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GABE COLLINS*

Blue Gold: Commoditize Groundwater and Use Correlative Management to Balance City, Farm, and Frac Water Use in Texas

ABSTRACT

Texas is increasingly dependent on groundwater supplies due to drought and rapid population and economic growth. The current groundwater law regime of absolute ownership and rule of capture is fundamentally unsustainable. Without reforms, Texas risks a California-style water supply crisis as soon as five to seven years from now. This would threaten millions of Texans' physical wellbeing and economic livelihoods. Texas oil and gas law offers a legal framework for a groundwater management system that can help avert future water supply crises. Texas courts already have more than 75 years' of experience deciding oil and gas cases under a managed withdrawal system. Using correlative rights and rated withdrawals to manage groundwater would provide stronger incentives for conservation. It would even enable market pricing of water while it is still in the ground. This, in turn, would open the door to a range of market-based conservation options that both save water and unlock additional economic value.

I. INTRODUCTION

With its landmark decision in *Edwards Aquifer Authority v. Day* (“Day”) in 2012, affirming that landowners have absolute ownership of any water that might lie below their tracts, the Texas Supreme Court opened the door to establish a market based price on water in the ground. The Lone Star State now sits on the cusp of an era of “blue gold,” in which water can be priced in terms of molecules rather than only in terms of a right to access. Properly managed, this change can open the door to new economic opportunities and new methods of conserving and managing this precious resource.

As a result of *Day*, Texan landowners should ask not only “Do I have mineral rights?” but also “Do I have viable groundwater resources

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underneath my land?" Perhaps most importantly, Texans should also ask "What good is a right to extract a resource from common pools if every other property owner with access to the pool also enjoys an 'absolute' right to extraction and use?" These new questions come at a time when groundwater—the most important source of freshwater in much of Texas—is under increasing pressure on both the demand and supply sides. On the demand side, Texas' population is projected to grow by 84 percent between 2010 and 2060, reaching a total of more than 46 million people. At the same time, drought is stressing water supplies.¹ Unless conservation is made more economically advantageous and water allocation is reshuffled, the combined effect of rapid population growth and serious drought could compromise Texas' dynamic economic growth. Such a disruption would have a profound national effect because Texas had a GDP of approximately \$1.5 trillion in 2014, ranking among the 15 largest economies globally.²

The Texas Water Development Board,³ created in 1957 and responsible for long-range planning and water project financing, forecasts that the state's total water supply will decline by 10 percent between 2010 and 2060.⁴ Groundwater supply—which constitutes 60 percent of the state's current water use—will decline by an estimated 30 percent during that time.⁵ At present, more than 400 Texas cities and towns are completely dependent on groundwater, and more than 600—or nearly two-thirds of the municipalities included in the Texas Water Plan—rely at least partially on groundwater to meet the needs of their citizens.⁶

In the face of these pressing challenges, Texas water law needs an update to ensure that it can protect groundwater for the state's people,

1. See, e.g., Terrance Henry & Alex Dropkin, *In Central Texas, Water War Shows No Signs of Drying Up*, NPR STATE IMPACT (Feb. 21, 2014), <http://stateimpact.npr.org/texas/2014/02/21/in-central-texas-water-war-shows-no-signs-of-drying-up/>; *U.S. Drought Monitor: Texas*, NATIONAL DROUGHT MITIGATION CENTER (Jan. 20, 2015), <http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?TX> (stating that 10.7 million Texans, or roughly 4 in 10, are presently affected by drought).

2. OFFICE OF THE GOVERNOR, ECON. DEV. AND TOURISM, OVERVIEW OF THE TEXAS ECONOMY (updated Jan. 2015), <http://gov.texas.gov/files/ecodev/texas-economic-overview.pdf>.

3. *About Texas Water Development Board*, TEX. WATER DEV. BD., <http://www.twdb.texas.gov/about/> (last visited Feb. 28, 2015).

4. TEX. WATER DEV. BD., WATER FOR TEXAS: 2012 STATE WATER PLAN 157 (2012), http://www.twdb.state.tx.us/publications/state_water_plan/2012/05.pdf.

5. *Id.* at 163–64.

6. Brief for Canadian River Municipal Water Authority as Amicus Curiae Supporting Respondents at 15, *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (2012) (No. 08-0964), available at <http://www.search.txcourts.gov/SearchMedia.aspx?MediaVersionID=27a30b66-f7a7-4317-8567-4cbda546e913&coa=cossup&DT=BRIEFS&MediaID=39e0b350-5549-42d9-9178-837590015736>.

cities, farms, and industry, particularly the vital oil and gas sector. Texas oil and gas law offers a deep body of correlative rights⁷ law that addresses thousands of factual situations and disputes over hydrocarbon molecules—which, like water, occur in underground reservoirs and migrate due to changes in pressure caused by extraction. Adapting key oil and gas law concepts to groundwater makes sense due to the substantial similarities in how the substances behave. Also, many Texas courts have substantial experience adjudicating oil and gas disputes, and could readily apply the existing oil and gas legal framework to water disputes as well. In *Day*, the Texas Supreme Court laid an important brick in the doctrinal path toward a more modern and effective water law regime to sustain the state's robust demographic and economic expansion.

In *Day*, the Texas Supreme Court appears to defer to the Legislature's role in setting groundwater law, but in practice, the Court's ruling has created a situation that is likely to force the Legislature's hand as landowners and water consumers increasingly treat water like oil and gas—minus the correlative rights system that regulates oil and gas extraction in Texas. In the following pages, the analysis will cover (1) how *Day* sets the stage for applying a correlative rights legal framework to groundwater; (2) Texas law's existing view of the "groundwater estate" and how it is likely to evolve; (3) the politics of groundwater law in Texas; (4) how recognizing ownership of groundwater in situ can unlock economic value; and (5) how a correlative rights regime can be practically implemented.

II. EDWARDS AQUIFER AUTHORITY V. DAY: SETTING THE STAGE FOR NEW WAYS OF MANAGING GROUNDWATER

On February 24, 2012, the Texas Supreme Court delivered a decision that concluded two farmers' approximately twelve-year battle against the Edwards Aquifer Authority (EAA or "Authority").⁸ In ruling for the farmers, the Court affirmed landowners' ownership right to per-

7. The Texas Supreme Court has endorsed the definition of "correlative rights" from Summers, *Oil and Gas*, Permanent Edition, Volume 1:

The term 'correlative rights' is merely a convenient method of indicating that each owner of land in a common source of supply of oil and gas has legal privileges as against other owners of land therein to take oil or gas therefrom by lawful operations conducted on his own land; that each such owner has duties to the other owners not to exercise his privilege of taking so as to injure the common source of supply; and that each such owner has rights that other owners not exercise their privileges of taking so as to injure the common source of supply.

Elliff v. Texon Drilling Co., 210 S.W.2d 558, 562–63 (Tex. 1948).

8. Edwards Aquifer Auth. v. Day, 369 S.W.3d 814, 820–21 (Tex. 2012).

colating waters beneath their land. This decision also opened new doors for groundwater management in Texas, which this Article analyzes in subsequent sections.

In *Day*, the Court faced a claim from two Central Texas landowners who, in 1994, bought 381.4 acres of land to grow oats and peanuts and raise cattle.⁹ The land lay atop the Edwards Aquifer and featured a decrepit water well, drilled in 1956, which naturally flowed under artesian pressure.¹⁰ At the time *Day* purchased the land, the well's artesian flow ran into a lake on the property. *Day* then filed for an "initial regular permit" from the new Edwards Aquifer Authority, seeking to pump 700 acre-feet per year of water for irrigation and seeking approval to drill a new well at another point on the land.¹¹ While waiting for the Authority to decide on his permit, *Day* went ahead and drilled a replacement well at the cost of \$95,000.¹² In November 2000, *Day* learned that the EAA would deny his permit because prior withdrawals from the well had not been put to a "beneficial use."¹³

Day then pursued an administrative appeal against the EAA with the State Office of Administrative Hearings. The State Office of Administrative Hearings ultimately granted a permit to use only 14 acre-feet per year, since the land's previous owners testified that only seven acres of grass were "directly" irrigated using well water.¹⁴

Day then brought a claim in the Texas district court, appealing the agency's decision and also sued the Authority for violating Article 1,

9. Bruce Wright, *A Victory for Property Rights: Texas Court Decision Affirms Right to Water*, TEX. COMPTROLLER OF PUB. ACCOUNTS FISCAL NOTES (May 7, 2012), <http://www.win-dow.state.tx.us/comptrol/fnotes/fn1204/water-rights.php>.

10. *Id.*

11. The Edwards Aquifer Authority Act was enacted in 1993 to help prevent the aquifer from being subjected to Federal control, which could have happened under the Endangered Species Act if continued drawdowns in the aquifer threatened endangered species living in the Comal and San Marcos springs, which are fed by the Edwards Aquifer. The Act also prohibited water withdrawals without a permit, except for wells producing less than 25,000 gallons per day (gpd) for domestic or livestock use. See Edwards Aquifer Auth. Act §§ 1.14(h), 1.15(b), and 1.33 (2013), <http://www.edwardsaquifer.org/legislation-and-rules/the-eaa-act>.

12. *Day*, 369 S.W.3d at 820.

13. *Id.* at 820–21.

14. One of the prior landowners, Billy Mitchell, testified during a deposition that in 1983 and 1984, only about 160 acres of the tract were irrigated, and 150 acres of this total were irrigated with water from a lake on the property that was partially fed by the artesian well. The administrative law judge concluded that the lake water—including the inflow from the artesian well—was surface water owed by the State of Texas, and that use of water for the lake could not support *Day*'s groundwater use application. Mitchell also testified that "no more than seven acres had been irrigated with water directly from the well." *Id.* at 821.

Section 17(a) of the Texas Constitution, asserting that the EAA had taken his property without compensation.¹⁵ The district court granted summary judgment for Day on the basis that irrigation sprinklers used water from the lake whose ultimate origin was the artesian well, thus making this irrigation of the 150 acres a “beneficial use” of groundwater from the well.¹⁶ Day and the Authority cross-appealed.¹⁷ The Court of Appeals affirmed the Authority’s decision to issue Day a permit for only 14 acre-feet.¹⁸ However, the Court of Appeals also held that “landowners have some ownership rights in the groundwater beneath their property” and that this water was “entitled to constitutional protection.”¹⁹ Subsequently, Day, the Authority, and the State of Texas petitioned for review in the Texas Supreme Court, which granted the petitions. In a decision by Justice Hecht, the Texas Supreme Court held that just as landowners own in severalty the oil and gas under their land, so too do they own the groundwater. The Court added that “groundwater rights are property rights subject to constitutional protection. . . .”²⁰

Before diving into a more detailed look at the doctrine and the legal history it arose from, we turn to the following hypothetical created by the author, which highlights how the legal precedent laid down by *Day* creates new avenues for creative, economically-based groundwater management in dry regions of Texas:

John, a West Texas cotton grower, is struggling. Drought and pumping restrictions imposed on use of the Ogallala Aquifer in his groundwater conservation district are hitting his 600-acre farm hard. Making matters worse, even when he is able to irrigate, John’s creaking, aged irrigation system loses a significant portion of the precious water his cotton needs. However, he cannot afford the steep cost of upgrading to more efficient equipment and no bank will loan money to a struggling farmer during a drought.

Amidst these trying times, a new oil play has emerged just a few miles from John’s farm. The company needs more than 100,000 barrels of water to drill and hydrofrac²¹ each new well. Attracted to John’s location near the new

15. *Day*, 369 S.W.3d at 821.

16. *Id.*

17. *Id.*

18. *Id.*

19. *Id.*

20. *Id.* at 833.

21. “Fracing” or “hydraulic fracturing” is a technique used to enable oil and gas production from “tight” source rocks that are relatively impermeable and would not yield economic hydrocarbon production with traditional well completion methods. Fracing entails pumping large volumes of a fluid (typically water) under high pressure to create fractures in the hydrocarbon-rich rock. The fluid is mixed with a “proppant” (usually sand or small ceramic beads) that props the cracks open and allows oil and gas molecules to flow into the wellbore and be removed to the surface. *See, e.g.,* George E. King, “Hydraulic Frac-

field and his location atop a deep pocket of the aquifer, the oil company makes him an offer. If John allows the company to conduct a hydrological survey of his land, the company will underwrite the cost of a new, efficient sprinkler system in exchange for one million barrels of water per year at a fixed discount of 20 percent relative to the market price. The company plans to use the water for its nearby oilfield, which is expected to operate for at least 20 years.

Given that frac water in John's area now hypothetically sells for an average of \$0.50 per barrel, he can garner an annual income stream of \$400,000 and also can use the millions of barrels of groundwater underlying his land as collateral for loans to invest in more efficient irrigation equipment, thus freeing up a permanent stream of water for sale while still keeping his cotton farming operation running at high capacity.

Such creative deal-making, which allows water to have practically accessible value while still in the ground, creates space for water-strapped areas of Texas to effectively do more with less and generate additional economic value by letting water flow to high value uses. To boot, the opportunity to use groundwater reserves as collateral for loans to pay for irrigation efficiency improvements gives farmers both the *incentive* to conserve, since water sold to oil companies (or municipalities) is worth far more than the crops the water would produce, and the *means* to conserve. This is because the loans can fund higher efficiency forms of irrigation that create "surplus" water for sale. Basically, this type of system lets the fracturing company, or other high-value water user, in effect pay for the costs of efficiency and conservation, creating a private market solution that holds much appeal in the pro-market, pro-property rights political climate of Texas.

Judicial affirmation of ownership of groundwater in place is the legal foundation for financial incentives that can motivate creative new methods of optimizing water use, slowing demand growth, and alleviating the growing water scarcity pressure many parts of Texas face. *Day* opens legal doors for new groundwater management ideas, but also leaves critical questions unaddressed. As such, the legal analysis starts with the "old" Texas groundwater management regime, moves to *Day*, and then asks where Texas groundwater law is likely to go after *Day*, where it *should* go, and what changes would be necessary to create the legal basis for a better long-term resource management framework.

**The “Old” Texas groundwater management regime
established the rule of capture.**

The traditional Texas jurisprudence regarding ownership of groundwater in place was the “rule of capture,” which has been widely misunderstood as recognizing only a right to use, but not a right of ownership in place.²² In fact, the rule of capture is a well-developed principle in Texas law, with at least twenty statutes and roughly fifty cases. Texas’ rule of capture jurisprudence springs from deep historical roots, as the doctrine draws upon English common law, which itself adopted Roman law governing water.²³

Of the eighteen western U.S. states (i.e., dry states where groundwater is an often critically scarce resource), Texas is now the only one that still follows the rule of capture.²⁴ Importantly, the right of capture concept has two clear and complementary aspects that distinguish it from the idea of “absolute ownership,” with which it is frequently confused.²⁵ First, it recognizes limitations on liability to multiple parties tapping the same groundwater system. Second, contrary to ideas of “absolute ownership” where a party effectively has no ownership until it actually severs water from the earth by pumping it or otherwise reduces it to possession, the Roman/English rule of capture recognizes surface owners’ vested real property rights to groundwater in place simply because it underlies a tract of land. Providing further support for the two-pronged nature of the rule of capture as pertains to groundwater in Texas, the Spanish, and later Mexican, legal codes that regulated Texas prior to its becoming a part of the U.S. also recognized and encouraged private ownership of groundwater.²⁶

However, since 1904, when the Texas Supreme Court adopted the common-law rule of capture in *Houston & T. C. R. Co. v. East*, Texas groundwater law has focused overwhelmingly on the liability half of the doctrine.²⁷ In *East*, the Houston & Texas Central Railroad Company dug a well on property that it owned in Grayson County and proceeded to pump about 25,000 gallons of percolating groundwater water per day to

22. Dylan O. Drummond, Lynn Ray Sherman & Edmond R. McCarthy, Jr., *The Rule of Capture in Texas—Still So Misunderstood After All These Years*, 37 TEX. TECH L. REV. 1 (2004).

23. *Id.* at 15.

24. *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 82 (Tex. 1999).

25. See Drummond et al. *supra* note 22, at 60–61.

26. *State v. Valmont Plantations*, 346 S.W.2d 853 (Tex. Civ. App. San Antonio 1961), writ granted (Nov. 29, 1961), *aff’d*, 163 Tex. 381, 355 S.W.2d 502 (1962)

27. *Houston & T. C. R. Co. v. East*, 81 S.W. 279 (Tex. 1904); see also *Texas Co. v. Burkett*, 296 S.W 273 (Tex. 1927); *Sipriano*, 1 S.W.3d 75.

feed its locomotives and machine shops.²⁸ The nearby plaintiff's well was dug for household supply but was dried up by the defendant railroad company's water use. The District Court decided in favor of the defendant railway company on the basis that its water use was reasonable and legitimate. The Court of Civil Appeals reversed, finding for the plaintiff on the basis that the railway company's water use was "artificial."²⁹ Finally, the Texas Supreme Court upheld the District Court's original ruling on the basis that there were not correlative groundwater rights in Texas and that the railroad had no liability to the neighboring landowner for the ill effects of its groundwater drawdown.

The portion of the common law rule of capture that the *East* court used and subsequent Texas rulings have relied upon comes from the English case of *Acton v. Blundell*,³⁰ where miners de-watering their mines inadvertently drained a neighbor's lake. In *Acton*, the court stated:

[T]he person who owns the surface may dig therein, and apply all that is there found to his own purposes at his free will and pleasure; and that if, in the exercise of such right, he intercepts or drains off the water collected from the underground springs in his neighbor's well, this inconvenience to his neighbor falls within the description of *damnum absque injuria*, which cannot become the ground of an action.³¹

Nearly a century later, in *Sipriano v. Great Spring Waters of Am., Inc.*, the Texas Supreme Court still relied heavily on the liability-focused rule of capture articulated in *East*. *Sipriano*, which famously led to the characterization of the rule of capture as "biggest pump wins," featured a local farmer suing Great Spring Waters of Americas, Inc., a subsidiary of the Nestle corporation engaged in water bottling.³² The Texas Supreme Court ultimately ruled that even though the defendant's pumping may have dried up the plaintiff's wells, the Court did not feel it appropriate to "insert itself into the regulatory mix by substituting the rule of reasonable use for the current rule of capture" and that the old rule of capture would stand.³³

One of the most interesting points of *Sipriano* is that the plaintiff's case focused primarily on liability for groundwater use, not ownership

28. *East*, 81 S.W. at 146.

29. *Id.* at 280.

30. *Acton v. Blundell*, 152 Eng. Rep. 1223 (1843).

31. *Id.* at 1235.

32. *Sipriano*, 1 S.W.3d 75; see also Stuart Eskenazi, *The Biggest Pump Wins*, DALLAS OBSERVER (Nov. 19, 1998), <http://www.dallasobserver.com/1998-11-19/news/the-biggest-pump-wins/>.

33. *Sipriano*, 1 S.W.3d at 80.

of the resource itself. The Court's language suggests that the justices in fact would like to make landmark-type decisions regarding groundwater use and regulation—they just need a party to frame the question in the right way. For instance, Justice Enoch noted:

We do not shy away from change when it is appropriate. We continue to believe that “the genius of the common law rests in its ability to change, to recognize when a timeworn rule no longer serves the needs of society, and to modify the rule accordingly.” And *Sipriano* presents compelling reasons for groundwater use to be regulated. But unlike in *East*, any modification of the common law would have to be guided and constrained by constitutional and statutory considerations.³⁴

The *Sipriano* court thus clearly left the door open for a future decision that would clarify the contours of groundwater use and ownership rights in Texas.

Burrell Day and Joel McDaniel presented the precise type of question the Court had been long awaiting in their takings claim against the Edwards Aquifer Authority: a question centered on water as property rather than liability for water use. Given the opportunity to decide a groundwater case based on property law, the Court did two important things. First, it clarified groundwater ownership rights. Second, it held that in Texas, oil and gas law and groundwater law in fact spring from a common source—no pun intended.

III. MANAGING SCARCE WATER SUPPLIES: TEXAS OIL AND GAS LAW AND GROUNDWATER LAW SPRING FROM A COMMON SOURCE

Water law was a core issue in Texas for hundreds of years before the discovery of oil and gas, as evidenced by the considerable body of Spanish and then Mexican law that also focused on the subject. Indeed, the first significant commercial oil and gas discovery in Texas occurred in 1894 when American Well and Prospecting Company struck oil while drilling a deep water well in search of new water supplies for the city of Corsicana.³⁵ Soon thereafter, oil production began, the automobile became widely popular, oil became a much more valuable commodity than water (at least in financial terms), and the Texas rule of capture for ownership of subsurface resources took on an oil-centric focus.

34. *Id.*

35. Texas State Historical Association, *Corsicana Oilfield*, THE HANDBOOK OF TEXAS (June 12, 2010), <http://www.tshaonline.org/handbook/online/articles/doc03>.

Nevertheless, the conceptual linkages between oil and gas law and groundwater law never disappeared. Like percolating groundwater, oil and gas are also subsurface resources that can move around within the confines of their reservoir—be it a 100 acre-sized oil pocket or a 100 mile long aquifer.

Both oil and gas and percolating groundwater have long been recognized in Texas jurisprudence as substances that can be owned in place underground prior to extraction. *Day* perfected the property rights bundle that Texas courts have now recognized for nearly 100 years. The line of cases from the Texas Supreme Court affirming ownership of groundwater in place is long and features themes that parallel oil and gas industry development with uncanny similarity. There are five key parallel themes. I address each in turn.

1. “Development Above All Else” leads Texas courts to reject correlative rights and support the rule of capture.

In the 1904 decision *Houston & T. C. R. Co. v. East*, the Texas Supreme Court adopted language from an earlier New York Court of Appeals³⁶ decision affirming surface owners’ full ownership of percolating groundwater beneath their property and explaining that percolating water:

is the same as land and cannot be distinguished in law from land. So the owner of land is the absolute owner of the soil and of percolating water, which is a part of, and not different from the soil.³⁷

The *East* court’s clear emphasis on development over conservation and sustainability of groundwater resources was clear in its rejection of correlative rights and endorsement of an 1861 Ohio decision saying:

[S]uch recognition of correlative rights would interfere, to the material detriment of the commonwealth, with drainage and agriculture, mining, the construction of highways and railroads, with sanitary regulations, building, and the general progress of improvement in works of embellishment and utility.³⁸

36. In New York, the New York Supreme Court is actually a trial court, while the New York Court of Appeals is the highest court in the state. See generally *New York State Unified Court System*, NY COURTS.GOV, <http://www.nycourts.gov/courts/index.shtml>.

37. *Houston & T. C. R. Co. v. East*, 81 S.W. 279, 281 (Tex. 1904).

38. *Id.* at 281 (summarizing *Frazier v. Brown*, 12 Ohio St. 294 (1861) (*overruled by Cline v. Am. Aggregates Corp.*, 474 N.E.2d 324 (1984))).

Since the *East* decision, the Texas Supreme Court has upheld a right to capture in several cases. The Legislature also supports a right of capture, and in the 2011 session (approximately one year before the *Day* decision), affirmed that landowners own groundwater beneath their tract as “real property.” In Section 36.002 of the Texas Water Code, the Legislature also affirmed that landowners are entitled “to drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence.”³⁹ In essence, the rule of capture is enshrined in the Texas Water Code, and the Texas Supreme Court has consistently said it defers to the Legislature with respect to delineating groundwater laws.⁴⁰

2. The Texas Supreme Court affirms surface owners’ right of absolute ownership *ad coelum*.

The doctrine of *cuius est solum, eius est usque ad coelum et ad inferos* (“*ad coelum*”)⁴¹ comes from the English common law and “says that a property owner is vested with property rights in all of the sky above his property up to the heavens and everything beneath his property to the center of the earth.”⁴²

In 1915, in *Texas Co. v. W.H. Daugherty*, the Texas Supreme Court endorsed the idea that “petroleum oil, like subterranean water, is included in the comprehensive idea which the law attaches to the word land, and will be protected as a part of the soil in which it is found.”⁴³ Subsequently, in *The Texas Co. v. Joe Burkett*, the court again noted that “percolating waters . . . are the exclusive property of the owner of the surface of the soil, and subject to barter and sale as any other species of property.”⁴⁴ *Burkett* is also important because the court presumes that groundwater is by default “percolating” and thus subject to the *ad coelum* doctrine and owned by the surface owner.⁴⁵

The Texas Legislature has also codified landowners’ *ad coelum* rights. Section 36.002 of the Texas Water Code provides that “a land-

39. TEX. WATER CODE ANN. § 36.002 (2005 as amended 2011), available at <http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.36.htm>.

40. See, for instance, the statement in the *Day* decision that “responsibility for the regulation of natural resources, including groundwater, rests in the hands of the Legislature.” 369 S.W.3d at 833.

41. BLACK’S LAW DICTIONARY 1628 (7th ed. 1999).

42. Marvin W. Jones & Andrew Little, *The Ownership of Groundwater in Texas: A Contested Battle for State Control of Groundwater*, 61 BAYLOR L. REV. 578, 583 (2009).

43. *Texas Co. v. Daugherty*, 176 S.W. 717, 721 (Tex. 1915).

44. *Texas Co. v. Burkett*, 296 S.W. 273, 278 (Tex. 1927).

45. *Id.*

owner owns the groundwater below the surface of the landowner's land as real property."⁴⁶

3. The surface owner has an exclusive right to use the resource occurring under his land, provided he has not severed those rights.

Oil and gas extraction was initially governed by an unfettered rule of capture,⁴⁷ but is now regulated instead by a doctrine of correlative rights overseen by the Oil and Gas Division of the Texas Railroad Commission, a state regulatory agency of three commissioners elected to six-year terms.⁴⁸

Governance of groundwater use in Texas does not yet have any meaningful correlative-rights aspects, but this author believes reforms are likely to be considered in coming years as a combination of drought and population growth continues to strain water supplies in Texas. Under post-*Day* Texas jurisprudence, the only common law restraints in groundwater withdrawal from under one's land are that it (1) not be malicious, (2) not be wasteful, and (3) not cause negligent subsidence (settling that adversely affects neighboring tracts).⁴⁹ The only exception would be if a local groundwater conservation district restricts withdrawals, a topic discussed in greater detail in Section XII below.

As part and parcel of the common law governing groundwater use in Texas, which is rooted in the classic English case of *Acton v. Blundell* and its Texan descendant, *East*, landowners have virtual free reign to tap percolating groundwater.⁵⁰ In *Pecos Co. Water Control and Improvement Dist. No. 1 v. Williams*, the groundwater pumping of Williams dried up Comanche Springs near Fort Stockton to the detriment of the water district, which could no longer irrigate with water emanating from the springs.⁵¹ Ultimately, the Eighth Court of Civil Appeals in El Paso ruled in Williams' favor, saying "it seems clear to us that percolating or diffused and percolating waters belong to the landowner, and may be used by him at his will."⁵²

46. TEX. WATER CODE ANN. § 36.002 (West 2005), available at <http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.36.htm>.

47. See generally *Jones v. Forest Oil Co.*, 44 A. 1074 (Pa. 1900).

48. *Commissioners, R.R. COMM'N OF TEX.*, <http://www.irc.state.tx.us/about-us/commissioners/> (last updated Jan. 22, 2015).

49. *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 77 (Tex. 1999); *Friendwood Dev. Co. v. Smith-Sw. Indus., Inc.*, 576 S.W.2d 21, 22 (Tex. 1978).

50. *Acton v. Blundell*, 152 Eng. Rep. 1223, (1843).

51. *Pecos County Water Control & Imp. Dist. No. 1 v. Williams*, 271 S.W.2d 503, 506 (Tex. Civ. App. El Paso 1954), *writ refused NRE*.

52. *Id.* at 505.

More than three decades later, in *Denis v. Kickapoo Land Co.*, an appellate court again came down in favor of a landowner who tapped into an underground water source to the detriment of a party who had previously relied upon the water.⁵³ The *Kickapoo* plaintiffs even introduced expert testimony by a hydrologist who believed the water tapped by defendant was actually coming from an underground network of cavities, but the court still adhered to the presumption that groundwater is percolating. As such, *Kickapoo* clarified that barring a conclusive showing that underground water is drawn from an underground cave system or other structure that clearly comprises a subterranean river, the Texas common law favors protection of surface owners' reasonable use of groundwater beneath their land, even if it disadvantages their neighbors in some fashion.

4. Texas courts now recognize a “groundwater estate” that affirms surface owners’ vested property interest in groundwater underlying their tract.

In 2008, the Fourth District Court of Appeals affirmed that Texas landowners can reserve or sever groundwater rights during land transactions.⁵⁴ In the case, *City of Del Rio v. Clayton Sam Colt Hamilton Trust*, the court stated that “under the absolute ownership theory, the Trust was entitled to sever the groundwater from the surface estate by reservation when it conveyed the surface estate to the City of Del Rio.”⁵⁵

The court's decision showed that just as mineral rights holders have a vested property right in oil and gas in place, surface owners of unsevered groundwater rights also have a vested property interest in water in place. Before this case, groundwater rights were often viewed as simply conferring the right to extract water and indeed, the City of Del Rio argued unsuccessfully that because the Trust was not actively extracting and capturing the groundwater, it thus had no rights to it.⁵⁶

5. The groundwater estate should allow sub-division of different water-bearing layers.

In Texas, the groundwater estate also arguably includes the right to divide the subsoil vertically in areas where there are multiple ground-

53. *Denis v. Kickapoo Land Co.*, 771 S.W.2d 235 (Tex. App. Austin 1989), *writ denied* (Oct. 25, 1989).

54. *City of Del Rio v. Clayton Sam Colt Hamilton Trust*, 269 S.W.3d 613 (Tex. App. San Antonio 2008), *pet. denied*.

55. *Id.* at 617.

56. *Id.* at 616.

water layers. For example, there are several cases of special warranty deeds⁵⁷ granting rights to specific groundwater strata (“formations”), such as that containing the Ogallala Aquifer in the Texas Panhandle.⁵⁸

Texas case law does not appear to have any direct legal challenges to such stratigraphic subdivisions of groundwater-bearing layers at present.⁵⁹ That said, Texas courts have long recognized the right to vertically divide oil and gas-bearing layers within the mineral estate, and given the parallels between common law treatment of oil and gas resources and groundwater, courts would almost certainly uphold a vertical division right for groundwater as well.⁶⁰

IV. PERFECTING TEXAS SURFACE OWNERS’ PROPERTY RIGHT TO GROUNDWATER

The Texas Supreme Court’s decision in *Day* puts the most recent—and arguably most definitive—stamp of judicial approval on the idea that the owner of the groundwater estate possesses not just a usufructuary right to the water, but rather has title and ownership of whatever water molecules reside in the subsoil underlying the tract which can be captured by a pump.⁶¹ The *Day* court also held that just as landowners own “separately, exclusively, and distinctively all the oil and gas under [their] land” (provided they have not severed the mineral rights) and have access to the “usual remedies” against trespassers and those who destroy the minerals’ market value, so too this position now

57. With respect to warranty deeds, Texas courts say “the warranty clause does not convey title nor does it determine the character of the title conveyed.” *Davis v. Andrews*, 361 S.W.2d 419, 424–25 (Tex. Civ. App. Dallas 1962), *writ refused NRE* (Feb. 6, 1963). “Rather, [a warranty deed] warrants that the same estate or any right, title, or interest therein has not been conveyed to any person other than the grantee and that the property is free from encumbrances.” *Stewman Ranch, Inc. v. Double M. Ranch, Ltd.*, 192 S.W.3d 808, 811 (Tex. App. Eastland 2006, *pet. denied*) (citing *Chapman v. Parks*, 347 S.W.2d 805 (Tex. Civ. App. Amarillo 1961), *writ refused NRE* (Oct. 3, 1961)).

58. Brief for Canadian River Municipal Water Authority as Amicus Curiae at exhibit B, *Flowers Special Warranty Deed, Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012) (No. 08-0964), *available at* <http://www.search.txcourts.gov/SearchMedia.aspx?MediaVersionID=27a30b66-f7a7-4317-8567-4cbda546e913&coa=cossup&DT=BRIEFS&MediaID=39e0b350-5549-42d9-9178-837590015736> (last visited Mar. 9, 2015).

59. The discussion and basis of some cases that focus on monitoring potential groundwater contamination associated with landfills provide additional support for the idea that Texas courts are willing to view groundwater in discrete layers, as opposed to treating any molecules under a tract as part of the same system by default. *See, e.g.*, *Citizens Against Landfill Location v. Texas Com’n on Env’tl. Quality*, 169 S.W.3d 258, 270–71 (Tex. App.—Austin 2005), *pet. denied*.

60. *Gilbreath v. Douglas*, 388 S.W.2d 279, 281 (Tex. Civ. App. Amarillo 1965), *writ refused NRE* (July 14, 1965).

61. *See Day*, 369 S.W.3d at 830.

“correctly states the common law regarding the ownership of groundwater in place [in Texas].”⁶²

By affirming private ownership of groundwater molecules, the *Day* decision helps lay part of the foundation for increasing the economic value of groundwater in Texas. This is because the aquifer underlying a given tract of land can be surveyed using reservoir modeling techniques that provide a high enough degree of precision to calculate water holding volumes at given water table levels.⁶³ Because the water holding capacity in that portion of the aquifer can be calculated, giving landowners absolute title in the water under their tract is effectively tantamount to recognizing ownership of actual volumes of water in place. This in turn holds great promise for finding ways to use market solutions to balance competing interests of cities, farmers, and frackers, particularly in dry areas such as the Permian Basin and Eagle Ford shale.

However, *Day* also has critical shortfalls which raise a number of important questions which are likely to be the subject of litigation in coming years. Most notably, the *Day* decision was based on a fact pattern of government regulator (Edwards Aquifer Authority) versus a private landowner (Burrell Day). As such, *Day* helps perfect a right against government interference with groundwater that was already recognized as private property by *East* and *Sipriano*, but it fails to draw any additional lines of demarcation such as more nuanced classes of water use that could help landowners protect their groundwater against fellow private well owners who can literally drain the resource away with virtual legal impunity under the current caselaw.

Such demarcating lines could include a hierarchy whereby on-tract uses receive priority, or where off-tract water sales require additional permitting and approval that take into account likely impacts on the physical and economic wellbeing of other parties who draw their water from the same reservoir.

1. Demographic shifts in the groundwater consumer base will increasingly tilt the political balance in favor of greater regulation.

Between 1980 and 2010, Texas metro areas experienced a population increase of more than 88 percent, while rural areas posted 22.6 per-

62. See *id.* at 832 (citing *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558 (Tex. 1948)).

63. Theodore A. Johnson & Wanjiru M. Njaguna, *Aquifer Storage Calculations Using GIS and Modflow, Los Angeles County, California*, <http://proceedings.esri.com/library/userconf/proc02/pap0330/p0330.htm> (last visited Mar. 4, 2015).

cent growth during that time.⁶⁴ At the same time, the number of irrigated farmland acres has remained roughly the same for the past decade—at approximately six million acres, with agricultural uses accounting for roughly 9.5 million acre feet of water use (57 percent of the state total).⁶⁵

Agricultural water use in Texas—the lion’s share of which comes from the Ogallala Aquifer—has remained relatively constant since the late 1970s. However, the water demand from urban areas has been rapidly increasing since then and is poised to continue growing in coming decades. Indeed, a 2012 estimate from researchers at Texas A&M University suggested that Texas water use could expand by an additional 1.4 million acre-feet by 2060.⁶⁶ The researchers projected that agricultural water demand will decline by approximately 1.5 million acre-feet during that time, but that municipal water consumption will rise by 2.9 million acre-feet.⁶⁷

This disparity highlights the profound impacts a rapidly growing and increasingly urban population will have on the supply/demand balance for water in Texas. It also suggests that even great improvements in agricultural water use efficiency and retirement of marginal farmland will not be able to free up enough potential water supplies to meet cities’ thirst without further calls on already strained groundwater resources.

Amidst this emerging structural water supply deficit, there has been a rapid increase in oilfield water use as hydraulic fracturing delivers a new oil boom to the state.⁶⁸ This boom in turn creates massive economic output relative to the volumes of water used. For example, the frac intensive Eagle Ford shale alone likely generated upwards of \$80 billion in economic activity in 2013.⁶⁹ When the large-scale fracturing activity in the Permian Basin and other oil and gas development areas are accounted for, total economic activity generated by fracturing statewide in Texas likely

64. Tex. Comptroller of Pub. Accounts, *Texas Forecast: Widely Scattered Growth*, http://thetexasconomy.org/people-places/population/articles/article.php?name=scattered_growth (last visited Mar. 4, 2015).

65. KEVIN WAGNER, TEX. WATER RES. INST., *STATUS AND TRENDS OF IRRIGATED AGRICULTURE IN TEXAS 2* (2012), <http://twri.tamu.edu/docs/education/2012/em115.pdf>.

66. *Id.* at 3–4.

67. *Id.* at 4.

68. Unconventional oil and gas plays in the U.S. such as the Bakken Shale, Barnett Shale, Eagle Ford Shale, and new formations being developed in the Permian Basin all require fracturing to produce oil and gas.

69. Amy Dalrymple, *Eagle Ford Shale generated \$87+ billion in economic output for Texas in 2013*, UTSA TODAY (23 September 2014), <http://www.utsa.edu/today/2014/09/efs-report.html>; Adam Haynes, *Oil and Gas Industry: Economic Impact Update*, CHESAPEAKE ENERGY 8 (2012), http://ftp.dot.state.tx.us/pub/txdot-info/energy/070212/oil_gas_econ_impact.pdf (discussing how rapidly economic activity has grown in the play).

exceeded \$100 billion in 2014—equal to roughly 6.5 percent of the state's total annual economic output of \$1.53 trillion in 2014.⁷⁰

Although significant, fracing remains a minority water use compared to use for municipal supply and irrigation for agriculture. Water recycling will increasingly penetrate the Texas oilfield, but the oilfield is expected to be a net water consumer for at least two or three years and possibly more depending on how the technology for recycling flowback water evolves.⁷¹ To put the current and future fracing water use volumes in perspective, fracing in Texas used approximately as much water in 2011 as the cities of Amarillo (Potter County) and Lubbock (Lubbock County) combined (a total of nearly 450,000 people) consumed in 2012.⁷² Note that 2011 is the latest year for which comprehensive frac water use estimates exist and 2012 is the latest year for which the Texas Water Development Board provides city-level water usage figures (measured by intake volume). At the anticipated peak between 2025 and 2035, fracing could use between 132,000 and 135,000 acre feet of water. Austin, with 850,000 people, provides the closest major city analogue for this number, as it used an estimated 146,795 acre feet of water in 2012, according to the Texas Water Development Board.⁷³

Given that fracing in Texas will likely use as much water each year as a city of nearly one million people, while still a smaller slice of the pie than municipal and agricultural use, it raises tough legal and policy questions in an environment of sustained water scarcity.

70. For 2014 Gross State Product Estimate, see OFFICE OF THE GOVERNOR, ECON. DEV. AND TOURISM, OVERVIEW OF THE TEXAS ECONOMY, (updated Mar. 2015), <http://gov.texas.gov/files/ecodev/texas-economic-overview.pdf>; see generally Dalrymple, *supra* note 69; Haynes, *supra* note 69; see also Corey Paul, *Wolfcamp Shale to see \$12 billion worth of investments this year*, ODESSA AMERICAN (Aug. 3, 2014), http://www.oaoa.com/inthepipeline/article_89620c74-19c6-11e4-a175-0017a43b2370.html.

71. "Flowback water" is the oil and chemical-rich fluid (mostly water) that flows back up a fraced wellbore during the well's initial production period. This water can be cleaned—typically by separating out oil and frac additives—then re-used in later frac jobs. See, e.g., EPA, *The Hydraulic Fracturing Water Cycle Agency Stage 4: Flowback and Produced Water*, <http://www2.epa.gov/hfstudy/hydraulic-fracturing-water-cycle#4> (last visited Apr. 18, 2015).

72. SCOTT W. TINKER, OIL AND GAS WATER USE IN TEXAS: UPDATE TO THE 2011 MINING WATER USE REPORT 65, 81 (2012), https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf.

73. *Id.*; see also Tex. Water Development Board, *Regional Water Planning Water User Group (Cities and Utilities): Summary, 2008 and Later* (2012) <http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/>.

2. There is strong legislative support for groundwater ownership in place

It is important to examine the Texas Legislature's position on groundwater issues, first because the Legislature has been active in legislating on water law and second because (as in *Sipriano*) the Texas Supreme Court has so far showed a high degree of deference to the Legislature's intent and policy goals when deciding water cases.⁷⁴

The Legislature has consistently favored treating groundwater as tangible property capable of ownership, a stance that confers ownership rights that are stronger and more extensive than a simple right to capture. In 1995, the Legislature enacted the Private Real Property Preservation Act ("The Act"), which defined "private real property" to include a "groundwater or surface water right of any kind."⁷⁵ The Act confers upon real private property owners standing to sue any government entity that has committed a "taking" by causing some type of impairment in use, economic harm, or actual physical deprivation of an owner's property.⁷⁶

Furthermore, section 36.002 of the Texas Water Code explicitly recognizes that "a landowner owns the groundwater below the surface of the landowner's land as real property."⁷⁷ This position, which came about as a product of Senate Bill 332 (enacted in 2011 with a vote of 28–3 in the Texas Senate and 147–0 in the Texas House, respectively⁷⁸) enhances the Legislature's previous position, which was that landowners had ownership rights *in* groundwater.⁷⁹ Importantly for this analysis, real property can also be bought and sold and serve as collateral for loans or other forms of financial transactions. However, section 36.002 of the Water Code "does not entitle a landowner . . . the right to capture a specific amount of groundwater below the surface of that landowner's land."⁸⁰ Judicial endorsement of a correlative rights system that pro-rates water withdrawals based on surface tract size would clarify this gap and be the logical next step of legal reform needed to truly open the door to a market-based water management system in Texas.

74. See *Friendswood Dev. Co. v. Smith-Southwest Industries, Inc.*, 576 S.W.2d 21, 26 (Tex. 1978); *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 77 (Tex. 1999); *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 833. (Tex. 2012).

75. Brief for Mesa Water L.P. as Amicus Curiae Supporting Respondents, *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012) (No. 08-0964) 2010 WL 766176.

76. TEX. GOV'T CODE ANN. § 2007.021(a), .002(5).

77. S. 332, 2001 Leg., 77th Sess. (Tex. 2001).

78. *Id.*

79. TEX. WATER CODE § 36.002(a) (West 2011).

80. TEX. WATER CODE § 36.002(b)(1) (West 2011).

3. Federal Courts and the IRS also recognize that Texas law provides for ownership of groundwater in place.

In 1965, United States Court of Appeals for the Fifth Circuit endorsed the Texas common law view that the owner of the land owns the soil and the percolating water which is a part of the soil.⁸¹ The case, *United States v. Shurbet*, hinged in large part on the question of whether groundwater could be treated for tax depreciation purposes⁸² as a “natural deposit” more akin to oil, gas, and other resources that are either non-renewable or regenerate so slowly as to be non-renewable for practical intents and purposes. Indeed, the *Shurbet* court endorsed the district court’s view that “ground water in the Ogallala formation of the Southern High Plains is a mineral and a natural deposit within the meaning of the federal tax statutes and regulations governing deductions for cost depletion.”⁸³

In a reply brief during the Supreme Court’s consideration of *Day*, the EAA and State of Texas worked very hard to try and distinguish the *Shurbet* decision and frame it in a way that militated against showing vested ownership of groundwater in place.⁸⁴ First, the State drew the distinction that this author makes above—namely, that the very slow recharge rate of the Ogallala Aquifer makes it different (and more mineral-like than the rapidly recharging Edwards Aquifer).⁸⁵ Second, the EAA and State claimed that Texas law and its position on ownership of groundwater did not serve as a basis for decision in the *Shurbet* case. It did so largely on the basis that *Shurbet* also included New Mexico taxpayers, but the court did not address groundwater ownership under New Mexico state law and thus was also not based upon any conclusions regarding groundwater ownership under Texas law either.⁸⁶

However, the EAA and State of Texas failed to make a strong case against applying *Shurbet*’s logic to a range of slowly recharging aquifers in Texas—basically every major aquifer aside from the Edwards. These important underground water systems—including the Edwards Trinity,

81. *U.S. v. Shurbet*, 347 F.2d 103, 106 (5th Cir. 1965).

82. The South Plains Underground Water Conservation District explains that irrigated farmland owners can benefit in two primary ways from the tax depreciation of declining groundwater levels. First, the saturated thickness of the aquifer underlying their property at the time of acquisition, and second, the cost of their land attributable to water. See South Plains Underground Water Conservation District, *IRS Cost in Water Depletion Program*, http://www.spuwcd.org/Cost_in_Water_Depletion.html (last visited Mar. 4, 2015).

83. *Shurbet*, 347 F.2d at 107.

84. See Reply Brief on the Merits of the Edwards Aquifer Authority, *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012) (No. 08-0964) 2009 WL 5251056, 15.

85. *Id.* at 15.

86. *Id.* at 16.

Gulf Coast, and Carrizo-Wilcox—have very slow recharge rates on par with those of the Ogallala Aquifer.⁸⁷ As such, the next court faced with a case on tax deductibility of depleting water levels in these large aquifers has a ready factual basis to apply *Shurbet* to treat groundwater akin to oil and natural gas, both in terms of its value in the ground and its ability to be owned and priced while still in the ground. If federal courts considering tax questions can effectively value groundwater volumes in most major Texas aquifers, this would suggest that commercial parties can also legally assign values to actual groundwater in place. The time is ripe for a test case using tax deductibility as a channel for forcing a court to decide the merits of valuing groundwater in place in another slow recharging aquifer other than the Ogallala.

4. Texas case law suggests surface owners also own the reservoir pore space that groundwater percolates through

To shed light on how ownership of groundwater might potentially translate into quantifiable volumes in place, we can look to case law on ownership of subterranean pore space, an issue that arises for underground natural gas storage and carbon dioxide re-injection and sequestration.⁸⁸ Pore space ownership is important because once the area and thickness of a water-bearing stratum are known, porosity is the final piece of the puzzle necessary to allow a groundwater estate owner to accurately estimate the volume of percolating water in place under his property.⁸⁹ This number in turn helps hydrologists calculate “specific yield,” or the total amount of water in the saturated thickness that will drain out by gravity, which is also the amount of water that can be pumped out by irrigation wells.⁹⁰

Under a straightforward application of the *ad coelum* (“heavens to the depths”) doctrine, a fee simple owner who has surface and mineral ownership also owns the subsurface pore space. However, cases in which the surface and subsurface estates are severed—for instance where one party owns surface and the other owns the minerals—Texas case law is not yet definitive on who owns the subterranean pore spaces.

87. B. R. Scanlon, A. R. Dutton & M. A. Sophocleous, *Groundwater Recharge in Texas*, University of Texas at Austin, Bureau of Economic Geology (2013), http://www.beg.utexas.edu/enviroq/ty/vadose/groundwater_recharge.htm.

88. Madeline Mathews, *Carbon Sequestration and Pore Space Ownership in Texas*, 41 TEX. ENVTL. L. J. 205, 211 (2011).

89. Lisa Dean, *Part 3—Volumetric Estimation*, RESERVOIR, Issue 11 (Dec. 2007) reprinted in, RESERVOIR ENGINEERING FOR GEOLOGISTS 11, <http://earth.boisestate.edu/pal/files/2012/04/ReservesEstimationOOIP.pdf>.

90. *Shurbet v. U.S.*, 242 F. Supp. 736, 742 (N.D. Tex. 1961).

Case law to date grants Texas surface owners the right to retain underground natural gas storage rights and also maintain control over saltwater disposal into subsurface strata. This suggests surface owners may own the subterranean pore space, particularly if that space is not being utilized or does not need to be substantially utilized by the mineral estate owner. In *Emeny v. United States*, a federal court applied Texas law when a lease owner sued the U.S. government, which leased mineral rights from plaintiffs, but instead of producing gas, chose to use the subterranean pore space to store helium as part of a federally-run helium reserve program under the auspices of the Helium Act Amendments of 1960.⁹¹ The *Emeny* court held that “the surface of the leased lands and everything in such lands, except the oil and gas deposits covered by the leases, were still the property of the respective landowners.”⁹² As such, *Emeny* supports the idea that surface owners who have not severed the groundwater estate own the subterranean pore spaces under their tract and thus own both groundwater under the land and the reservoir space that it percolates through.

While the right to ownership of groundwater is absolute under Texas law, a right to reservoir ownership would be subject to some limitations. Most prominently, the surface estate is treated as subservient to the dominant mineral estate, meaning that mineral owners/lessees have a right “to use as much of the premises as necessary to produce and remove the minerals,” subject to the requirement that they exercise their rights “with due regard for the rights of the surface owner.”⁹³ As such, as long as the mineral owners exercise “due regard” for the surface owners’ interest, then mineral owners would have the right to cross the subterranean pore space of an unsevered groundwater estate, which remains linked to the surface, to develop and extract minerals deeper down. However, under such circumstances, the mineral owner would be liable to the groundwater estate owner for any damage or impairment that was inflicted in violation of the “due regard” limitation. For cases where the surface, groundwater, and mineral estates are controlled by different parties, the groundwater estate’s position in the hierarchy of rights is much less clear.

The second limitation to surface owners’ rights to own subterranean pore space occurs where the owner or lessee of the mineral estate either uses said pore spaces or creates artificial reservoir pore space by mineral extraction. For instance, in *Mapco, Inc. v. Carter*, Carter and Mapco were co-tenants in a mineral extraction project, and Mapco

91. *Emeny v. U.S.*, 412 F.2d 1319, 1322 (Ct. Cl. 1969).

92. *Id.* at 1323.

93. *Humble Oil & Refining Co. v. West*, 508 S.W.2d 812, 815 (Tex. 1974).

owned the surface.⁹⁴ Mapco was leaching a storage cavern out of mineral salt and continued construction despite a cease-and-desist order from the majority mineral owners. A subsequent lawsuit resulted in the Mapco court holding that the mineral owner, not the surface owner held title to the subsurface storage space.⁹⁵

A key distinction between *Emeny* and *Mapco* is that the Bush Dome underground gas storage zone in *Emeny* was composed of naturally occurring pore space, while *Mapco* involved an artificially constructed storage space. Fact patterns in future Texas disputes over whether or not the groundwater estate owner also owns subterranean pore spaces will likely exclusively involve naturally occurring pore spaces in aquifers, making *Emeny* a more strongly controlling case for settling ownership questions.

V. RECOGNIZING OWNERSHIP OF GROUNDWATER IN PLACE UNLOCKS NEW ECONOMIC VALUE AND HOLDS PROMISE FOR MARKET SOLUTIONS, SUCH AS RESERVE BACKED LOANS, THAT EQUITABLY BALANCE FARMER, CITY, AND FRACER WATER NEEDS

As the population continues rapidly growing in Texas, cities' demand for groundwater resources is set to rise further, both in the heavily populated "Texas Triangle" of Dallas-Fort Worth, Austin, San Antonio, and Houston, and in mid-size cities such as Midland/Odessa that lie in oil boom areas and are growing rapidly. From the perspective of farm and frac water users, municipal water supplies are basically off-limits for political and legal reasons, since courts prioritize "domestic" water uses when disputes occur. Because municipal and agricultural users have already effectively locked up a substantial portion of the available water supply, oil and gas sector water users in many parts of Texas are fighting for the remaining slice of the water supply pie, which becomes the "marginal acre foot" and is highly valuable.

Water markets are in general a much more cost and time-efficient and equitable means of allocating supplies than litigation. The *Day* decision's affirmation of strong groundwater ownership rights in Texas now creates a situation that open the legal door for attaching a price tag for water molecules still in the ground, which can help free up supplies while preserving existing uses. The primary mode for this is through using reserve-backed loans based on the value of groundwater in place

94. *Mapco, Inc. v. Carter*, 808 S.W.2d 262 (Tex. App. Beaumont 1991), writ granted (Oct. 23, 1991), rev'd in part, 817 S.W.2d 686 (Tex. 1991).

95. *Mapco*, 808 S.W.2d at 274; see also Owen L. Anderson, *Geologic CO2 Sequestration: Who Owns the Pore Space?*, 9 Wyo. L. Rev. 97 (2009).

and secured by water sales that then give farmers the means to invest in efficiency improvements that will free up “surplus” water and allow them to realize income from water sales while continuing with their farming operations.

Reserve-backed loans are loans for which the borrower puts up collateral (in this case estimated water reserves underneath his land) and then gets a loan amount based on the present value of expected future sales. The loan process would take account of factors such as the level of reserves, expected water prices, a discount rate, assumptions for operational expenditure, capital expenditure, and any tax and price hedging employed.⁹⁶

If the use of groundwater reserves as collateral for loans takes off, *Day*'s embrace of the rule of capture is likely to be pushed towards adopting something closer to a “reasonable use” doctrine, at least in terms of putting some type of strictures on groundwater pumping. Texas oil and gas law underwent a similar transition from unfettered rule of capture to a correlative rights system overseen by the Texas Railroad Commission. Similarly, the *Day* court's position that “to forfeit a landowner's right to groundwater for non-use would encourage waste” sets the stage for the emergence of a more comprehensive legal and regulatory system to attach value to groundwater in place by managing extraction rates.⁹⁷

However, the *Day* decision alone is insufficient to allow groundwater to be reliably valued in place to the point that estimated reserves may become the basis for financial transactions. Absolute property rights for all landowners in practice means the right is devalued because one landowner can drain an aquifer and his neighbors have no recourse to enjoin the drawdown of the water under their land unless the neighbor is pumping “maliciously” or not putting the water to “beneficial use,” which are malleable standards that almost never yield a cause of action. This brings us to the second part of Farmer John's story.

John has begun selling water to the oil company fracing near his farm. The initial sales have been good—more than \$100,000 over the past three months. However, a problem has emerged: the water levels in John's wells are dropping far faster than he has ever seen before. He has also noticed the neighbor has reduced the size of his cotton crop, left much of his acreage fallow, and has laid a plastic flow line across his field towards a large pond where truck traffic comes day and night to fetch water at a rate far higher than John has been selling

96. *Reserves-Based Lending*, SUMITOMO MITSUI BANKING CORPORATION, <https://www.smbcgroup.com/emea/eu/lending/index> (last visited Apr. 8, 2014).

97. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 842 (Tex. 2012).

his water at. John learns that about 6 months ago, the neighboring farmer had his well deepened and the bore size expanded and installed a pump system capable of lifting water at twice the previous rate.

When the local bank learns of these new facts, it pulls out of a ground-water-backed collateralized loan that John was soon to receive, which he would have used to install a modern drip irrigation system in his large cotton field. John goes to his lawyer's office, seeking to sue the neighbor and enjoin his massive pumping scheme. Unfortunately, the lawyer has to tell John that in Texas, the rule of capture carries the day and if a neighbor with a bigger well and more powerful pump drains the water under your land, there is basically no legal recourse.

John is now immersed in the painful reality that absolute rights for all means that landowners can not only lose water, but also be able to do little to nothing about it. This undermines the ability to conserve water resources by making them more economically valuable. It also highlights that an "absolute right" as stands under Texas groundwater law really is not much of a robust property right at all unless one lives miles from other potential water users and no one else has a well—a situation hard to find in even the most remote corners of Texas.

1. Absolute ownership of groundwater is disastrous without correlative rights.

The *Day* decision puts a stamp of judicial approval on a century-long history of treating groundwater as an absolute property right in Texas. It also commoditizes this precious resource—but only to the benefit of those with the largest pumps and deepest wells. A more profound commoditization—one that allows water volumes to be priced *in place*—would actually help preserve groundwater reserves.

But this only works if a system of correlative rights is put in place that prevents "beggar thy neighbor" practices whereby one neighbor can dry out another's wells with impunity. In short, Texas water law needs to move the true ownership point—the point at which a landowner has real title to water—away from the wellhead and instead, truly perfect the property right in groundwater by making ownership in place meaningful.

Otherwise, *Day's* recognition of an absolute property right will only fuel a burst of helter-skelter well drilling, pumping, and depletion of the resource. If correlative rights and fair chance doctrine make water a more "traditional" commodity that has value *prior* to being extracted and captured, this sets the stage for conservation because water will come to have a monetary value for simply existing as un-extracted molecules in the ground and because it gives landowners incentive to know

what volume of water they actually have in place under their land, bringing more transparency to the market. Better knowledge of hydrological conditions will in turn make prices more reflective of the real supply/demand balance, as opposed to valuing water based on the economic returns generated by its end use. Greater data clarity would also facilitate marketing by encouraging water owners to make water supplies available in response to price changes, which helps build a more liquid marketplace and supporting infrastructure and reduces transaction costs.

2. Correlative rights can work in a Texas water context.

Full use and enjoyment of private property is compatible with regulatory rules, particularly when finite resources such as oil and gas or Texas groundwater are involved. The Texas oil and gas industry began with a rule of capture system predicated on absolute rights of ownership, but after experiencing depletion and wastage of an increasingly valuable resource, a correlative rights system and regime of careful data gathering and production reporting overseen by the powerful Texas Railroad Commission came into effect. The result has been the world's leading body of oil and gas law and regulation. Now, Texas has a similar opportunity to lead the evolution of a water law regime that, through recognition of private property rights, creates incentives to serve as good stewards of a substance that we literally cannot live without.

A legal regime that encourages surface owners to manage water extraction rates and practices would introduce predictability for parties seeking to attach monetary values to physical groundwater volumes in place. Greater predictability would in turn reduce the risk of making a loan based on groundwater that a neighbor could pump away. At this point, valuations could begin to account for geological uncertainties in the same way that oil reserves are valued on a "risky" basis; with the level of risk declining and financial value rising as additional exploration and drilling more clearly reveal an oil deposit's contours. In turn, this creates a more favorable environment for the farmers who sit atop large surface tracts and own the water underneath to increase the efficiency of their usage and free up water for sale to high-paying frackers and municipalities, who use, over all, much less water than farmers. Such an outcome serves the economic needs of farmers and rural landowners atop water-rich tracts, while also reducing or at least constraining overall water demand growth.

3. Water is similar to oil and gas from a legal standpoint

Hydrologists and geologists have noted that “regardless of whether the vested “ownership” promised by Senate Bill 332 is adopted, groundwater is unlike “static” underground resources, such as copper or coal.⁹⁸ If a coal seam or copper lode runs under multiple owners’ land tracts, one owner can extract the resource from under his land without affecting his neighbors’ resource endowments. Water, in contrast, is much more like oil or natural gas: it is a “fugitive” resource which can move to different locations in a deposit based on pressure gradients induced by landowners extracting minerals from their respective portion of a deposit underlying multiple tracts. And for this reason, it makes great sense to manage Texas’s precious groundwater resources in the same way oil and gas are managed: by requiring that withdrawal rates and volumes be based upon the amount of surface acreage the pumper holds.

VI. TEXAS GROUNDWATER RESOURCES SHOULD BE MANAGED LIKE OIL AND GAS ON A “FAIR CHANCE” WITHDRAWAL SYSTEM

Texas water law is now in an era equivalent to that which the state’s oil industry regulations were in between 1901, when the Spindletop Field was discovered near Beaumont, and the 1930s, when the over-extraction that collapsed prices (and eventually production) in the East Texas Field. The East Texas Field was a “tragedy of the commons” situation where rampant over-extraction threatened the long-term viability of a huge and vital resource base. The refusal of oil producers to comply with private attempts at pro-rating production triggered a prolonged political crisis during which the Governor of Texas, J. Ross Sterling, declared martial law in the field in 1931. Ultimately, the Texas Legislature hurriedly passed the Market Demand Act in November 1932. In relevant part, the act authorized the Texas Railroad Commission to regulate production levels to preserve oil and gas resources.⁹⁹ Before the East Texas Field came online, the Texas oil patch was a “frontier zone” where the main focus was on finding and pumping new fields—in short, development was prized over sustainability.

98. Rene Barker & Raymond Slade, Jr., *The Fallacy of Vested Groundwater Ownership*, (Apr. 4, 2011), <http://www.hillcountryalliance.org/uploads/HCA/FallacyofVestedGWOwnership2.pdf>.

99. History of the Railroad Commission 1866-1939, R.R. COMM’N OF TEX., <http://www.rrc.state.tx.us/about-us/history/history-1866-1939/> (last visited Mar. 6, 2015).

Likewise, the mentality underpinning the Texas Supreme Court's consistent support for a groundwater management ideology based on the rule of capture and absolute ownership also suggests a "development at all costs" frontier mentality that risks over-drawing Texas's groundwater resources and impairing the state's future growth potential. Just as over-extraction damaged oil production in the East Texas Field in the early 1930s, over-zealous groundwater extraction now threatens to deplete Texas groundwater resources at the very time that rapidly growing cities are becoming more dependent on them.

Adopting a correlative rights groundwater system that rates withdrawals based on surface acreage and other factors offers a possible solution, since such a system is already used to manage oil and gas production in Texas. In response to the friction between ownership in place and the rule of capture, Texas oil and gas law evolved to recognize the so-called "fair share" or "fair chance" doctrine, which "guarantees the adjacent mineral owner an opportunity to produce his share of the oil and gas reserves in an underlying common reservoir."¹⁰⁰

Indeed, the Texas Supreme Court's 1948 decision in *Elliff v. Texon Drilling Co.* noted that while "the fundamental rule of absolute ownership of the minerals in place is not affected" in Texas, multiple earlier judicial affirmations of the well spacing regulations established by the Texas Railroad Commission in 1919¹⁰¹ reflected "the sound view that each landowner should be afforded the opportunity to produce his fair share of the recoverable oil and gas beneath his land."¹⁰² *Elliff* goes further and states that this idea of fair chance "is but another way of recognizing the existence of correlative rights between the various landowners over a common reservoir of oil or gas."¹⁰³

Elliff's reasoning clearly is extendable to groundwater resources, which should also be managed under a correlative rights system.¹⁰⁴ Indeed, the legal basis is already largely in place. As is the case for oil and gas, correlative rights and absolute ownership regimes also both respect

100. Sydney W. Falk, Jr., *Natural Gas Regulation and Vested Property Interests: Ratable Taking, Proration Standards, and Fieldwide Civil Liability*, 62 TEX. L. REV. 691, 698 (1983).

101. *Elliff v. Texon Drilling Co.*, 210 S.W.2d 558, 582 (Tex. 1948); see 16 TEX. ADMIN. CODE § 3.37 (2004).

102. *Elliff*, 210 S.W.2d at 582.

103. *Id.*

104. Correlative rights incorporate the right to extract a resource from a common reservoir that is conferred by the rule of capture, but with the proviso that each reservoir owner has reciprocal duties to the others that restrain him from capturing the resource in ways that prejudice the interests of other reservoir owners. In Texas, correlative rights in the oil and gas sector are primarily based on surface spacing to ensure that wells are not placed so closely together that they unnecessarily drain the reservoir, as well as pro-rating production in order to avoid over-production that could damage the reservoir.

groundwater owners' vested ownership rights to water molecules underneath their land. For decades, Texas judicial opinions did not address the potential for diluting or altering the absolute ownership system, until the 1999 *Sipriano* decision subtly cracked open this door.

Sipriano considered whether the English rule of "absolute ownership" should be replaced with the "American" rule of "reasonable use." Despite the differing liability implications, from a property perspective, both regimes recognize that the landowner owns the corpus of the groundwater under his tract. Essentially, under both absolute ownership and reasonable use, the landowner is not required to reduce the water to actual possession in order to have a vested property interest in it. Therefore, creating a correlative rights system for groundwater management would not contravene *Day's* holding.

Indeed, the *Day* court said landowners have absolute title in severalty to the oil and gas in place beneath their land but qualified the ownership right by adding that "it must be considered in connection with the law of capture and is subject to police regulations."¹⁰⁵ The Court then held that this position "correctly states the common law regarding the ownership of groundwater in place" in Texas.¹⁰⁶ Groundwater conservation districts offer a tool for policing groundwater use in Texas.

1. Groundwater Conservation Districts are the Texas legislature's preferred management tool

The history of Texas groundwater conservation districts (GCDs) begins with the passage of the Groundwater District Act of 1949.¹⁰⁷ The Act ended a fifteen-year period in which legislators introduced bills to create a comprehensive groundwater scheme four different times (1937, 1939, 1941, and 1947) but failed to pass any of these bills.¹⁰⁸

The Act permitted creation of "underground water conservation districts" for the purpose of "conservation, preservation, protection, and recharging and the prevention of waste of the underground water of an underground water reservoir or subdivision thereof."¹⁰⁹ Districts created pursuant to the Act had the power to:

1. make and enforce regulations for the conservation and recharging of underground water reservoirs;

105. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 832 (Tex. 2012).

106. *Id.*

107. Edward P. Woodruff, Jr. & James Peter Williams, Jr., *The Texas Groundwater District Act of 1949: Analysis and Criticism*, 30 TEX. L. REV. 862 (1952).

108. *Id.* at 865-66.

109. *Id.* at 866.

2. make and enforce rules against “waste” of underground water, as “waste” is defined in the act;
3. issue permits for the drilling of wells within the reservoir;
4. impose spacing rules and prorating withdrawals;
5. require reports on the drilling, equipping, and completion of wells;
6. acquire lands for the purpose of carrying on recharging operations;
7. make surveys and plans and carry on research relative to groundwater;
8. enforce, by injunction or other appropriate process, the duly adopted regulations of the district.”¹¹⁰

The Act expressly recognized the landowners’ “ownership and rights” in groundwater under their tracts.¹¹¹ Most notably for the purposes of the present analysis, the language of the Groundwater Conservation District Act of 1949 influenced Senate Bill 1, a landmark water bill passed in 1997 that helped form the foundation of Chapter 36 of the Texas Water Code.

Senate Bill 1 amended Chapter 36 of the Texas Water Code to say groundwater conservation districts “are the state’s preferred method of groundwater management.”¹¹² GCDs are intended to “provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions.”¹¹³ Senate Bill 1’s explicit endorsement of GCDs opened the door to a period of rapid GCD formation. The data supports this, as the first thirty-eight Texas GCDs were formed between 1951 and 1996, while a much more rapid period of GCD creation followed the 1997 passage of Senate Bill 1, with sixty districts coming into existence between 1997 and 2012.

The Legislature’s approach to GCDs draws upon a strong historical preference among the Texas electorate for local control, shown in other areas such as school boards. GCDs that rely on local power and persuasion (as opposed to top down coercion from state authorities) could potentially yield policies that are better adapted to the local conditions.¹¹⁴ Many GCDs, however, instead arose out of political realism. Par-

110. *Id.*

111. *Id.* at 867.

112. Amendments to Texas Water Code § 421, available at <http://www.legis.state.tx.us/tlodocs/75R/billtext/html/SB00001F.htm>.

113. TEX. WATER CODE ANN. § 36.0015 (West 2001).

114. See ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTIONS 103–42 (James E. Alt & Douglass C. North eds., 1990); Christopher

ticularly in the Texas Panhandle, where the Ogallala Aquifer dominates supply, users elected to organize into local GCDs because they feared that if they did not, harsher regulations would be imposed on them by the State of Texas or other political entities that, from a local perspective, were “outsiders.”¹¹⁵ As a result of these local roots, many Texas GCDs are beholden to the users in their districts that must approve of any GCD attempts to use their teeth. In essence, without the consent of local water users who the GCD is supposed to regulate (and who likely sit on its board), the district will have its hands tied. This illustrates a fundamental problem of trying to locally manage common pool resources that often transcend the boundaries of numerous local political entities.

Despite the delegation of significant groundwater management authority to locally-based GCDs, a sizeable number of water users still balk at creating their own GCDs. Local voters fear creating bodies that could impose limits, fees, and/or taxes upon their water use. For example, one farmer near Lubbock has said he views groundwater withdrawal restrictions and metering of pumping (both of which lie within the purview of GCDs’ power), as “a real property rights violation.”¹¹⁶ In the agriculture and ranching community—particularly in the drier regions of Central and West Texas—many hold the views of farmer Maurice Rimkus, an Edwards Aquifer pumper profiled by the Texas Monthly, whose pickup famously sported a bumper sticker reading “You Can Have My Water, Just Like You Can Have My Gun—When You Pry it Out of My Cold Dead Hands.”¹¹⁷

Of course not every user potentially subject to regulation feels this way, but these particular farmers’ statements reflects a deeply rooted Texan view that private property—including that which lies under the surface—is sacred. Local water users’ deep-seated unease with ground-

R. Brown & Blake Farrar, *A Hole in the Bucket: Aspermont’s Impact on Groundwater Districts and What It Says About Texas Groundwater Policy*, 39 TEX. ENVTL. L. J. 1 (2008); James Nachbaur, *Precipitating Institutional Change: Drought Sinks In* AMER. ASS’N FOR THE ADVANCEMENT OF SCIENCE (May 9, 2014), <http://publicchoicesociety.org/content/papers/jamesnachbaur-924-2014-925.pdf>.

115. Mark Somma, *Local Autonomy and Groundwater District Formation*, 24 PUBLIUS: THE J. OF FEDERALISM 53 (Spring 1994). Such fears of influence by outsiders or a higher political power are a recurrent theme in Texas water governance. Indeed, the Edwards Aquifer Authority Act was created in response to the federal government’s threat to bring the management of the aquifer under its control if the state of Texas failed to act. To forestall federalization of the Edwards Aquifer, the state legislature promptly passed the Act in 1993.

116. Kate Galbraith, *Texas Farmers Battle Ogallala Pumping Limits*, TEX. TRIB. (Mar. 18, 2012), <https://www.texastribune.org/2012/03/18/texas-farmers-regulators-battle-over-ogallala/>.

117. Al Reinert, *This Water is My Water*, TEX. MONTHLY, 128, 131 (Nov. 1988).

water regulation has shown up at the ballot box: between 1989 and 2006, a total of eleven discrete GCDs failed their votes to confirm the creation of the district.¹¹⁸ Even the judiciary has in some cases adopted the stance that restrictions on groundwater use may constitute takings of private property. For instance, in November 2013, the Court of Appeals (San Antonio), ruled in favor of Glenn and JoLynn Bragg, two pecan farmers who relied on Edwards Aquifer water supply to irrigate their orchards, and faced curtailment of groundwater use following the Texas Legislature's 1993 passage of the Edwards Aquifer Act.¹¹⁹

The core problem with GCDs and local control is that they do not fundamentally change the reality that groundwater remains governed by relatively weak local regulatory bodies that are at a very high risk of being captured by the local water consumers they are supposed to regulate. The interests of long-term water resource management would be better served by implementing legislation that (1) clarifies the existing Water Code provision granting GCDs independent, state-level legal power to rate withdrawals and (2) requires GCDs along multi-county aquifers (such as the Carrizo or Edwards-Trinity) to develop coherent management policies or else face management policies formulated at the state level. This would mirror the political incentive structure in which the Edwards Aquifer Authority was created—essentially, local users had to either rapidly develop a better management structure, or face the prospect of their water use rights coming under the control of a higher-level political entity. Private water markets could help allocate large-volume water resources within the confines of such a rated withdrawal framework.

The gradual shift of political power from rural to urban voters in Texas will make the approach described above increasingly possible. The Texas Constitution provides for thirty-one State Senate districts and 150 House of Representatives districts.¹²⁰ Legislative districts must be as equal as possible in terms of their populations,¹²¹ and after the most re-

118. TEX. COMM'N ON ENVTL. QUALITY, SFR-053/06, PRIORITY GROUNDWATER MANAGEMENT AREAS AND GROUNDWATER CONSERVATION DISTRICTS, REPORT TO THE 81ST TEXAS LEGISLATURE 35 (2009), available at http://www.tceq.state.tx.us/assets/public/comm_exec/pubs/sfr/053_06.pdf.

119. In the Bragg case, Judge Sandee Bryan Marion wrote “[w]e conclude the trial court properly determined the implementation of the Act resulted in a takings of the Braggs’ property. . . .” *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 124 (Tex. App. 2013); see also *Edwards Aquifer Authority Act of May 30, 1993*, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, amended through Sept. 2009, available at http://www.eahcp.org/documents/2009_EAA_EAA-Act1993-Amended2009.pdf.

120. TEX. CONST., Art. III, § 2.

121. *Reynolds v. Sims*, 377 U.S. 533, 567 (1964).

cent census (2010) each Texas Senate district contains roughly 811,000 people and each Texas House district contains 167,000 people.¹²² Future redistricting will continue to rebalance and shift in favor of the largest metro areas in the state, in particular the San Antonio, Houston, Austin, and Dallas-Fort Worth metro areas, as well as the Lower Rio Grande Valley, which between 1997 and 2007 accounted for roughly 85 percent of Texas's population growth (4.29 million new residents).¹²³

The fact that the bulk of the Texas population increase comes in a relative handful of counties in and near major cities will continue to drive legislative district shifts that stand to weaken the rural-driven extreme private property views that currently govern groundwater law in Texas. Such re-alignment will occur faster in the State House than the Senate, since each million additional residents are equal to roughly six House seats, but only slightly more than one Senate seat. It is likely that city dwellers who see water as something that comes from the tap when they turn the spigot will have different views on water issues than rural residents who draw their water from wells and see water as property that they own, rather than a service provided by someone else. As rapid urban population growth continues to gradually erode rural influence in the Texas legislative bodies, the door opens to tighten regulation of groundwater withdrawals.

2. GCDs should have stronger powers.

Day's holding suggests that the ownership of groundwater in Texas may not be as absolute as it is popularly understood to be. Correlative rights-based qualification of groundwater extraction could follow a framework similar to that used to regulate oil and gas extraction in Texas, namely allocation of production rights based on surface ownership as well as overall restrictions on production based on reservoir conditions. Bolstering the power of geographically-based GCDs offers an existing, albeit imperfect, institution for regulating groundwater use in Texas.

Under sec. 36.101 of the Texas Water Code, the Texas Legislature grants GCDs the power to "make and enforce rules, including rules limiting groundwater production based on tract size or the spacing of

122. Matt Stiles & Ryan Murphy, *Interactive: Census Totals by House, Senate District*, TEX. TRIB. (Mar. 3, 2011), <http://www.texastribune.org/2011/03/03/interactive-census-totals-by-house-senate-district/>.

123. *Texas Land Trends: Loss of Agricultural Lands*, TEX. PARKS & WILDLIFE DEPT., https://tpwd.texas.gov/business/feedback/meetings/2009/0827/agenda/item_3/media/exhibita.pdf (last visited Mar. 4, 2015).

wells.”¹²⁴ At least one Texas groundwater conservation district, the Llano Estacado UWCD in Gaines County, already restricts groundwater extraction based on the surface acreage a pumper owns.¹²⁵

The Legislature instructs GCDs that when adopting rules, they must follow a range of instructions, most importantly: (1) consider all groundwater uses and needs; (2) develop rules that are fair and impartial; (3) consider the groundwater ownership and rights described by section 36.002; and (4) consider the public interest in conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and in controlling subsidence caused by withdrawal of groundwater from those groundwater reservoirs or their subdivisions, consistent with the objectives of section 59, article XVI, Texas Constitution.¹²⁶

Article XVI, section 59 of the Texas Constitution says “the preservation and conservation of all such natural resources of the State are each and all hereby declared public rights and duties; and the Legislature shall pass all such laws as may be appropriate thereto.” Such language suggests that the Texas Legislature has chosen to delegate a meaningful degree of its state police powers on groundwater issues to local GCDs, subject to the provisions set forth in section 36 of the Texas Groundwater Code. GCDs are classified by the Texas Water Code as political subdivisions of the state equivalent to counties.¹²⁷ This conferral of authority is important because the U.S. Supreme Court has upheld states’ ability to exert their regulatory police powers by pro-rating oil and gas production based on the size of producers’ surface tracts and other factors.¹²⁸

The case of *S. Plains Lamesa R.R. v. High Plains Underground Water Conservation Dist. No. 1* illustrates the contours of GCD power in practice.¹²⁹ In *S. Plains Lamesa R.R.* the District initially approved a water well permit but then retracted approval when it learned that the well was located on a small tract but would be extracting large volumes of water

124. TEX. WATER CODE ANN. § 36.101 (West 2011).

125. Rule 7.1, *LEUWCD Rules*, LLANO ESTACADO UNDERGROUND WATER CONSERVATION DIST., <http://www.llanoestacadouwcd.org/LEUWCD%20Rules.pdf> (last visited Mar. 5, 2015).

126. TEX. WATER CODE ANN. § 36.101(a)(1)–(4) (West 2011).

127. TEX. WATER CODE ANN. § 36.001(15) (West 2011).

128. *Northwest Cent. Pipeline Corp. v. State Corp. Com’n of Kansas*, 489 U.S. 493 (1989) (determining that a Kansas Corporations Commission could regulate production and withdrawals from the Hugoton Field because it was regulating “evenhandedly to effectuate a legitimate local public interest” and the burden imposed on commerce was not “clearly excessive in relation to the putative local benefits.”); *id.* at 526 (citing *Pike v. Bruce Church*, 397 U.S. 137, 179 (1970)).

129. *S. Plains Lamesa R.R., Ltd. v. High Plains Underground Water Conservation Dist. No. 1*, 52 S.W.3d 770 (Tex. App. Amarillo 2001), *pet. denied*.

for export to a nearby farm. The pumper, a lessee farmer, ultimately prevailed because the Seventh District Court of Appeals in Amarillo ruled that GCDs lack the authority to make discretionary decisions unless GCDs first promulgate clearly enunciated rules that give water users notice. While groundwater ownership rights are “subject to rules,” the Water Code does not make groundwater ownership rights subject to “discretionary decisions” of the groundwater conservation districts.¹³⁰ Further, the court held that “the applicable Code provisions do not clearly authorize the District to enact a regional rule to prohibit the production of a disproportionate amount of groundwater as it relates to the size of the tract or to implement a reasonable use rule.”¹³¹ The Legislature should address this issue by requiring GCDs overlying key aquifers to harmonize their rules regarding withdrawals.

In essence, the *S. Plains Lamesa* decision establishes that GCDs can promulgate and enforce specific rules when the rules are tailored to local conditions and designed to uphold the public interest in protecting and preserving groundwater supplies. This is a significant power, but one that is also circumscribed by the fact that the districts are not given forward looking interpretive powers that would enable them to rule and regulate by analogy. Rather, GCDs must address new situations by passing rules that give clear notice. As such, GCDs are hard-pressed to enact rules to pre-empt future overdrafts of water or otherwise crack down in a timely manner on undesired water extraction practices not already covered by the existing rulebook. In practice, this complicates the system by creating substantial incentives for districts to promulgate their own lengthy and detailed local water codes, as the High Plains Underground Water Conservation District No.1 has done in the wake of the *S. Plains Lamesa R.R.* decision.¹³²

3. The Legislature should give GCDs the teeth to regulate groundwater extraction just as the Texas Railroad Commission regulates oil and gas production.

In *Day*, the Texas Supreme Court explicitly notes that “responsibility for the regulation of natural resources, including groundwater, rests in the hands of the Legislature.”¹³³ To date, the Texas Legislature has actually reinforced the strength of the “groundwater as private prop-

130. *Id.* at 780.

131. *Id.* at 779–80.

132. *Rules*, HIGH PLAINS WATER DISTRICT, <http://www.hpwd.com/public/pdfs/HPWDRules.pdf> (last visited Mar. 5, 2015).

133. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 833 (Tex. 2012).

erty” position. In 2011, the Legislature amended section 36.002 of the Texas Water Code, saying in relevant part that:

- (a) The legislature recognizes that a landowner owns the groundwater below the surface of the landowner’s land as real property.¹³⁴

The *Day* court interpreted this language, determining that “by ownership of groundwater as real property, the Legislature appears to mean ownership in place.”¹³⁵ However, section 36.002 “does not entitle a landowner, including a landowner’s lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner’s land.” As such, landowners should ask what an “absolute” right to a common pool of resources actually means if there is not a management tool that can transcend the rights and autonomy of individual pumpers and bring order to the system for the good of all participants. Correlative rights create a more predictable, ordered system that helps maximize the value of private property—as shown by the Texas oil & gas industry. Indeed, in 2013 the Texas portion of the Permian Basin alone generated as much as \$113.8 billion in economic output.¹³⁶

4. A correlative rights groundwater management system would be highly compatible with private property-based solutions.

Given the currently limited powers of GCDs to restrict pumping and push for conservation, it is important to explore other avenues by which groundwater can be conserved. In the present Texas political environment, one possible solution would be groundwater development co-ops, a structure that would protect private property rights. Co-ops could tap into powerful economic incentives for re-directing water flows from agriculture to higher value-added uses in cities and would also help solve problems locally and not require the bitter political fight that would likely arise by imposing central-planning solutions from Austin. Once water reserves are monetized and additional lucrative sale and export opportunities arise, most GCDs (whose members are locally elected) will likely re-consider their positions and come to favor both correlative rights regulatory approaches *and* the merits of exporting water to oilfield operations and thirsty municipalities. As the law settles and GCDs become more open to regulating water in the manner oil and gas extraction

134. TEX. WATER CODE ANN. § 36.002 (West 2011).

135. *Day*, 339 S.W.3d at 832.

136. BRADLEY T. EWING ET AL., ECONOMIC IMPACT: PERMIAN BASIN’S OIL & GAS INDUSTRY (Aug. 2014), <http://www.depts.ttu.edu/communications/media/downloads/PermianBasin.pdf>.

is regulated, co-ops offer a ready structure to rationally and efficiently extract and utilize groundwater.

For example, the Middle Trinity Basin Conservation Cooperative is a 150,000 acre association of thirty-five landowners in Freestone and Anderson counties in East-Central Texas.¹³⁷ Members cooperatively manage land to improve game animal habitat and are also considering groundwater marketing opportunities. The co-op structure could be reproduced in other parts of Texas as well and the economic incentives to do so in preparation for water marketing are significant. For instance, San Antonio reportedly pays \$1,200 per acre foot for water from Gonzales County and once the Vista Ridge Pipeline project comes online, the city may pay as much as \$1,700 to \$1,900 per acre foot.¹³⁸ At prices in this range, a co-op capable of delivering 10,000 acre feet per year (an eminently reasonable figure for a large wellfield in a productive aquifer) could generate revenues of between \$12 and \$19 million annually.¹³⁹

IV. CONCLUSION

When the next groundwater ownership case comes before Texas Supreme Court, the Court should seize the opportunity to endorse a correlative rights approach to groundwater management. In a system without correlative rights where the biggest pump wins, the ability to own water underneath one's property and even to calculate volumes in place and use them as collateral for loans means relatively little. As the law presently stands, the pumper need only meet the low threshold of demonstrating that water is being put to a beneficial use, is not being pumped maliciously, and is not causing subsidence of neighboring lands as per *Friendswood*.

To boot, *Day's* affirmation of surface owners' absolute ownership of groundwater under their tracts also raises concerns about water inequality. Now that the Texas Supreme Court has clarified that there is a vested ownership right (albeit leaving some remaining gray area), there is a significant chance that other big money interests will follow the lead

137. Gary Cartwright, *Contemplating the Trinity*, TEX. PARKS & WILDLIFE MAGAZINE (July 2004), available at http://www.tpwmagazine.com/archive/2004/jul/ed_4/.

138. Scott Huddleston, *Major Water Pipeline Deal Could Come this Fall*, SAN ANTONIO EXPRESS-NEWS (June 29, 2014), <http://www.expressnews.com/news/environment/article/Major-water-pipeline-deal-could-come-this-fall-5588274.php>.

139. 10,000 acre feet times \$1,200 or \$1,900 per acre foot equals \$12 million to \$19 million.

of T. Boone Pickens' Mesa Water, L.P. and attempt to acquire large surface tracts in order to gain ownership of the underlying groundwater.¹⁴⁰

There is a substantial risk that without a correlative rights system to rate water withdrawals based on surface acreage and other factors, large interests could acquire land and create groundwater pumping conflicts with facts akin to those in *Sipriano* (i.e., drying out neighboring landholders), but on a much larger scale. Therefore, the Texas Legislature would be wise to consider a water management regime that follows Texas oil and gas law and lays down a correlative rights framework to govern a resource that has always been precious in Texas. It is even more precious now with a rapidly growing population, fracing, and other uses that drive demand while drought crimps the surface water supplies many Texas cities have traditionally relied upon. The Legislature could do this in a number of ways. One prong should include devolving greater power to local groundwater conservation districts and mandating that districts cooperate and promulgate binding regulations on a basin-wide or aquifer-wide level. Introducing proposed legislation to mandate wider cooperation between GCDs would likely meet stiff local resistance, especially from agricultural interests who crave access to low cost water that can be pumped at will and see their water supply as akin to a birthright. However, changing demographics triggered by the disproportionately urban-centric growth of Texas's population are already poised to begin shifting the balance in the state legislature. As Texas's population continues to urbanize, this will likely create a more propitious environment for commoditizing groundwater and managing it with a correlative rights-style system.

The Legislature should also take action to ensure that groundwater owned in place is not monopolized by a handful of moneyed interests, since water is a unique class of commodity, that humans literally cannot live without. One way to address this concern would be to more closely regulate acquisitions of large surface tracts for water purposes ("water ranching"), perhaps using the Herfindahl-Hirschman Index, "a commonly accepted measure of market concentration" used by the Justice Department to decide whether a firm's market power has become unacceptably large in anti-trust cases.¹⁴¹ Finally, the Legislature should

140. Mesa Water L.P. was formed by oil billionaire T. Boone Pickens to accumulate water rights in the Texas Panhandle with the ultimate objective of constructing a pipeline to sell the water to the Dallas-Fort Worth area. After the pipeline idea foundered, Mesa sold its rights to the Canadian River Municipal Water Authority and exited the business in 2011. Kevin Welch, *Group Buys Mesa Water Rights*, AMARILLO GLOBE NEWS (June 24, 2011), <http://amarillo.com/news/local-news/2011-06-24/group-buys-mesa-water-rights>.

141. *Herfindahl-Hirschman Index*, U.S. DEP'T OF JUSTICE, <http://www.justice.gov/atr/public/guidelines/hhi.html> (last visited Mar. 5, 2015).

also require all well owners to install tamper-resistant digital meters and make it mandatory that users report withdrawal data on at least a monthly basis. Effective regulation can only occur through data transparency that helps regulators where water is being used, how it is being used, and how much is being used.

The bottom line is that Texas groundwater management is rapidly entering the Blue Gold era. Now, the Texas Legislature and courts will need to move quickly to deal with the market forces being unleashed by the Texas Supreme Court's decision to affirm landowners' absolute vested ownership rights to groundwater beneath their land.