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GROUNDWATER: A COMPARATIVE ANALYSIS OF THE REGULATION OF GROUNDWATER ENCOUNTERED IN SURFACE MINING

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"Keep to the trees and waters.
Be the singing of the soil"[1]

As the law began to regulate natural resources, the mystery surrounding groundwater helped form the doctrine of absolute ownership. Perhaps the seminal case is *Acton v. Blundell*,[2] which involved a coal miner whose operation caused springs on a nearby farm to dry up.[3] Declaring groundwater to be "*unknown and unknowable*," the English court in *Blundell* held that the coal miner owned his lands—including the water—"from the heavens above to the center of the earth below." Consequently, the miner was not liable to the farmer for the drying springs.[4]

Because of significant advances in science since the *Blundell* case (1843), groundwater is no longer "*unknown and unknowable*"—it should no longer be treated as a mystery by the law.[5] Well-understood models have

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1. N. SCOTT MOMADAY, *To an Aged Bear*, *in* IN THE BEAR'S HOUSE 64 (1999). Groundwater, as it emerges from the earth to form springs and streams may be Momaday's "singing of the soil," providing life. "The inhabitants of the city must have water, but by our statutes and our Constitution the city is afforded a means of obtaining it without pauperizing those innocent private citizens who have devoted their lifetimes to improving, developing, and maintaining their homesteads." Canada v. Shawnee, 64 P.2d 694, 700 (Okla. 1936).

2. 12 M&W 324, 152 Eng. Rep. 1223 (Exch. 1843).

3. *Id.*

4. *Id.*

5. T.C. WINTER, J.W. HARVEY, O.L. FRANKE & W.M. ALLEY, GROUND WATER AND SURFACE WATER: A SINGLE RESOURCE (U.S. Geological Survey Circular 1139, 1998); T.N. Narasimhan, *Groundwater: From Mystery to Management*, 4 ENVTL. RES. LETTERS 1 (2009), *available at* http://iopscience.iop.org/1748-9326/4/3/035002/pdf/1748-9326_4_3_035002.pdf.

been developed from decades of empirical research and data collection.[6] Those models, and the science of hydrogeology, permit a very detailed understanding of how groundwater works.[7]

However, both the law and popular culture have been slow to respond to scientific understanding.[8] For example, a monument stands in Pixley, California, in the center of a now dry watering trough. The monument bears this ironic inscription:

> ARTESIAN WELLS
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> At this site and in the close vicinity to the west, several artesian wells were bored which helped in the early development of Pixley.
>
> ***
>
> Men bored for water in Tulare County and found underground strata which, under enough pressure, forced the water upward without pumping.
>
> ***
>
> By 1885 there were over 250 artesian wells in Tulare County, all of which helped develop the semi-arid west side for agriculture.
>
> By the first decade of the twentieth century most artesian water stopped flowing. *Several explanations for this have been explored over the years*.[9]

Groundwater is, however, not the only water resource once considered mysterious in the eyes of the law. The oceans, perhaps the largest and most obvious water resource, were long considered mysterious—*unknown and unknowable*—because of their immensity and depth.[10] However, as science

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6. *Id.*

7. *Id.*

8. *See* ROBERT GLENNON, WATER FOLLIES 3 (2002) ("This excessive pumping of aquifers has created an environmental catastrophe known only to a few scientists, a handful of water management experts, and those unfortunate enough to have suffered the direct consequences. Quite remarkably, *no* books or magazine articles have focused on the impact of groundwater pumping on the environment [as of 2002].").

9. Narasimhan, *supra* note 5, at 3 (emphasis added). No matter how many explanations are possible, the over-draught of the aquifer by the installation of 250 or more wells is difficult to overlook as the cause of the issues inscribed on the Pixley Monument.

10. An example of the oceans' mystery is the "milky sea" encountered by the Nautilus in Jules Verne's classic *20,000 Leagues Under the Sea*. The phenomena was long thought to

explained the oceans' mysteries as understandable facts and as increasing use and exploitation of the oceans demonstrated the need for regulation, the world agreed upon the United Nations Convention on the Law of the Sea (herein "UNCLOS").[11] UNCLOS provides a broad and integrated "constitution for the oceans," establishing a framework of laws through which the various issues of human interaction with the oceans can be resolved comprehensively, whether those issues relate to fishing, mining, land-based pollution, vessel-based pollution, trade, or travel.[12]

Prior to UNCLOS, the oceans were regulated by a seventeenth century notion, the so-called "freedom of-the-seas doctrine,"[13] analogous in some respects to the ancient English common law doctrine of absolute ownership expressed in *Blundell*. UNCLOS was prepared when increasing problems of over-exploitation, pollution, and continued boundary conflicts prompted the world to consider not only economic expansion but also continued future sustainable development of the Oceans' resources upon which both the current economy and all future economies depend.[14]

Indeed, it may be this same unique confluence of old laws, new science, and developing social policies that formed UNCLOS are converging today

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be a fairy tale but was recently confirmed as a natural process caused by glowing ocean bacteria. *See* Robert Britt, *Satellite Images Confirm Mystery Glow in Ocean*, NBCNEWS.COM, http://msnbc.msn.com/id/9593095 (last updated Oct. 4, 2005).

11. On the first day the treaty was open for signature, 119 countries signed the document – a record achievement. 'A Constitution for the Oceans': Remarks by Tommy T.B. Koh of Singapore, http://www.un.org/depts/los/convention_agreements/texts/koh_english.pdf (last visited Aug. 14, 2012) [hereinafter A Constitution for the Oceans]. However, the United States still has not signed UNCLOS. Nonetheless, UNCLOS' provisions, because they are so widely and universally accepted as the law, and because they are followed, have ascended to the role of customary law. United States and other courts have held that UNCLOS' provisions are therefore binding on the United States. *See* United States v. Alaska, 503 U.S. 569, 588 n.10 (1992) (finding that fundamental provisions of UNCLOS reflect customary international law); Sarei v. Rio Tinto, 487 F.3d 1193, 1210, 1078 (9th Cir. 2007) (noting that UNCLOS has arisen as custom, but not *jus cogens*); R. v. Rimbaut (1998), 202 N.B.R. 2d 87, ¶ 12 (Can. N.B. Q.B.) (holding UNCLOS article 111 is custom).

12. A Constitution for the Oceans, *supra* note 11; Lakshman Guruswamy, *The Promise of the United Nations Convention on the Law of the Sea (UNCLOS): Justice in Trade and Environment Disputes*, 25 ECOLOGY L.Q. 189 (1998).

13. U.N., *The United Nations Convention on the Law of the Sea, A Historical Perspective*, *in* INTERNATIONAL YEAR OF THE OCEANS (1998), http://www.un.org/depts/los/convention_agreements/convention_historical_perspective.htm.

14. *Id.*

with the United States' domestic water policy.[15] For instance, it has been suggested recently that the concept of Sustainable Development is already, and should further be incorporated in the laws regulating the use of water in the United States:[16]

> The definition of Sustainable Development (SD) . . . calls for the wise use of natural resources such that human needs are fulfilled, but are counterbalanced by the need for resources to continue to be available for use by future generations.
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> ***
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> Traditionally, life support systems have been managed in a fragmented manner. These life support systems can be better managed if they are viewed as an integrated whole. Scientists have offered illuminating examples of multiple interacting changes affecting water, atmosphere, and biodiversity, among life support systems. These examples provide support of an integrated management approach that embraces not only natural life support systems (physical, chemical, biological) but also human systems (legal and institutional).[17]

The application of Sustainable Development to groundwater is particularly important because, in its own right, groundwater supplies more than 25% of the United States' available fresh water each year, and that percentage is increasing.[18] But groundwater is more than just a supply of water for human use—it is often the "base" supply of water for natural systems.[19] That is, groundwater is often the source of water that is found on the surface. Accordingly, while groundwater may directly provide a bit more than 25% of the nation's use of water today, in reality it also supplies much of the surface water resources that make up the other 75%.

Groundwater is not simply important as a source of life-giving sustenance. It is also important because it can provide support for the land itself. Professor Glennon opens his important work, *Water Follies*, with the story of Ubar, an ancient Arabian City that mysteriously disappeared.

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15. Lakshman Guruswamy & Dan Tarlock, *Sustainability and the Future of Western Water Law*, *in* IN SEARCH OF SUSTAINABLE WATER RESOURCE MANAGEMENT, LESSONS FOR THE AMERICAN WEST AND BEYOND 155, 160 (Douglas Kenney ed. 2005).

16. *Id.* at 160.

17. *Id.* at 158-59.

18. *See* GLENNON, *supra* note 8, at 3.

19. Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842, 848 (Okla. 2006).

While myths attributed Ubar's destruction to other worldly causes, in fact the city—and its 2500 to 3000 inhabitants—collapsed into an underground limestone cavern. The cavern was once filled by groundwater, but the city's increasing reliance on groundwater caused the spring that filled the cavern to recede. When the cavern was emptied by increasing groundwater use, the city fell into the empty space and was covered by sand, not to be discovered until the 1980s.[20] Land subsidence resulting from groundwater overdrafting is well documented in the United States.[21]

With the issues of absolute ownership, Sustainable Development and the services that groundwater provide all in mind, this paper reviews a new law in Oklahoma from the 2011 legislative session—Senate Bill 597—as an example of these diverse policies coming together. Specifically, this paper compares Senate Bill 597 to the law of other states to determine whether Senate Bill 597 parallels the legal frameworks adopted elsewhere and whether Senate Bill 597 or the laws of other states are shifting, with respect to groundwater towards a Sustainable Development framework.

To accomplish these goals, this paper is divided into three parts. Part I, Background, begins with a review of the antiquated absolute ownership notion of groundwater in Oklahoma as well as the related notion that surface water and groundwater can be regulated independently. Part I then focuses on the Arbuckle-Simpson Aquifer, reviews its current legal status, and briefly examines a new law—Oklahoma Senate Bill 597—that regulates water produced in mining pits over the Aquifer in Oklahoma. Part II, Analysis, provides a description of the law of other states in relation to how the water produced in open mining pits is regulated. While a complete comparative review of various states' regulation of water encountered in mining operations was completed to support the research for this paper, it is not possible to reproduce that entire work here.[22] Instead, certain states are presented as examples of various types of regulation in Part II. Part III concludes that Oklahoma Senate Bill 597 is a mainstream example of water legislation in the United States and is part of the modern trend of implementing Sustainable Development for water resources in the United States.

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20. *See* GLENNON, *supra* note 8, at 23.

21. *See* S.A. Leake, *Land Subsidence from Ground-water Pumping*, U.S. GEOLOGICAL SURV., http://geochange.er.usgs.gov/sw/changes/anthropogenic/subside/ (last visited Apr. 8, 2012).

22. The research produced by a review of all fifty states' laws relating to the regulation of water produced in mining operations is available from the authors.

I. Background

In Oklahoma, the "independent"—or mysterious—view of groundwater can arguably be implied from the state's property statutes, particularly title 60, section 60, which contains the chestnut, "[t]he owner of the land owns water standing thereon, or flowing over or under its surface but not forming a definite stream."[23] This declaration stands in stark contrast to the next sentence of the statute, "The use of groundwater shall be governed by the Oklahoma Groundwater Law."[24] In the absence of a clearly expressed public trust for groundwater,[25] it is unclear what standards apply to the regulation of the *use* of groundwater which is owned while *under* the land or what ownership while *under* the land means in light of the *use* regulation.[26] This distinction was initially dealt with by the Oklahoma Supreme Court in 1936, when the court adopted a rule of reasonable use for water—irrespective of its source in the ground or on the surface.[27]

Since then, Oklahoma has struggled with the distinction between surface and groundwater and the use-ownership dichotomy of title 60, section 60 in such cases as *OWRB v. Lawton*[28] and *Messer-Bowers Co., Inc. v. OWRB*.[29] The Oklahoma Supreme Court, in *Lawton*, held that "when natural spring water forms a definite stream, the water in the stream and the spring itself, from its inception, is to be classified as stream water and appropriated as such."[30] Contrary to *Lawton*, in *Messer-Bowers*, the court held that the surface discharge of waste *needed* to be taken into account in a groundwater

23. 60 OKLA. STAT. § 60(A) (2011).

24. *Id.*

25. The Oklahoma Supreme Court hinted that Oklahoma water resources are subject to the public trust doctrine. *See* Franco-American Charolaise v. OWRB, 835 P.2d 568, 595 (1990) (dissenting op.) (noting that the majority opinion relied upon the police power of the state to protect public welfare, and in so doing invoked the public trust doctrine even if it did not mention the words "public trust" explicitly).

26. A recent review of the Oklahoma Supreme Court's discussion of the degree to which public interest regulation applies to groundwater in Oklahoma, is found in Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842 (Okla. 2006).

27. Canada v. Shawnee, 64 P.2d 694 (Okla. 1936). "By whatever is meant when the statute says that the landowner 'owns' that elusive and unstable substance, percolating water, beneath his land, it must likewise be true that the adjacent landowner is given the same with respect to that which underlies his land." *Id.* at 699.

28. 580 P.2d 510 (Okla. 1977).

29. 8 P.3d 877 (Okla. 2000).

30. 580 P.2d at 513 Where *Lawton* ignored its legal roots in *Shawnee* (discussed below) when it disconnected springs from groundwater, the Court arguably revived the notion of the groundwater-surface water connection in *Messer-Bowers* where it decided that discharges of surface level waste needed to be considered in a groundwater permit.

permit.[31] It is unclear from these cases whether the Oklahoma Supreme Court views groundwater as independent from surface waters. One might argue the court saw no distinction in the case of pollution (*Messer-Bowers*) but did in relation to water rights and uses (*Lawton*). However, such a distinction would be an inconsistent and illogical disjunction because both *Messer-Bowers* and *Lawton* were water right cases.

Early in Oklahoma's history the Supreme Court was confronted with a case involving interference with springs resulting from groundwater pumping: *Canada v. City of Shawnee*.[32] In that case, the City of Shawnee purchased seventy acres near farms that had "gushing springs" of an "apparently inexhaustible" supply.[33] The city installed twelve wells on the seventy acres, and fitted them with mechanized pumps producing "enormous volumes of water."[34] Noting that "[t]he overwhelming weight of the evidence was that the injury thereby inflicted upon plaintiffs was very real . . ." because "[t]he springs ceased to produce water[,]" the court considered whether such interference with spring flow as a result of pumping groundwater could be enjoined.[35]

Taking up the issue, the court examined the *Blundell* case and the statute that was the progenitor of title 60, section 60 of the Oklahoma Statutes. Interpreting language that bears little difference from title 60, section 60 as it now stands, the Oklahoma Supreme Court rejected *Blundell*, and adopted a rule of reasonableness, stating:

> We do not believe, however, that the landowner's ownership of percolating water was given him as a weapon with which to unreasonably maim his neighbor; nor do we believe it was intended that such ownership was to be uncircumscribed by the

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31. 8 P.3d at 882. The Supreme Court held in *Messer-Bowers*:

> On remand, the Water Resources Board is directed to receive evidence and make findings of fact to determine whether waste by pollution will occur through all uses of groundwater at Kronseders swine facilities, including the spread of effluent from its swine operation onto its land. Kronseder must present evidence concerning the effect of its effluent irrigation on the groundwater formation.

Id.

32. 64 P.2d 694 (Okla. 1936).

33. *Id.* at 695.

34. *Id.* at 696.

35. In addition to the springs drying, the plaintiffs' wells also ran dry. *Id.* Accordingly, it would not be fair to argue that *Shawnee* was only about a surface water impact resulting from overdrafting an aquifer. However, the impact of the groundwater overdraft of spring flow features prominently in the case.

> limitations usually imposed upon the use of property of other Classes.[36]

The Supreme Court made no distinction between surface and groundwater and readily acknowledged its interaction and relationship when it enjoined the City of Shawnee from pumping its wells because they were making neighboring springs dry up.[37]

More recently, the Oklahoma Supreme Court in *Jacobs Ranch, LLC v. Smith*, appears to have begun the process of reconciling its original view of the interconnectedness of groundwater and surface water in *Shawnee* with its later pronouncements in *Lawton* and *Messer-Bowers*, when it stated:

> However, it is undisputed that: 1) aquifers in Oklahoma have suffered irreversible decline where withdrawals exceeded the aquifer's ability to recharge, such as the Ogallala Aquifer; 2) decline in the groundwater level has resulted in the loss of the natural flow of streams, such as the Beaver River in the Oklahoma panhandle; and 3) a decline in the groundwater level of the Arbuckle-Simpson Groundwater Basin could jeopardize the flow of springs and streams, such as the spring that is the source of the water for the city of Ada.[38]

Some might argue the meaning of *Jacobs Ranch* is limited because it related only to the Arbuckle-Simpson Aquifer where a particular statute specifically recognizes the interconnection of surface and groundwater in relation to that aquifer.[39] Despite the confines of the legal issues raised in *Jacobs Ranch*, the Supreme Court took pains to address surface and groundwater systems falling outside the particular statute in question and far distant from the Arbuckle-Simpson Aquifer. As a result, it is reasonable to infer that the Court intended to acknowledge —on a statewide basis—the scientific fact that groundwater is connected to surface water.[40] If that is

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36. *Shawnee*, 64 P.2d at 698.

37. On rehearing, the injunction was modified to permit the city to take the springs by eminent domain and pay damages. *Id.* at 701.

38. Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842, 848 (Okla. 2006).

39. *See* S.B. 288, 49th Leg., 1st Reg. Sess. (Okla. 2003) (codified at 82 OKLA. STAT. § 1020.9 (2011)).

40. It appears from recent events that special interests which derive economic benefits by exploiting the "independent" view of groundwater and surface water hold the view that the supreme court intended to harmonize the law because these special interests proposed a bill to the Oklahoma legislature which, if passed, would forbid the conjunctive management of groundwater and surface water. *See* S.B. 1030, 53rd Leg., 2d Reg. Sess. (Okla. 2012)

the case, the Supreme Court may have begun the process of harmonizing Oklahoma law with scientific reality, with its original opinions on the matter as expressed in the case of *Canada v. Shawnee*, and with its positions in *Messer-Bowers*.[41]

The Oklahoma Supreme Court in *Jacobs* was interpreting Senate Bill 288, which correlates groundwater and surface water management by requiring that any groundwater use shall not be "likely to degrade or interfere with springs or streams" where the "*water originates* from a sensitive sole source groundwater basin or subbasin."[42] A sensitive sole source groundwater basin or subbasin is identified, pursuant to state law, by reference to the designation of a Sole Source Aquifer by the U.S. Environmental Protection Agency pursuant to its authority under the Safe Drinking Water Act.[43] In Oklahoma there is currently only one sensitive sole source groundwater basin or sub-basin—the "Arbuckle-Simpson Aquifer."[44]

Among other things, Oklahoma law now requires that future *groundwater* use permits within the Arbuckle-Simpson Aquifer require an examination of whether the permit would degrade the natural flow of *stream* water or springs.[45] If degradation were to occur, the permit cannot be issued.

Making a full circle, Senate Bill 288 was first tested against facts eerily similar to those in *Blundell*: certain mining companies over the Arbuckle-

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(available from the authors). The Oklahoma legislature refused to resort to their dowsing sticks and rejected Senate Bill 1030, at least in 2012.

41. *Shawnee* has been cited as good law numerous times by the Oklahoma Supreme Court, and has been adopted and used as the basis for elements of water law in Alabama, Arizona, Colorado, Florida, Illinois, Maryland, Missouri, New Jersey, North Dakota, and Pennsylvania. *See, e.g.*, Martin v. City of Linden, 667 So. 2d 732 (Ala. 1995); Farmers Inv. Co. v. Bettwy, 558 P.2d 14 (Ariz. 1976); Safranek v. Limon, 228 P.2d 975 (Colo. 1951); Koch v. Wick, 87 So. 2d 47 (Fla. 1956); Behrens v. Scharringhausen, 161 N.E.2d 44 (Ill. App. Ct. 1959); Finley v. Teeter Stone, Inc., 248 A.2d 106 (Md. 1968); Higday v. Nickolaus, 469 S.W.2d 859 (Mo. Ct. App. 1971); Crane v. Essex Fells, 169 A.2d 845, (N.J. Super. Ct. Ch. Div. 1961); Volkmann v. Crosby, 120 N.W.2d 18 (N.D. 1963); Kline v. State, 759 P.2d 210 (Okla. 1988).

42. *See* S.B. 288 § 3, 49th Leg., 1st Reg. Sess. (Okla. 2003) (codified at 82 OKLA. STAT. § 1020.9(A)(1)(d) (2011)) (emphasis added).

43. The provision of the Safe Drinking Water Act relating to the designation of Sole Source Aquifers is 42 U.S.C. § 300h–6.

44. In *Jacobs Ranch, L.L.C. v. Smith*, 148 P.3d 842 (Okla. 2006), which generally involved a challenge to Senate Bill 288, the appellants unsuccessfully argued that the bill was a "special law" or unconstitutionally took a property interest by regulating the groundwater from the Arbuckle Simpson Aquifer.

45. *See* Okla. S.B. 288 (partially codified at 82 OKLA. STAT. § 1020.9(A)(2)(d) (2011)).

Simpson Aquifer argued in 2007 that water infiltrating into their mining pits was exempt from regulation by the OWRB.[46] While Oklahoma's groundwater policy stated at that time that "the provisions of this act shall not apply to the taking, using or disposal of water trapped in producing mines,"[47] it was unclear what impact Senate Bill 288 had on the OWRB's authority: namely, whether the OWRB could limit or condition the mine's use of the water once it emerged from the ground, either pursuant to Senate Bill 288, independently of Oklahoma's groundwater policy,[48] pursuant to the agency's general authority, or pursuant to surface water law.[49]

The issues were raised in *Tishomingo v. Meridian Aggregates*, when the OWRB prohibited a mining company from using water emerging in its pit using a series of conditions placed on a groundwater permit.[50] The mining company appealed the conditions and the District Court found that the OWRB's order prohibiting the use of water emerging in the pit exceeded the agency's authority in light of title 82, section 1020.2 of the Oklahoma Statutes.[51] The Oklahoma Court of Civil Appeals affirmed the District Court and refused to consider whether the water in the pit was surface water, subject to OWRB regulation.[52] The Oklahoma Supreme Court denied certiorari on a vote of 4-5.[53]

Whether decided correctly or not, the *Meridian Aggregates* case signaled an apparent retreat by the Oklahoma courts to the archaic "independent" or absolute ownership theory of groundwater through the regulatory exception for water trapped in producing mines. This was all the more true in fact,

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46. Supplemental Brief of Meridian Aggregates Co. at 1, Tishomingo v. Meridian Aggregates Co., No. VC-06-82 (Johnston Cnty. Okla. July 13, 2007) [hereinafter Meridian Supplemental Brief] (available from the authors).

47. *See* 82 OKLA. STAT. § 2020.2(B) (2011).

48. *See In re* Application of Meridian Aggregates, LP, for a Permit to Use Groundwater in Johnston Cnty., Okla., GW No. 2002-602 at 28, *available at* http://www.owrb.ok.gov/util/pdf_util/meridianaggregatesfinalsignedorder.pdf.

49. Meridian Supplemental Brief, *supra* note 46.

50. *See In re* Application of Meridian Aggregates, LP, for a Permit to Use Groundwater in Johnston Cnty., Okla., GW No. 2002-602 at 29-31, *available at* http://www.owrb.ok.gov/util/pdf_util/meridianaggregatesfinalsignedorder.pdf.

51. Case No. VC-06-82 at 1-2 (Johnston Cnty. Okla. Aug. 17, 2007) (available from the authors).

52. *See* Tishomingo v. Meridian Aggregates Co., No. DF-105050 (Okla. Civ. App. Aug. 5, 2009) (unpublished and available from the authors). The appeals court refused to hear the surface water issue because it was not addressed in the administrative proceedings below.

53. *See* Tishomingo v. Meridian Aggregates Co., No. DF-105050 (Okla. Sup. Ct. Nov. 23, 2009) (unpublished and available from the authors).

because mining operations can, as illustrated in the *Blundell* case, have a significant effect on surrounding groundwater reserves.

The Meridian Aggregates mine, as a result of an interim, partial settlement in the administrative proceeding that led to the aforementioned litigation, monitors the quantity of groundwater that it produces.[54] According to the mining company's records, the mine now produces approximately 1,000 acre-feet of groundwater each year. The following is a table of the water pumped from the mine pit from 2006 to 2010:

	North Well Allowable 105.29 (AFY)	Production Well Allowable 274 (AFY)	Mill Creek Allowable 1425 (AFY)	Total Permitted Water Pumped (AFY)	Water Pumped from Pits (AF)
2006		134.09	230.30	364.39	0.97
2007		4.94	1128.05	1132.99	533.97
2008		248.20	993.77	1241.97	981.40
2009	19.74	249.65	49.96	319.35	1272.78
2010	0.00	0.25	0.00	0.25	1366.91
2011 (thru July)	0.00	0.46	0.00	0.46	731.81

FIGURE 1 - MERIDIAN AGGREGATES' TECHNICAL REVIEW PANEL DATA (3D QUARTER 2011)

The Meridian Aggregates company began working the mine as an open pit in 2006 and it soon reached a depth of about ninety feet.[55] It is further

54. Monitoring of the mine's withdrawal of water results from a settlement agreement between the mine and the United States Park Service and Fish and Wildlife Service that was entered into during administrative proceedings before the Oklahoma Water Resources Board. A copy of the settlement agreement is available from the authors or from the Oklahoma Water Resources Board by requesting the Meridian Aggregates Technical Review Panel Agreement. To the authors' knowledge, no other surface mine overlying the Arbuckle Simpson Aquifer historically recorded the quantity of pit water it was producing.

55. Testimony of Pete Dawson, Meridian Aggregates mine manager, before the OWRB in the administrative hearings leading up to *Tishomingo* (transcript available from the authors).

believed that the mine, in 2011, reached a depth of nearly three hundred feet. The normal water table in the area of the mine was at about twenty feet.[56] As Figure 1 shows, the quantities of water entering the mine increased as the mine was deepened below the normal water table. In this way, the mine appears to act much like a very large artesian well, where the groundwater flows under its own pressure to the new ground surface when the mine extends below the water table.

The withdrawal of pit water from open mine pits over the Arbuckle-Simpson Aquifer may be the single largest extraction of groundwater in the area. The Meridian Aggregates mine produces about 10% of the gravel or sand produced from the Arbuckle-Simpson Aquifer area.[57] Overall, in the Arbuckle-Simpson Aquifer, the Oklahoma Water Resources Board reports that approximately 6,000 acre-feet of groundwater was used for some *permitted* beneficial use, including public water supplies, irrigation, industrial uses, recreation, fish or wildlife, mining or agriculture.[58] If one were to assume that the half-dozen *other* mining operations in the area withdraw pit water at rate similar to that reported by the Meridian Aggregates mine, the withdrawal of pit water from mines would be greater than *all permitted* uses of water in the Arbuckle-Simpson Aquifer. Pit water is a nuisance in a mine, and a large part is disposed of without use.[59] Accordingly, a credible argument can be made that groundwater is "wasted" by mines when they discharge the water which is a nuisance to them, but would otherwise be available for use for drinking water and other beneficial uses over the Arbuckle-Simpson Aquifer.

Extending our purview beyond just the Arbuckle-Simpson Aquifer, mining likely has a significant effect on groundwater resources throughout Oklahoma. The production of gravel and sand from the Arbuckle-Simpson Aquifer area accounts for approximately 20% of the sand and gravel

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56. *Id.*

57. Documents obtained from the Oklahoma Department of Mines pursuant to an Oklahoma Open Records Act request are available from the authors, upon request.

58. OKLA. WATER RES. BD., FACT SHEET: THE ARBUCKLE SIMPSON HYDROLOGY STUDY 4 (Nov. 2003), *available at* http://www.owrb.ok.gov/studies/groundwater/arbuckle_simpson/pdf/a_s_factsheet.pdf.

59. The authors are familiar with this fact through personal observation and communications with representatives of Meridian Aggregates. The representatives stated that the mine at one time asserted that they did not waste the water but allowed it to flow out to an old storage pond which was abandoned because the pond is "leaky" and could not as a result be used to store water. However, since that time, Meridian Aggregates has initiated a mitigation program that appears to be intended to divert some quantity of pit water to a nearby stream which has experienced reduced flows. This development is quite hopeful.

produced in Oklahoma.[60] Sand, and limestone from which gravel is usually produced, often creates the proper matrix of rocks for highly productive aquifers. That is, the same kinds of rocks conducive to storing groundwater are often desirable for groundwater. Given that the Arbuckle Simpson geology accounts for only 20% or so of Oklahoma's sand and gravel production, 80% of the impact of pit water withdrawals on aquifers occurs elsewhere in Oklahoma and is likely to produce similar impacts on groundwater resources wherever sand, sandstone, or limestone are mined in water bearing strata. It is therefore possible that most of the groundwater removed from aquifers in Oklahoma is wasted to eliminate its presence as a nuisance to mining operations. In times of growing water shortages and increasing needs for water for economic and social Sustainable Development in Oklahoma, such a waste of water may require additional attention at a policy level.

The lessons taught by the Pixley Monument of the dry artesian wells and the drying springs in *Blundell* and *Shawnee* leave little room for doubt as to the impact on groundwater resources from the unregulated withdrawal of pit water, particularly in a system where there are many such mines withdrawing large volumes of water.

In light of Oklahoma's evolving view of groundwater and the Oklahoma courts' apparent expansion of the exemption for water trapped in producing mines, research was conducted to analyze the different ways various states other than Oklahoma regulate the use of groundwater encountered as a result of surface mining. The purpose of the analysis was to determine how Oklahoma might regulate such groundwater found in mining pits—or "pit water" as it has been defined in new Oklahoma law.[61]

In 2011, the Oklahoma legislature adopted Senate Bill 597,[62] which regulates pit water found in "sensitive sole source groundwater basin[s] and sub-basin[s]" in Oklahoma. Senate Bill 597 builds upon the integrated notion of groundwater and surface water found in Senate Bill 288[63] and

60. Data obtained from the Oklahoma Department of Mines 2011 is available from the authors by request.

61. Such water encountered in a mine can be, and now is, referred to in Oklahoma law as "pit water." *See* S.B. 597, 53d Leg., 1st Reg. Sess. (Okla. 2011) (codified at 82 OKLA. STAT. § 1020.2 (2011)). Refer to section 1020.2(C)(3), (E)(1) for the use of the term "pit water."

62. Okla. S.B. 597 (codified at 82 OKLA. STAT. § 1020.2(C) (2011)).

63. *See* S.B. 288, 49th Leg., 1st Reg. Sess. (Okla. 2003) (codified at 82 OKLA. STAT. § 1020.9 (2011)).

attempts to bring the management of pit water within the overall management regime applicable to the Aquifer.

Senate Bill 597 modifies title 82, section 1020.2's exemption for groundwater in producing mining operations inside a sensitive sole source groundwater basin or subbasin.[64] The exemption for existing mines continues, "provided that"[65] existing mining operations implement a "site-specific water management and conservation plan."[66] Additionally, by 2013, existing mines over the Arbuckle-Simpson Aquifer must begin reporting the accumulation and disposition of pit water.[67] Additionally, under Senate Bill 597, new mines, and existing mines that consumptively use more groundwater than permitted, must develop a plan which will either demonstrate that augmentation will recharge natural flow of water, that no impact will result from the withdrawal on springs or streams, or that the requisite groundwater permits have been obtained.[68]

Senate Bill 597 falls within the broad rubric of direct regulation of "pit water" as it is found in other states. Moreover, Senate Bill 597 falls respects the hydrologic connection between surface and groundwater, and is evidence that Oklahoma law generally acknowledges the surface and groundwater interaction.

II. Analysis

In the United States there are three different primary systems of regulating water: 1) Riparian,[69] 2) Prior Appropriation and 3) Dual Riparian/Appropriation.[70] Pit water is often directly regulated, no matter

64. *See* Okla. S.B. 597, §§ 1(B), (C) (codified at 82 OKLA. STAT. § 1020.2(B), (C)).

65. See 82 OKLA. STAT. § 1020.2(C).

66. *See* Okla. S.B. 597, § 1(C) (codified at 82 OKLA. STAT. § 1020.2(C)).

67. *See* Okla. S.B. 597, § 1(E)(1) (codified at 82 OKLA. STAT. § 1020.2(E)(1)).

68. *See* Okla. S.B. 597, §§ 1(D), (E)(2) (codified at 82 OKLA. STAT. §§ 1020.2(D), (E)(2)).

69. In general it is widely agreed that there are essentially no "pure" riparian systems in the United States today, with most systems of administration at least requiring some form of registration. However, for ease of reference, the term Riparian is used.

70. While each of these systems is a surface water management system, the distinctions are largely formalistic as applied to the regulation of "pit water." Despite the labels of "riparian" or "dual," in practice and in theory the states often do not make such distinctions. Professor Allison, in his article appearing in this volume, deals with this issue, noting for instance that Oklahoma and California may be the only "dual" or "hybrid" states left. Moreover, this article treats groundwater and surface water as the same source of water—which is often the case in fact—making the distinctions less meaningful. Despite their

the water law system. Even where pit water is not directly regulated, it is often indirectly regulated.

While this paper focuses on direct regulation, research in this area reveals three major systems of indirect regulation: 1) delegation of regulatory authority to local municipal districts to provide zoning rules relating to pit water, or mining operations in general, 2) the creation of liability schemes where the mining operator is liable in damages, or for the replacement or mitigation of groundwater resources impacted by mining activities; or 3) the creation of critical groundwater management areas which may or may not impact the use or management of pit water. Each of these methods of indirect regulation often co-exist with direct regulation. Indirect regulation likely exists in Oklahoma already, where, for instance, interference with water supplies may require the mine operator to replace the damaged resource, as a matter of mining law, irrespective of water rights.[71]

In the text that follows, a summary of the direct pit water regulation in a state from each of the major groundwater systems is briefly examined. In addition, a summary chart is provided illustrating that each riparian, prior appropriation or dual state directly or indirectly regulates pit water. Notably, the systems of direct regulation of pit water do *not* differ markedly even where the overall systems of water management are different.

A. Prior Appropriation Systems

A number of states that utilize the prior appropriation system for water allocation also directly regulate pit water. Perhaps the example of another state's law most relevant to Oklahoma is New Mexico.[72] Although New

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relative uselessness, the appellations of "riparian," "dual," and "appropriation" are helpful to provide some organizational structure to the remaining parts of this paper.

71. *See* OKLA. ADMIN. CODE § 460:20-43-8 (2006). This section provides in part:

> (a) General. All surface mining and reclamation activities shall be conducted to minimize disturbance of the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area, to assure the protection or replacement of water rights, and to support approved postmining land uses in accordance with the terms and conditions of the approved permit and the performance standards of this Chapter.

Id. While this provision appears in the surface coal mining regulations, the language of the rule is not on its face limited to coal mining.

72. New Mexico water law seems to be a model for some recent Oklahoma water laws. For instance, in its ongoing dispute with the municipalities in North Texas, Oklahoma has recently adopted some of New Mexico's laws relating to the interstate transportation of water

Mexico is divided into water districts which aid the State Engineer in determining how water allocations should be distributed,[73] the Mine Dewatering Act (MDA)[74] applies state wide.[75] Stating that mine dewatering is neither an appropriation of water nor a waste and creates no water rights,[76] the MDA holds mining operations accountable for such diversions.[77] However, mines existing before the MDA came into effect are exempted from regulation under the MDA.[78] All dewatering is prohibited unless the operation has a mine dewatering permit issued by the State Engineer.[79]

The Mine Dewatering Act defines dewatering as "the diversion and discharge of ground water developed by mining activities by means of depressurizing wells, mine shaft pumping or by other means necessary to displace water from an area of mining operations or proposed mining operations, but does not include *in situ* leaching."[80]

All those conducting mine dewatering have the obligation to replace water rights injured by the dewatering with the expenses of the replacement borne by the applicant.[81] If the plan of replacement fails to consider potential harm to an appropriative rights holder, the State Engineer may "require the permittee to show cause why the permit should not be suspended or terminated pending submission or amendment of a plan of replacement to provide protection against the claimed impairment."[82]

Pit water is also regulated in Arizona, under statutes that appear to be quite restrictive requiring a specific dewatering permit and requiring a mine

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resources. Mark A. Willingham, *The Oklahoma Water Sale Moratorium: How Fear and Misunderstanding Led to an Unconstitutional Law*, 12 U. DENV. WATER L. REV. 357 (2009).

73. N.M. STAT. ANN. § 72-3-1 (West 1980).

74. According to one author, the MDA was created to overcome a problem where uranium mine operators needed to treat the pit water prior to disposal and that treatment resulted in the extraction of uranium. That extraction from the water was considered a use, but the mines could not qualify for the quantities required. Since the mines could not discharge the water containing the uranium, the MDA filled the gap and allowed the continued operation of the mines, while also providing a system for accounting for the groundwater withdrawn or impacts to other water rights. *See* Michael Campbell, *Mine Dewatering*, N.M. WATER RESOURCES RES. INST., http://wrri.nmsu.edu/publish/watcon/proc25/Campbell.pdf (last visited June 24, 2012).

75. Mine Dewatering Act, N.M. STAT. ANN. §§ 72-12A-1 to 72-12A-13 (Michie 1985).

76. *Id.* § 72-12A-5.

77. *Id.* § 72-12A-2.

78. *Id.* § 72-12A-5.

79. *Id.* § 72-12A-6.

80. *Id.* § 72-12A-3 (emphasis added).

81. *Id.* § 72-12A-4.

82. *Id.* § 72-12A-9.

that is dewatering to replace the water resources it may injure.[83] Colorado is perhaps even more restrictive, requiring a *specific* permit before any mine operator may expose groundwater in its operations.[84] To obtain such a permit, the mine operator will likely have to prepare a "replacement plan" for the groundwater exposed by the mining.[85] Because virtually all watercourses in Colorado are over-permitted, every potential appropriation for dewatering will likely be subject to the approval of a replacement plan.[86]

State	Riparian	Appropriative	Dual	Regulates pit water	Creates Critical Groundwater Areas	Uses local regulation or zoning to regulate pit water or groundwater use	Creates a liability scheme for over drafting
Alaska		X		X			X
Arizona		X		X	X	X	X
Colorado		X		X	X	X	X
Idaho		X			X	X	
Montana		X					X
Nevada		X				X	
New Mexico		X		X		X	
Tennessee		X					
Utah		X		P			
West Virginia		X		P			
Wyoming		X		P			

FIGURE 2 - APPROPRIATION STATES.[87]

B. Riparian Systems

Representing millions of tons of limestone, sulfur, sand, gravel and clay,[88] mining is a well-developed part of Kentucky's economy.[89] Technological advancement has increased Kentucky's mineral extraction and it is a vital part of the state's economy today. Kentucky establishes

83. Groundwater Code, ARIZ. REV. STAT. ANN. § 45-513 (West 1994).

84. COLO. REV. STAT. ANN. § 37-90-107 (West 2006).

85. *Id.*

86. Telephone Interview with Joanna Williams, Colorado Division of Water Resources (Jan. 25, 2011).

87. In the figure, "X" denotes regulation of the type indicated, while "P" indicates potential regulation, depending on how the laws may be interpreted or applied in a given circumstance.

88. This leaves coal aside altogether for the purposes of this analysis. Coal has historically been mined in vast quantities in Kentucky.

89. Kentucky Geological Survey, *Overview: The Economy, Technology and Minerals*, U. KY. (2008), *available at* http://www.uky.edu/KGS/im/overview.htm (last visited Mar. 1, 2011).

apparently well thought out groundwater withdrawal and mitigation requirements for surface mining operations. The state of Kentucky, as a matter of mining law, requires:

> All surface mining activities shall be planned and conducted to minimize disturbance of the hydrologic balance in both the permit area and adjacent areas, in order to:
>
> (a) Prevent material damage to the hydrologic balance outside the permit area;
>
> (b) Assure the protection or replacement of water rights.[90]

Kentucky mining regulations further provide:

> In order to protect the hydrologic balance, surface mining activities shall be conducted according to 405 KAR 8:030, Section 32(1) and (2) and the following:
>
> Groundwater quality shall be protected by handling earth materials and run-off in a manner that minimizes acidic, toxic, or other harmful infiltration to groundwater systems and by managing excavations and other disturbances to prevent or control the discharge of pollutants into the groundwater; and
>
> Groundwater quantity shall be protected by handling earth materials and run-off in a manner that will restore the approximate premining recharge capacity of the reclaimed area as a whole, excluding coal mine waste disposal areas and excess spoil fills, so as to allow the movement of water to the groundwater system.[91]

In short, Kentucky's mining regulations permit the discharge of pit water, but require administrative approval.[92] In addition, if "baseline geologic and hydrologic information" shows that a neighboring landowner's water supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from the surface mining activities, the mine owner or operator must replace the water supplies and pay damages, which include the future costs of operation and maintenance for the newly required water works.[93]

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90. 405 KY. ADMIN. REGS. § 16:060(1) (2008).
91. *Id.* § 16:060(5).
92. *Id.* § 16:060(12).
93. *Id*. § 16:060(8).

Consistent with the mining laws, Kentucky's water law requires a permit for withdrawals of water at rates over 10,000 gallons per day,[94] with no exception allowed for surface mining operations.[95] A permit may also be required when "significant portion of the available water supply or collection of withdrawal data is necessary for water resource planning purposes."[96]

The following table illustrates that many riparian states directly regulate pit water.

State	Riparian	Appropriative	Dual	Regulates pit water	Creates Critical Groundwater Areas	Uses local regulation or zoning to regulate pit water or groundwater use	Creates a liability scheme for over drafting
Alabama	x						x
Arkansas	x			P	x		
Connecticut	x					x	
Delaware	x					x	
Florida	x					x	
Georgia	x			x			x
Illinois	x					x	
Indiana	x			x			x
Kentucky	x			x			x
Maine	x			x			x
Maryland	x			P			x
Massachusetts	x			P		x	
Michigan	x			P			
Minnesota	x			x		x	
Mississippi	x			x			
Missouri	x					x	
New Hampshire	x			P		x	
New Jersey	x				x		
New York*	x						
North Carolina	x			x	x		
Pennsylvania	x			P			
Rhode Island	x						
South Carolina	x						
Vermont	x						x
Virginia	x			P		x	
Wisconsin	x			x			x
Louisana	x*			P	x		x
Ohio	x*			x			x

FIGURE 3 – RIPARIAN SYSTEMS.[97]

C. Dual Riparian/Prior Appropriation Systems

Texas provides an interesting comparison to Oklahoma water law. Both are dual riparian/appropriation states, though Texas arguably converted to

94. KY. REV. STAT. ANN. § 151.140 (West 1978); 401 KY. ADMIN. REGS. 4:010 (2008).

95. KY. REV. STAT. ANN. § 151.140.

96. 401 KY. ADMIN. REGS. 4:010.

97. In the figure, "X" denotes regulation of the type indicated, while "P" indicates potential regulation, depending on how the laws may be interpreted or applied in a given circumstance.

an appropriation system by requiring the registration of water rights.[98] Oklahoma and Texas differ in other respects, as well. Texas' current water laws derive from *Blundell*, appearing to make groundwater subject to the absolute ownership doctrine.[99] Oklahoma rejected such a notion in the 1930s, noting that one landowner should not be given such a "weapon" to use on his neighbor.[100] As a result, while Oklahoma does not permit well interference,[101] Texas has been called the "law of the biggest pump,"[102] often permitting one landowner to drain groundwater from adjoining landowners under the authority of a 1904 case, *Houston & Texas Central Railroad Co. v. East*, which adopted the rule of capture.[103]

The rule of capture was recently extended by the Texas Supreme Court in the case of *Edwards Aquifer Authority v. Day* even while the court invited the legislature to change the law.[104] As a result, in general and in most areas, Texas landowners may pump as much water as they chose, without liability to surrounding landowners who might claim the pumping has depleted their wells. However, in the various groundwater districts, the volumes of groundwater may be allocated.[105] How that allocation is intended to work under *Edwards* is less than clear.

Looking past *Edwards* at the statutory system, Texas places all groundwater permitting authority in water districts, even its large sole source aquifer, the Edwards Aquifer.[106] Notwithstanding the common law rules of capture and absolute ownership, the districts have the authority to

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98. TEXAS WATER CODE ANN. §§ 11.301-11.341 (West 1981). Contrary to the result in Texas, the Oklahoma Supreme Court rejected such an attempt to limit future riparian water rights. Franco-American Charolaise, Ltd. v. Okla. Water Res. Bd., 855 P.2d 568 (Okla. 1990).

99. *See* Edwards Aquifer Auth. v. Day, 55 Tex. Sup. Ct. J. 343 (Tex. 2012). Similarly, one purpose of the Edwards Aquifer Authority Act's regulatory provisions is to afford landowners their fair share of the groundwater beneath their property.

100. Canada v. City of Shawnee, 64 P.2d 694, 699 (Okla. 1936).

101. *See* 82 OKLA. STAT. §§ 1020.4-1020.6 (2011) (establishing a process for determining the quantity of water allocated to each surface acre of land based upon hydrogeological surveys).

102. *Texas Water Law*, WATER LAW -- TEX. A&M U., http://texaswater.tamu.edu/water-law.

103. 81 S.W. 279 (Tex. 1904).

104. 55 TEX. SUP. CT. J. 343, 2012 Tex. LEXIS 161 (Tex. Feb. 24, 2012).

105. "Similarly, one purpose of the [Edwards Aquifer Authority Act's] regulatory provisions is to afford landowners their fair share of the groundwater beneath their property." *See id.* at *41.

106. *Sole Source Aquifers*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/region6/water/swp/ssa/maps.htm (last visited Apr. 7, 2011).

alter or limit these rights.[107] As of 2010, there were ninety-eight groundwater conservation districts nestled into sixteen management areas in Texas.[108] Each management area has the power to individually regulate groundwater in each area.[109] The state water regulations require each district to submit its own water management plan,[110] but the regulations are not found in the state's administrative code. Rather, they are available from each district.[111]

Although groundwater control is left to local management, and despite the rule of capture and the doctrine of absolute ownership, the Texas Railroad Commission (herein the TRC) promulgated rules prohibiting the degradation of aquifers in certain situations. The TRC's rules require mining companies to survey areas they plan to mine.[112] If the proposed mining area is within a recharge zone of an aquifer that provides drinking water to the public, the mining is prohibited.[113] The rules also allow the Commissioner to prohibit surface mining in areas where the operation could cause substantial loss or reduction to the water supply in lands overlying aquifers or aquifer recharge areas.[114] Accordingly, Texas directly regulates the impacts of mines on groundwater resources independently of the water use and allocation law.[115]

While Texas is an interesting comparison to Oklahoma's Senate Bill 597, direct regulation of mining impacts to groundwater also occurs in Kansas. Kansas requires, in sand and gravel mines, an appropriation permit for water evaporating from open pits as a result of exposure to the groundwater table: the diversion is measured by the natural rate of evaporation.[116] The regulation of pit water in Texas[117] and Kansas[118] may

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107. TEX. WATER CODE ANN. § 36.002 (West 2005). Proposed legislation would amend the statute to limit district regulation to reasonable limitations on the owner or lessee's ownership rights. *See* S.B. 332, 82nd Leg. (Tex. 2011).

108. *Groundwater Management Areas*, TEX. WATER DEV. BD., http://www.twdb.state.tx.us/groundwater/management_areas (last visited Aug. 14, 2012).

109. TEX. WATER CODE ANN. § 36.1071.

110. 31 TEX. ADMIN. CODE § 356.3 (2012).

111. *Id.*

112. 16 TEX. ADMIN. CODE § 11.165 (2012).

113. *Id.*

114. *Id.*

115. Many of the mining operations over the Arbuckle Simpson Aquifer are based in Texas, or are transporting a significant quantity of their product to Texas. The impact of the continued inter-state trade in gravel may already be impacting the regulation of natural resources. *See* Tarrant Reg'l Water Dist. v. Herrmann, 656 F.3d 1222 (10th Cir. 2011).

116. KAN. ADMIN. REGS. § 5-13-6 (2012).

be the result of fairly large and developed surface mining activities in those states.

The following table summarizes the types of regulation of pit water found in Dual Riparian/Appropriation states:

State	Riparian	Appropriative	Dual	Regulates pit water	Creates Critical Groundwater Areas	Uses local regulation or zoning to regulate pit water or groundwater use	Creates a liability scheme for over drafting
California			X		X	X	
Hawaii			X			X	
Kansas			X	X		X	
Nebraska			X			X	
North Dakota			X	P		X	X
South Dakota			X			X	X
Oregon			X	P	X		X
Texas			X	X		X	X
Washington			X		X	X	X

FIGURE 4 - REGULATION OF PIT WATER IN DUAL RIPARIAN/APPROPRIATION STATES OTHER THAN OKLAHOMA.[119]

III. Conclusion

At least two conclusions can be drawn regarding Oklahoma Senate Bill 597: 1) the statute is similar to the regulations imposed by other states; and 2) it is a step towards the implementation of the Sustainable Development of groundwater resources.

117. *Mineral Resources and Mining*, TEX. STATE HIST. ASS'N, http://www.tshaonline.org/handbook/online/articles/gpm01 (last visited Aug. 14, 2012). Mining in Texas is particularly varied, ranging from uranium to coal to sand, essentially every other mineral included. It could be surmised that this huge diversity may account at least in part for Texas' regulation of water issues using local districts.

118. Lawrence L. Brady, *Mining History in Kansas* (Apr. 7, 2011), FED. HIGHWAY ADMIN., http://www.fhwa.dot.gov/engineering/geotech/hazards/mine/workshops/kdot/kansas01.cfm.

119. In the figure, "X" denotes regulation of the type indicated, while "P" indicates potential regulation, depending on how the laws may be interpreted or applied in a given circumstance.

The contours of Senate Bill 597 have close similarities to the regulation imposed on pit water in New Mexico, Texas, Kansas and Colorado—all states near Oklahoma with similar water management issues and similar mining concerns.[120] However, and unlike these other states, most pit water withdrawals in Oklahoma are unregulated, even after Senate Bill 597. Indeed, Senate Bill 597 regulates pit water withdrawals from the Arbuckle-Simpson Aquifer, from which only about 20% of the sand and gravel produced in Oklahoma is mined. While the Arbuckle-Simpson Aquifer is an important Oklahoma resource, all of Oklahoma's groundwater resources are important, accounting for nearly half of Oklahoma's water use each year.[121] It is possible that the waste of groundwater to permit continued mining accounts for more groundwater than is beneficially used each year in Oklahoma. Accordingly, the extension of Senate Bill 597 statewide would further the goals of Sustainable Development and help bring Oklahoma's regulation of water resources in harmony with the current trends of other states. It would also conserve important state resources in line with the government's duty[122] to protect the public welfare as outlined by the Oklahoma Supreme Court in *Jacobs* and *Franco-American*.

Moreover, the expansion of Senate Bill 597 on a statewide basis would harmonize the Oklahoma statutory system with the common law rule of reasonable use long ago established in Oklahoma in *Canada v. Shawnee*.[123] Given the Oklahoma Supreme Court's recent recognition of the interrelatedness of surface and groundwater in the *Jacobs Ranch*[124] case, consideration might be given to a statewide application of Senate Bill 597, particularly where the old and recurring facts of *Blundell* reappear.

120. While factors such as climate and population necessitate different management from state to state, issues relating to pit water are similar among the states.

121. OKLA. WATER RES. BD., EXECUTIVE REPORT: OKLAHOMA COMPREHENSIVE WATER PLAN 4 (2012).

122. The Oklahoma legislature's failure to expressly adopt a public trust for water and to ensure the public's interests are ensured creates political, social and economic uncertainty, and is a significant stumbling block for future Sustainable Development in and around the state.

123. 64 P.2d 694, 699 (Okla. 1936).

124. Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842, 848 (Okla. 2006).