the owner's (or legal tenant's) use of the property is sufficient showing of

damage" (Hill and Hill 2014). This doctrine is most often employed when the lessee of the mineral owner exceeds the legal boundaries of the lease for exploration, development, or remediation; when the operator fails to remove equipment; or when the operator stores equipment on site that is no longer needed or is in violation of the length of the operator's lease (Smith 2009). Trespass may also happen when rigs and structures are placed at locations other than those indicated on the plan provided to the surface owner.

There are also cases of subsurface trespass, where a producer takes minerals that are not specifically covered by the mineral-rights conveyance. Subsurface trespass can also occur if structures other than those necessary for mineral extraction are placed on the property, even if they are within the confines of the lease boundaries. In some situations where enhanced oil recovery techniques are used to reinvigorate dormant wells, if the project is not covered by the mineral lease, the producer is guilty of subsurface trespass if those minerals are extracted (Morgan 2008, p. 14). In recent years (as will be discussed later), the use of horizontal wells in hydraulic fracturing has also created trespass issues (Pierce 2010).

IV. Legislative Approaches to Surface Rights

Use of the rule of capture has created significant legal issues for which legislative responses have been developed. In addition to adopting the accommodation legislation, other approaches have become almost universally enacted.

A. "Conservation" Legislation

A major problem the rule of capture created was "waste" due to overproduction. Too many wells would be drilled in essentially the same reservoirs, reducing the pressure and thereby permanently reducing the production from the field or pool (Interstate Oil and Gas Commission 2004; Morgan 2008). As a result, the mineral would be prematurely "exhausted," decreasing the field's overall productivity as significant amounts of the oil and gas were "locked in" and the field was not fully developed. This economic waste led all mineral-producing states to adopt some form of conservation legislation and a conservation commission or other body to enforce the regulations (Flanery and Morgan 2011; Pierce 2013).

While there are state-to-state variations in name and content, most state legislation is parallel to the model legislation advanced by the Interstate Oil and Gas Compact Commission. Among the

conservation regulations common to the states are spacing (including spacing units) and location of wells, disposal of water and other waste, the amount of the mineral that can be produced, and venting and flaring of gas (Interstate Oil and Gas Commission 2004, pt. II, secs. 5–7).

One property-rights advocate sees this legislation as inferior to market solutions. "Three things are known," writes Bradley (1996, p. 77). "First, conservation regulation historically has been wasteful and abused by political interests. Second, self-interest and market process work to combat economic waste. And third, despite all obstacles, voluntary unitization agreements have been made over a five- to six-decade period. These conclusions suggest that mandatory conservation law to restrict production was the wrong road to take." It is worth noting, "Like the rule of capture, the waste statutes did not create a property interest in the minerals while they are in situ" (Strong 1967, p. 211).

B. Accommodation Law

Most oil and gas states have "accommodation" legislation to ensure compliance and to clarify what is included in the expectations. These laws are designed to compensate the surface owner for any monetary loss suffered due to the drilling activity. In West Virginia, the "Oil and Gas Production Damage Compensation Act" (WV Code 227-7-3) allows compensation for the following (Archer, n.d.):

- Lost income or expenses due to the inability of use land actually occupied by the driller to the uses to which it was in place prior to the start of drilling
- Market value of crops destroyed, damaged or prevented from reaching market
- Damage to a water supply in use prior to the commencement of drilling
- Cost of repair of personal property up to the value of replacement of like age and quality
- The reduction in value, if any, of the surface lands after drilling measured from the date of commencement of the drilling activity

Arkansas law broadly defines what is eligible: "damages to real property, growing crops, trees, shrubs, fences, roads, structures, improvements, livestock, personal property and measurable damage to the productive capacity of the soil" (Smith 2009). North Dakota has gone further than other states in providing compensation for

surface damages (NDCC 38-11.1-04): "North Dakota legislature requires [the] mineral developer to compensate the surface owner for all damages done; this is a broader obligation than the past requirement of compensating only for unreasonable damages" (Saxowsky 2014). Damages to be compensated are lost land value, lost use of or access to the surface owner's land, and lost value to improvements.

Some states have even broader provisions (Ferraro 1967). Those states have acts related to compensation to be paid to surface owners for damages (Earthworks, n.d.). While not identical in scope or coverage, there are common instances of compensable damages when the operator fails to comply with the law or contract. Among these are provisions to remit the amount of compensation, provisions for reconciling disputes over damage, and provisions requiring insurance or bond to cover damages.

C. Adjacent Surface Property

There is often an impact from the exercise of a mineral right on adjacent surface property. There is no disagreement that the accommodations doctrine does not apply to the use of neighboring surface property: "While operators may have a lot of leeway when it comes to surface owners, the same cannot be said for neighboring property . . . there is no implied right to infringe on neighboring property" (Massone 2011, p. 5).

V. Conflicts between Subsurface Rights Owners

Legal issues arise not only from conflicts between surface rights holders and those with rights to subsurface minerals, but also from competing rights among subsurface mineral interests, which also must be reconciled. These are "slant drilling" and "hydraulic fracturing." These issues have been the basis for laws concerning "pooling" or "unitizing" of subsurface mineral interests.

A. Slant Drilling

The law of capture allows an operator to capture all oil and gas that naturally flows into the well "bottom." Subsurface trespass law applies to "slant drilling," where the pad on one piece of property places or slants a well (sometimes called "deviation") onto another's subsurface property (Younger and Boda 2013). Slant drilling is considered either to be illegal or an actionable tort in all states (Rodgers 2013, pp. 112–19; Ragsdale 1993, p. 320).

B. Hydraulic Fracturing

Hydraulic fracturing presents the situation where laterals are horizontally extruded from the well bottom across property lines where the surface owner may not have authorized the laterals (Kramer and Anderson 2005, p. 934). Gas trapped in Marcellus, Barnett, or Utica shale does not naturally "flow" into a well bottom as do conventional oil and gas; rather, it is trapped in the shale formation. High-pressure water is then pumped into these laterals to fracture the shale and release the oil or gas (United States Environmental Protection Agency, n.d.). For this reason, there is support for considering horizontal laterals as subsurface trespass (Lamarre 2011, pp. 472–74; Pierce, n.d., pp. 61–64). This was the basis for a dissent in the Texas case (*Coastal Oil & Gas Corp. v. Garza Energy Trust* 2008). This interpretation has been noted in one federal case (*Young v. Ethyl Corp.* 1974).

State courts have not been consistent on this issue (Kulander and Shaw 2014; Pierce 2010; Robertson 2014). In Texas, the court said that the rule of capture bars recovery of damages from taking the mineral that flows into the well bottom no matter what its source (*Coastal Oil & Gas Corp. v. Garza Energy Trust* 2008; Rodgers 2013). In North Dakota, however, this process has been viewed as subsurface trespass in the same way as slant drilling (*Continental Resources, Inc. v. Farrar Oil Co.* 1997). This finding has also occurred in West Virginia (Nicholson 2014).

C. Pooling or Unitizing

Many legal issues surrounding conflicts in subsurface mineral rights were to be addressed by "pooling" or "unitizing" the field. Before pooling, the only way an individual mineral rights owner or operator could secure a portion of the oil and gas under their property was to drill their own wells, which created a strong incentive to drill excess wells (Flannery and Morgan 2011).

There are two basic types of pooling: voluntary and compulsory. Under pooling options, when separately owned mineral interests are within a "spacing unit," the owners may voluntarily pool their tracts and interests (Rothbard 1982, p. 136). Voluntary pooling, write Flanery and Morgan (2011, p. 463), "involves private arrangements to allow for joint development of separately owned oil and gas interests within a spacing unit. . . . compulsory or statutory pooling arises

when applicable spacing requirements necessitate the inclusion of adjacent tracts . . . which are not commonly owned."

If there is no agreement on voluntary pooling, in thirty-three states, the oil and gas commission or other designated board may require pooling of nonconsenting owners or operators, usually following the model legislation (Interstate Oil and Gas Commission 2004, pt. IV, sec. 10[a]).

Compulsory pooling raises two conflicting positions on property rights: First, should individuals who do not want to participate lose their right not to participate? Second, should those holding mineral interests be denied the right to gain from those interests if pooling is not instituted?

When mineral interests are fragmented among many owners, high transaction costs may doom voluntary pooling. This is another example of the difficulties of individual action as described by Coase:

> In order to carry out a market transaction, it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiation leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure the terms of the contract are being observed . . . These operations are often extremely costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system worked without cost. (1960, p. 15)

Major producing states have compulsory pooling, where the goal is not only to promote efficient extraction and provide a stream of income to both individuals and the state, but also to protect correlative rights (Kramer 2013; Harder 2014). The operators usually must obtain agreement from 50–60 percent of all mineral-rights owners or leaseholders prior to requesting the formation of the unit. The courts have upheld pooling as being in the "public interest." These pooling arrangements have been held by state courts to supersede individual contract and property rights (Williams and Myers 1957).

The prevailing view is that pooling and unitization are environmentally and economically beneficial because "forced pooling through decreases in transaction costs, decreased bargaining power of landowners, and price setting, induces an increase in petroleum development" (Eubanks and Mueller 1986, p. 484). Organizations

representing both operators and royalty owners have favored pooling because it allows for a reservoir to be efficiently developed and for all mineral-rights owners collectively to receive greater income, as the pool is not depleted irresponsibly (Tincher 2015). In effect, pooling is a legally sanctioned cartel.

Since pooling requires the proration of royalties among those in the pool, the royalty clauses in the individual leases executed prior to the pooling are abrogated and the royalty payments divided according to the "division order" that created the pool or unit (Fambrough 1996, p. 7). Holders of the original mineral leases in some cases see their royalty portion reduced under the pooling arrangement, as a "taking" of their individual rights to royalties as well as a violation of their individual liberty to contract (Cordato 2013). "The compulsion involved in statutory pooling suggests that mineral owners, are no longer entirely free to choose when to lease their mineral interests, nor are they entirely free to negotiate the price of the lease," write Eubanks and Mueller (1986, p. 478). There is a property-rights issue with compulsory pooling: "What would not be permissible is one group getting together and deciding that another group should be forced into assuming their risks" (Rothbard 1982, p. 136).

There is a possibility that without pooling, the field may not be developed at all. "Holdouts" from a voluntary pooling may be seeking a higher percentage of the revenue than allowed under the pooling arrangement, wishing to wait to receive income in the future, or wanting to pass an unencumbered mineral right to heirs. If holding out was allowed and it prevented the pooling from going forward, it would deny the other mineral owners the income they could have received under the foregone pooling (Eubanks and Mueller 1986). From the standpoint of those wanting the pool, the refusal of others to join constitutes a taking of their property rights, since production cannot begin in the absence of a pooling arrangement. Those primarily affected would be the smaller owners who did not hold a sufficient acreage to allow their own drilling (Brätland 2012; Flannery and Morgan 2011). Compulsory pooling orders thus serve as antiholdout laws (Harder 2014).

"Nonconsenting" mineral-rights owners do maintain limited individual rights. Depending on the state, nonconsenting owners have three possible regimes regarding coverage of the operator's costs of exploration, drilling, and operation (Harder 2014; Baca 2011):

1. Costs only. The nonconsenting owners pay the costs of production attributable to their share of the production only if the well is successful. This approach encourages holdouts and discourages exploration, as the full costs of exploration may not be covered if the hole turns out to be dry.
2. Risk penalty. This is the most frequently used approach. The nonconsenting owner pays a "risk penalty" to compensate the operator for the costs involved in bringing in the well. The penalty is a percentage of the landowner's compensation, which can run as high as 300 percent of the nonconsenting owner's prorated cost of production.
3. Options given. The states using this approach allow for choice among alternatives under the mandatory pooling order including either of the two above. Advocates view this as the approach that best approximates the market. Critics see it as discouraging voluntary pooling, as holdouts can wait and see before choosing an option.

Nonconsenting owners are entitled to receive royalties from their prorated share of the production. In addition, the surface use of the land held by the nonparticipant cannot be used for exploration or extraction.

VI. Conclusions

Since the start of the petroleum industry in 1858, there has been continuing legal controversy over the property rights of the parties involved in the development, extraction, and distribution of the hydrocarbons. The issues involving the conflict between the owners of surface rights and the owners of subsurface rights in minerals have not been finally settled, as the myriad of cases in state courts bears testimony (Goldstein and Thompson 2006). There are still issues as to how much use a subsurface rights owner can make of the surface owner's land. The recent conflict in property rights among subsurface mineral-rights owners has been brought to the forefront by the employment of hydraulic fracturing in oil and natural gas production, where the gas does not "naturally" flow into a well bottom.

The legal confusion has its basis in the United States being the only major mineral-producing country (except Canada) to base its mineral law on the rule of capture (Daintith 2010, p. 413). Had the nation followed the homestead first title rationale, where the individual discovering the deposit and working it would be the owner with the right to develop the entire resource, most of the issues

discussed here would have been reconciled and the confusion over property rights reduced. Rothbard stated, "Using the homesteading principle, the *ad coelum* rule never made any sense, and is therefore overdue in the dustbin of legal history" (1982, p. 155).

Compounding the conflict is the diffusion of ownership among subsurface mineral owners, since these severed rights have been passed on to heirs, to assignees, and by contract. In many cases, ownership of subsurface rights has been diffused among dozens if not hundreds of owners. The surface owners, when they acquired the property, may not have been aware of the subsurface rights or how these rights may affect the use of their surface property.

This fragmentation of ownership has led to government action to reduce the inherent problems of economic waste and transaction costs. The earlier efforts by the states enacting "conservation legislation" have succeeded in preventing the overdrilling and waste that resulted from the rule of capture. State laws embracing the accommodations doctrine further reduced the conflict between surface and subsurface owners but did not eliminate it. Common law doctrines of trespass and negligence have been infrequently employed as well to settle disputes in favor of surface owners.

Accepted by the courts and embodied in many state laws, the doctrine of correlative rights has offered protection for owners of conflicting and competing claims on subsurface minerals. Legislation providing for pooling and unitization based on both waste reduction and correlative rights has provided a partial solution, but one involving a "taking" of property and contract rights established prior to the arrangement. While voluntary pooling or unitization is to be preferred, it is sometimes impossible to gain agreement due to the multiple ownership of subsurface rights. Further, fragmentation has made it difficult to locate all owners of the mineral rights. Plus, there is the problem of "holdouts" refusing to enter the agreement, seeking a larger share or a settlement. These complications have formed the basis for laws requiring forced pooling, which has converted individual property rights into collective ones.

Unfortunately, under the current legal regime, the courts have often been the ones making property-rights decisions involving oil and gas. The issue of property rights is confused by multiple and conflicting decisions that not only vary between states but within them as well. The decisions have more often than not supported waste elimination and government regulation, which has tended to cartelize the industry. Starting over with a philosophy of property

rights for oil and gas based on the homestead theory is appealing. But given the current long standing body of law and court decisions based on rule of capture, that change is, unfortunately, unlikely.

References

Acemoglu, Daron, and James Robinson. 2012. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. New York: Crown Publishing.

Acton v. Blundell. 1843. 152 Eng. Report 1223, 125 (Ex Ch).

Alchian, Armen. 2008. "Property Rights." *The Concise Encyclopedia of Economics* (online). Library of Economics and Liberty, Liberty Fund.

Anderson, Terry, and Fred McChesney. 2003. *Property Rights: Cooperation, Conflict, and Law*. Princeton, NJ: Princeton University Press.

Appraisal Institute. 2008. *The Appraisal of Real Estate*, 13th ed. Chicago: Appraisal Institute.

Archer, Julie. n.d. "Questions from Water Celebration Day." Charleston, WV: West Virginia Surface Owners' Rights Organization. Accessed February 1, 2014.

Baca, Marie C. 2011. "Forced Pooling: When Landowners Can't Say No to Drilling." ProPublica, May 18.

Bradley, Robert. 1996. *Oil, Gas & Government: The US Experience*, vol. 1. Lanham, MD: Rowman & Littlefield.

Brätland, John. 2012. "Timing 'Externalities' Imposed by Mineral Ownership Law: Coasean Versus Lockean Remedies." *Journal of Private Enterprise*, 28(1): 61–67.

Brown v. Spillman. 1895. 159 US 665.

Burney, Laura. 2014. "Oil, Gas and Mineral Titles: Resolving Perennial Problems in the Shale Era." *Rocky Mountain Mineral Law Foundation Journal*, 51(1): 157–219.

Carleton, Elaine, and Lauren Matthews. 2008. *Everything You Wanted to Know about Oil & Gas Interests (But Were Afraid to Ask)*. Denver: Carleton Law Firm LLC.

Clay, Karen, and Gavin Wright. 2012. "Gold Rush Legacy." In *Property in Land and Other Resources*, ed. Daniel Cole and Elinor Ostrom, 67–89. Cambridge, MA: Lincoln Institute of Land Policy.

Coase, R. H. 1960. "The Problem of Social Cost." *Journal of Law and Economics*, 3: 1–44.

Cole, Daniel, and Elinor Ostrom. 2012. "The Variety of Property Systems and Rights in Natural Resources." In *Property in Land and Other Resources*, ed. Cole and Ostrom, 37–67. Cambridge, MA: Lincoln Land Institute.

Continental Resources, Inc. v. Farrar Oil Co. 1997. N.D. 31, 559 N.W.2d 841.

Cordato, Roy. 2013. "Fracking and the Question of Property Rights." John Locke Foundation website, October 2.

Cordiet, David. 2014. "Oil & Lease Bonus Payment Taxation." Herbein and Company blog. January 30.

Coastal Oil & Gas Corp. USA v. Garza Energy Trust. 2008. 268 S.W.3d 1.

Daintith, Terence. 2010. *Finders Keepers? How the Law of Capture Shaped the World Oil Industry*. New York: Resources for the Future.

Davis, Lance, and North, Douglass. 1971. *Institutional Change and American Economic Growth*. Cambridge, MA: Cambridge University Press.

Deaton, Angus. 2015. *The Great Escape: Health, Wealth and the Origins of Inequality*. Princeton, NJ: Princeton University Press.

Earthworks. n.d. "Surface Owner Protection Legislation." Earthworks website. Accessed February 7, 2014.

Eubanks, Larry, and Michael Mueller. 1986. "An Economic Analysis of Oklahoma's Oil and Gas Forced Pooling Law." *Natural Resources Journal*, 26: 469–92.

Fambrough, Judon. June 1996. "Mineral, Surface Rights and Royalty Payments: Technical Report No. 40." College Station, TX: Real Estate Center, Texas A&M University.

Ferraro, A. G. 1967. "Valuation of Property Interests for Ad Valorem Taxation of Extractive Industry and Agricultural Realty: Problems and Solutions." In *The Property Tax and Its Administration*, ed. Arthur D. Lynn, 119–139. Madison, WI: University of Wisconsin Press.

Flanery, Sharon, and Ryan Morgan. 2011. "Overview of Pooling and Unitization Affecting Appalachian Shale Development." *Journal of the Energy and Law Institute*, 32: 458–513.

French v. Chevron USA Inc. 1995. 896 S.W.2d 795.

Goldstein, Paul, and Barton Thompson. 2006. *Property Law: Ownership, Use, and Conservation*. New York: Foundation Press.

Grover, George, and John Mann. 1990–91. "*Acton v. Blundell* Revisited: 'Property' in California Ground Water." *Western State University Law Review*, 18: 589–641.

Halleck, Henry W. 1860. Introductory remarks by the translator. In *Fundamental Principles on the Law of Mines*, by J. H. N. de Fooz, 1-cxlvii. San Francisco: J. B. Painter, printer.

Harden, Garrett. 1968. "The Tragedy of the Commons." *Science*, 162: 1243–48.

Harder, Abby. 2014. *Compulsory Pooling Laws: Protecting the Conflicting Rights of Neighborhood Landowners*. Washington, DC: National Conference of State Legislatures.

Hill, Garret, and Kathleen Hill. 2014. "Trespass." In *The People's Law Dictionary*. Huntingdon Valley, PA: Farlex.

Hunker, H. L. 1964. *Erich W. Zimmermann's Introduction to World Resources*. New York: Harper and Row.

Illinois Severed Mineral Interest Act 765 ILCS 515(a).

International Association of Assessing Officers. 1997. *Glossary for Property Appraisal and Assessment*. Kansas City, MO: International Association of Assessing Officers.

Interstate Oil and Gas Commission. 2004. "2004 Model Oil and Gas Conservation Act." Suggested legislation.

Kent, Calvin. 2015. "State and Local Ad Valorem Taxation of Mineral Interests." Working paper WP15CK1. Cambridge, MA: Lincoln Institute of Land Policy.

Kramer, Bruce M. 2013. "Oil and Gas Leases and Pooling: A Look Back and a Peek Ahead." *Texas Tech Law Review*, 45: 877–903.

Kramer, Bruce M., and Owen L. Anderson. 2005. "The Rule of Capture: An Oil and Gas Perspective." *Environmental Law*, 35: 899–900.

Kulander, Chris, and Robert Shaw. 2014. *Toward Uniformity in Subsurface Trespass Jurisprudence: Geophysical Techniques, Hydraulic Fracturing, Gas Storage, and Injection Well Disposal.* Austin: University of Texas.

Lamarre, Colleen E. 2011. "Owning the Center of the Earth: Hydraulic Fracturing and Subsurface Trespass in the Marcellus Shale Region." *Cornell Journal of Law and Public Policy*, 21(2): 458–86.

Leeson, Peter. 2008. "Escaping Poverty: Foreign Aid, Private Property, and Economic Development." *Journal of Private Enterprise*, 23(2): 39–64.

Lueck, David. 1998. "First Possession." In *The New Palgrave Dictionary of Economics and the Law*, ed. Peter Newman, 1–36. New York: Palgrave Macmillan.

Mazzone, Michael J. 2011. "Changing Times Bring Conflict with Surface Owners." *American Oil and Gas Reporter*, December: 1–2.

McCarty, F. William, and John W. Bagby. 1993. *The Legal Environment of Business*. Homewood, IL: Irwin.

McChesney, Fred. 2003. "Government as Definer of Property Rights." *In Property Rights: Cooperation, Conflict, and Law*, ed. Terry Anderson and Fred McChesney, 227–53. Princeton, NJ: Princeton University Press.

McManus, Lisa. 2009. "The Accommodation Doctrine in Pennsylvania." LexisNexis Legal Newsroom: Energy. December 10.

Morgan, Charles A. 2008. *The Arkansas Leasing Manual*. Texarkana, TX: Dunn Nutter & Morgan, LLP.

Ohio Oil Co. v. Indiana. 1900. 177 U.S. 190.

Pennsylvania Coal Co. v. Mahon. 1922. 260 U.S. 393.

Pierce, David. 2009. "Minimizing the Environmental Impact of Oil and Gas Development by Maximizing Production." *North Dakota Law Review*, 85(4): 759–80.

Pierce, David. 2010. "Trespass Issues in a Shale Play." *Development Issues in Major Shale Plays*, paper no. 7. Rocky Mountain Mineral Law Foundation.

Pierce, David. 2013. *Oil and Gas Conservation Law and Practice*. Topeka, KS: Washburn University School of Law.

Pierce, David. 2015. "Developing a Correlative Rights Doctrine to Accommodate Development of Oil and Gas in Arkansas." *Arkansas Law Review*, 68: 407–24.

Pierce, David. n.d. "Exploring Past, Present, and Future Roles for Correlative Rights in Arkansas Oil and Gas Conservation Law." Lecture presented at Washburn University School of Law, Topeka, KS.

Pierson v. Post. 1805. 3 Cai. R 175, 1805 NY.

Ragsdale, Terry. 1993. "Hydraulic Fracturing: The Stealthy Subsurface Trespass." *Tulsa Law Review*, 28(3): 213–46.

Robertson, Brannon. 2014. "Important Cases on Subsurface Trespass Pending before the Texas Supreme Court." King & Spaulding Energy Newsletter, May.

Rodgers, Levi. 2013. "Subsurface Trespass by Hydraulic Fracturing: Escaping *Costar v. Garzas* Disparate Jurisprudence through Equitable Compromise." *Texas Tech Law Review – Online Edition*, pp. 102–29.

Rokisky & Associates. n.d. "Common Contract Terms." Rokisky Law website. Accessed 2013.

Rothbard, Murray. 1982. "Law, Property Rights, and Air Pollution." *Cato Journal*, 2(1): 55–99.

Saxowsky, David. 2014. *Surface Owners' Rights*. Fargo, ND: North Dakota State University.

Shogren, Jason, and Gregory Parkhurst. 2012. "Who Owns Endangered Species?" In *Property in Land and Other Resources*, ed. Daniel Cole and Elinor Ostrom. Cambridge, MA: Lincoln Institute of Land Policy.

Siegal, Matthew J., and David Bryce. n.d. *Whose Right Is It Anyway? Surface Use Issues in Oil and Gas Development*. Houston: McCollan, Duplantis & Eagan.

Smith, Toni. 2009. "Skimming the Surface: Arkansas Act 507's Attempt to Limit Compensation for Spill Damages." *Arkansas Law Review*, 62(4): 885–903.

Strong, Sidney. 1967. "Application of the Doctrine of Correlative Rights by the State Conservation Agency in the Absence of Express Statutory Authorization." *Montana Law Review*, 28(2): 204–24.

Texas Railroad Commission. n.d. *Oil & Gas Exploration and Surface Ownership*. Austin: Texas Railroad Commission.

Tincher, Sarah. 2015. "'Forced Pooling' Bill Failure Disappoints Industry." *State Journal*, March 20.

Topp, Susan. 1999. "Severed Minerals: Are Surface Owners Entitled to Damages for Diminution of Their Property Value?" *Michigan Bar Journal*, 78: 148–51.

Topp, Susan, and William Horn. 2012. "Oil and Gas." Chapter 20 in *Michigan Environmental Law Deskbook*, 2nd edition, ed. Jeffrey K. Haynes. State Bar of Michigan Environmental Law Section.

United States Environmental Protection Agency. n.d. Natural Gas Extraction: Hydraulic Fracturing. Washington, DC: US Environmental Protection Agency.

Wilkerson, D. D. n.d. "Understanding Mineral Rights." Bozeman, MT: Montana State University Extension.

Williams, H. R., and Myers, C. J. 1957. "The Effect of Pooling and Unitization upon Oil and Gas Leases." *California Law Review*, 45(4): 411.

Yandle, Bruce. 2003. "Property Rights or Externalities." In *Property Rights: Cooperation, Conflict, and Law*, ed. Terry Anderson and Fred McChesney, 259–82. Princeton, NJ: Princeton University Press.

Young v. Ethyl Corp. 1974. 382 F. Supp 769, 774 (W.D. Ark. 1974) (8th Circuit Court of Appeals).

Younger, Gary, and David Boda. 2013. *Horizontal Drilling and Sub-surface Trespass*. Denver: Beatty & Wozniak PC.