WHERE DID ALL THE WATER GO: THE NEED FOR COOPERATIVE ADMINISTRATIVE REGULATION TO EFFECTIVELY CONSERVE TEXAS'S GROUNDWATER RESOURCES

I. INTRODUCTION

Texas holds its surface waters in trust and state law must expressly permit appropriation before an entity can use that water.[1] State water is "water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state" and "[w]ater imported from any source outside the boundaries of the state for use in the state and which is transported through the beds and banks of any navigable stream within the state or by utilizing any facilities owned or operated by the state . . . ."[2] The Texas legislature allows for state water to "be appropriated, stored, or diverted for . . .

1. *See* TEX. WATER CODE ANN. § 11.0235(a)–(b) (Vernon Supp. 2010).
2. *Id.* § 11.021(a)–(b) (Vernon 2008).

mining and recovery of minerals . . . ."[3] This appropriation is still subject to a Texas Natural Resource Conservation Commission (TNRCC) rule that "establish[es] an amount of unappropriated water, if available, to be set aside to satisfy the environmental flow standards to the maximum extent reasonable when considering human water needs . . . ."[4]

Groundwater not under the regulation of a Groundwater Conservation District (GCD) is subject to the long-standing common law rule of capture.[5] The use of water for oil and gas exploration, production, and mining has become a source of contention with the increased development of hydraulic fracturing in the Barnett Shale.[6] While many questions remain unanswered about the effect that hydraulic fracturing has on the quality of drinking water, this paper will instead explore the need for a cooperative administrative approach to regulation of groundwater resources and explain why a method of regulation similar to that of the Edwards Aquifer is necessary to prevent irreversible loss of water resources in Texas.[7]

II. WATER MANAGEMENT IN TEXAS

A. Surface Water

Generally, surface water is the most economical source of water for oil and gas exploration, production, and mining.[8] The law categorizes surface water in Texas into "diffuse surface water and water in a watercourse."[9] So long as diffuse water gathers and remains on an owner's land, before entering into a natural watercourse, that water is the property of the landowner.[10] A natural watercourse "must have bed, banks, a current of water, and a permanent source of water supply."[11] The state holds in trust for the public the

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3. *Id.* § 11.023(a)(3).

4. *Id*. § 11.1471(a)(2). The Texas Water Code defines "commission" as used in the code as meaning the Texas Natural Resource Conservation Commission. *Id.* § 11.002(1), 36.001(2). However, in 2001, the Texas legislature changed the name from the Texas Natural Resource Conservation Commission to the Texas Commission on Environmental Quality, effective January 1, 2004. H.B. 2912, 77th Leg., R.S. (Tex. 2001). To maintain consistency with the statutory definition of "commission," TNRCC is used throughout the paper when referring to Chapters 11 and 36 of the Texas Water Code, but it should be noted that the current name of the agency is the Texas Commission on Environmental Quality (TCEQ). *Id.*

5. *See* Michael L. Williams, *Can Oil and Water Mix?*, 68 TEX. B.J. 816, 817 (2005).

6. *See, e.g.*, R. Marcus Cady, II, *Drilling into the Issues: A Critical Analysis of Urban Drilling's Legal, Environmental, and Regulatory Implications*, 16 TEX. WESLEYAN L. REV. 127 (2009).

7. *See, e.g.*, *id.*; Wes Deweese, *Fracturing Misconceptions: A History of Effective State Regulation, Groundwater Protection, and the Ill-Conceived FRAC Act*, 6 OKLA. J. L. & TECH. 49 (2010); GASLAND (International WOW 2010).

8. *See* Williams, *supra* note 5, at 817.

9. City of San Marcos v. Tex. Com'n on Envtl. Quality, 128 S.W.3d 264, 271 (Tex. App.—Austin 2004, pet. denied) (citing Domel v. City of Georgetown, 6 S.W.3d 349, 353 (Tex. App.—Austin 1999, pet. denied)).

10. *See Domel*, 6 S.W.3d at 353.

11. Hoefs v. Short, 273 S.W. 785, 787 (Tex. 1925).

other category of surface water, water in a watercourse, as property of the state.[12] To obtain the right to appropriate surface water in Texas, a person must obtain a permit from the TNRCC.[13] However, the statute is silent as to whether groundwater discharged into a natural watercourse becomes the property of the state.[14]

B. Rule of Capture

In *Houston & Texas Central Railroad Co. v. East*, the Texas Supreme Court adopted the rule of capture for groundwater in Texas.[15] In *East*, the Houston & Texas Central Railroad dug a well on its own property that caused East's previously dug well to run dry.[16] The court explained the rule of capture to mean

> [t]hat the 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* [an injury without a remedy], which cannot become the ground of an action.[17]

The court pointed out that the law did not recognize correlative rights of underground water based primarily on public policy considerations:

> (1) Because the existence, origin, movement, and course of such waters, and the causes which govern and direct their movements, are so secret, occult, and concealed that an attempt to administer any set of legal rules in respect to them would be involved in hopeless uncertainty, and would, therefore, be practically impossible. (2) Because any such 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.[18]

The court went on to explain that Houston & Texas Central Railroad made "reasonable and legitimate use of the water" and that East advanced "no claim of malice or wanton conduct of any character."[19] The court examined an

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12. *See City of San Marcos*, 128 S.W.3d at 272.
13. *See* TEX. WATER CODE ANN. § 11.022 (Vernon 2008).
14. *See City of San Marcos*, 128 S.W.3d at 272; City of Corpus Christi v. City of Pleasanton, 276 S.W.2d 798 (Tex. 1955).
15. *See* Houston & Tex. Cent. R.R. Co. v. East, 81 S.W.279, 281–82 (Tex. 1904).
16. *See id.* at 280.
17. *Id.* (quoting Acton v. Blundell, 152 Eng. Rep. 1223, 1235 (Ex. Ch. 1843)).
18. *Id.* at 281 (quoting Frazier v. Brown, 12 Ohio St. 294 (Ohio 1861)).
19. *Id.* at 282.

alternative to the rule of capture, the rule of reasonable use, but ultimately adopted the common law rule adopted by the majority of other jurisdictions.[20]

Thirteen years later, Texas amended its constitution to give the legislature the duty to conserve and develop the state's natural resources, including groundwater.[21] The impetus for this amendment was a series of severe droughts that hit the state during the 1910s, a threat that "always lingers in the face of ever-increasing demands for water."[22] By the mid-twentieth century, the Texas Supreme Court recognized that the mysteries of underground water flow were no longer mysteries, but the court still opted to adhere to the rule of capture adopted at the turn of the century.[23] In *City of Corpus Christi*, the court enumerated the limitations of the rule of capture, specifically "that the owner may not maliciously take water for the sole purpose of injuring his neighbor or wantonly and willfully waste it."[24] The court did acknowledge that "[t]he modern tendency is toward [the reasonable use] rule."[25] The court later added to the list of limitations the withdrawal of groundwater that results in subsidence.[26] The legislature has also sought to limit the rule of capture by requiring the takers of groundwater to use it for a beneficial purpose and not waste it.[27] The courts or legislature may eventually broaden the definition of waste to a best practices standard if the current trend of changes in state water policies continues.[28]

The Texas Supreme Court again examined the rule of capture relating to groundwater in *Sipriano v. Great Spring Waters of America*.[29] In *Sipriano*, the plaintiffs alleged that a water bottling company "negligently drain[ed] their water wells."[30] The court admitted that the plaintiffs advanced "compelling reasons for groundwater use to be regulated" but ultimately determined that it was without the authority to replace the rule of capture adopted in *East* with the rule of reasonable use.[31] In fact, Texas is the only state that still adheres to the rule of capture for groundwater.[32]

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20. *See id.* at 280–81 (Tex. 1904); *see also* Bassett v. Salisbury Mfg. Co., 43 N.H. 569 (N.H. 1862) *and* Swett v. Cutts, 50 N.H. 439 (N.H. 1870).

21. *See* TEX. CONST. art XVI, § 59(a).

22. Barshop v. Medina County Underground Water Conservation Dist., 925 S.W.2d 618, 626 (Tex. 1996).

23. *See* Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75, 77 (Tex. 1999) (citing City of Corpus Christi v. City of Pleasanton, 276 S.W.2d 798, 801 (Tex. 1955)).

24. *City of Corpus Christi*, 276 S.W.2d at 801.

25. *Id.*

26. *See* Friendswood Dev. Co. v. Smith-S.W. Indus., Inc., 576 S.W.2d 21, 30 (Tex. 1978).

27. *See* TEX. WATER CODE ANN. § 36.001(8)–(9) (Vernon 2008).

28. *See* Williams, *supra* note 5, at 820.

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

30. *Id.*

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

32. *See* City of San Marcos v. Tex. Com'n on Envtl. Quality, 128 S.W.3d 264, 271 (Tex. App.—Austin 2004, pet. denied).

C. Groundwater Conservation Districts

Texas prefers its GCDs to manage and conserve groundwater even though groundwater is subject to fewer restrictions than surface water.[33] The TNRCC "has exclusive jurisdiction over the creation of [GCDs]" "subject to . . . authority, conditions, and restrictions" found in the Texas Constitution.[34] "[A] majority of the landowners within the proposed district," or at least fifty landowners if there are more than that number in the proposed district, must sign a petition that requests the creation of a GCD and submit that petition to the TNRCC.[35] An elected board of directors is "responsible for the management of all the affairs of the district."[36] The legislature has granted GCDs rulemaking power to

> make and enforce rules . . . limiting groundwater production based on tract size or the spacing of wells, to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater.[37]

The GCD must create a management plan that addresses, among other goals, "providing the most efficient use of groundwater" and "controlling and preventing waste of groundwater."[38] The GCD must then submit the management plan to the Texas Water Development Board (TWDB) for approval.[39]

Of the 254 counties in Texas, 174 are within a GCD, and of the ninety-nine districts created, the TWDB has confirmed ninety-six.[40] Despite the majority of Texas counties being within a GCD, some counties that are subject to extensive oil and gas exploration, production, and mining because of their location atop the Barnett Shale are still without a GCD, most significantly Dallas County.[41] However, being within a GCD does not foreclose the possibility of taking that groundwater from that GCD for oil and gas exploration, production, and mining purposes.[42] A GCD cannot require a permit for

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33. *See* Williams, *supra* note 5, at 817, 819.
34. TEX. WATER CODE ANN. § 36.011 (Vernon 2008); *see also* TEX. CONST. art XVI, § 59.
35. TEX. WATER CODE ANN. § 36.013 (Vernon 2008).
36. § 36.057.
37. § 36.101.
38. § 36.1071.
39. *See* § 36.1072.
40. *See* Texas Water Development Board, *GCD Facts*, http://www.twdb.state.tx.us/groundwater/conservation_districts/facts.asp (last visited May 12, 2012).
41. *See* Texas Water Development Board, *Groundwater Conservation Districts*, http://www.twdb.state.tx.us/mapping/doc/maps/gcd_only_8x11.pdf (last visited May 12, 2012) [hereinafter *Groundwater Conservation Districts*].
42. *See* TEX. WATER CODE ANN. § 36.117 (Vernon 2008).

> [the] drilling [of] a water well used solely to supply water for a rig that is actively engaged in drilling or exploration operations for an oil or gas well permitted by the Railroad Commission of Texas provided that the person holding the permit is responsible for drilling and operating the water well and the well is located on the same lease or field associated with the drilling rig.[43]

The well must be "actively engaged in drilling or exploration operations for an oil or gas well permitted by the Railroad Commission of Texas" for the statute to apply.[44] If an oil and gas applicant "meets all applicable rules as promulgated by the [GCD]," the GCD cannot deny the oil and gas applicant a permit because the oil and gas applicant intends to use the groundwater for oil and gas exploration, production, and mining, nor can the GCD subject the oil and gas applicant to spacing requirements.[45] The oil and gas applicant can also transport the groundwater outside of the GCD.[46]

III. DEVELOPMENT OF OTHER WATER SOURCES

Cities and industrial users have begun to rely heavily on treated wastewater, or reclaimed water, to meet demand.[47] Desalinization is also becoming an economically feasible source of water.[48] Some water suppliers have even begun to seek out distant sources of water that were not economically feasible a few years ago.[49]

A. Reclaimed Water

Reclaimed water is groundwater or surface water used once, treated, and reused for a beneficial purpose.[50] Reclaimed water provides direct and indirect uses.[51] Direct reuse involves piping treated wastewater directly from the treatment plant to the user.[52] Indirect use, on the other hand, involves placing treated wastewater into a river or stream for use farther downstream.[53] Use of reclaimed water is often an economically viable source of water because customers and the source of the water are usually in close proximity; however,

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43. § 36.117(b)(2).
44. § 36.117(d)(2).
45. § 36.117(f)–(g).
46. *See* § 36.117(k).
47. *See* Williams, *supra* note 5, at 819.
48. *See id.*
49. *See id.*
50. *See* Texas Water Development Board, *Water for Texas – 2007*, p. 241 (November 14, 2007), *available at* http://www.twdb.state.tx.us/publications/State_Water_Plan/2007/2007StateWaterPlan/CHAPTER 8 Final_112906.pdf.
51. *See id.*
52. *See id.* An example of direct reuse is the use of treated wastewater received directly from the treatment plant for irrigation purposes. *Id.*
53. *See id.* An example of indirect reuse is the use of treated wastewater diverted from a river for irrigation purposes. *Id.*

no entity in Texas uses reclaimed water as a source for drinking water despite the ability to treat wastewater so that it is compliant with drinking water standards.[54] By 2050, the TWDB projects the existing supply of reclaimed water to be 358,000 acre-feet, but when the TWDB factors water management strategies in its conclusion, its projection increases to over 1.5 million acre-feet in reclaimed water supply.[55] An acre-foot is the amount of water required to cover one acre to a depth of one foot, or 325,851 gallons.[56] These projections demonstrate that reclaimed water can play a significant role in meeting the state's water demands as the twenty-first century progresses.

B. Desalinization

Desalinization presents a drought proof source of water, albeit a currently expensive one.[57] However, technological advances and increasing scarcity of historic water sources have resulted in desalinization efforts garnering more support.[58] Water suppliers prefer to utilize pressurized filtration through reverse-osmosis to achieve desalinization.[59] Pretreatment of saline water to "remove[] suspended solids and organic constituents that cause fouling of the membranes" is necessary for this method to operate efficiently.[60] Because use of this water source is expanding, it may force a change in the definition of "useable quality water."[61]

There are significant obstacles to implementing a desalinization project, the greatest being the economic hurdle.[62] For example, the proposed funding needed for a desalinization plant in Brownsville exceeds $67 million.[63] Research into desalinization technology has been increasing over the past fifteen years leading to newer and better technologies that can ultimately lower the cost of desalinization.[64] Counter-intuitively, this dizzying pace of technological advancement can actually create an additional obstacle for water utilities as they constantly face the possibility of having to operate obsolete

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54. *See id.*
55. *See id.* at 241–42.
56. *See* Gregg Eckhardt, *Glossary of Water Resource Terms*, The Edwards Aquifer Website, http://www.edwardsaquifer.net/glossary.html (last visited May 12, 2012) [hereinafter Eckhardt, *Glossary of Water Resource Terms*].
57. *See* Texas Water Development Board, *The Future of Desalination in Texas Biennial Report on Seawater Desalination*, p. vii (December 2008), *available at* http://www.twdb.state.tx.us/innovativewater/desal/doc/2008_TheFutureofDesalinationinTexas.pdf [hereinafter *Report on Seawater Desalinization*].
58. *See id.* at 1.
59. *See id.* at 5.
60. *Id.*
61. Williams, *supra* note 5, at 821.
62. *See Report on Seawater Desalination*, *supra* note 57, at 25.
63. *See id.*
64. *See id.* at 27.

and less cost-effective technology.[65] Desalinization projects also face regulatory and technological obstacles.[66]

The TWDB is also exploring the possibility of brackish groundwater desalinization.[67] The TWDB estimates that brackish groundwater supply is in excess of 2.7 billion acre-feet; however, the TWDB needs more information before it can more extensively utilize this possible water source.[68] The TWDB requested funding from the legislature in 2009 "to map and characterize the brackish aquifers of the state in greater detail using existing geophysical well logs and available aquifer data; build replicable numerical groundwater flow models to estimate aquifer productivity; and develop parameter-screening tools to help communities assess the viability of their brackish groundwater supplies."[69] The state could place protections on brackish water if it becomes a municipal water source.[70]

C. Other Sources

As historic sources of water have become unable to meet increasing demand, cities such as San Antonio have started to look elsewhere to meet that growing demand.[71] Similar to desalinization, these alternate sources have only recently become economically feasible.[72]

One such alternative is Aquifer Storage and Recovery (ASR).[73] The San Antonio Water System (SAWS), San Antonio's water utility, received a permit from the TRNCC to construct an ASR in the Carrizo-Wilcox Aquifer and opened the Twin Oaks ASR in June 2004 to store excess water pumped from the Edwards Aquifer during low demand periods for use during high demand periods.[74] SAWS found that because the Carrizo-Wilcox Aquifer consisted primarily of sand, which prevents or slows water movement, it would make an optimal location for an ASR.[75] One of the primary benefits to water storage in an ASR is that none of the water is lost to evaporation like traditional reservoirs experience.[76] The Twin Oaks ASR, located in southern Bexar County, became the second ASR in Texas and second largest in the nation

65. *See id.*
66. *See id.* at 28–29.
67. *See* Texas Water Development Board, *Brackish Resources Aquifer Characterization System (BRACS)*, http://www.twdb.state.tx.us/innovativewater/bracs/ (last visited May 12, 2012).
68. *See id.*
69. *Id.*
70. *See* Williams, *supra* note 5, at 821.
71. *See id.* at 819.
72. *See id.*
73. *See* San Antonio Water System, *Twin Oaks Aquifer Storage & Recovery*, http://www.saws.org/our_water/waterresources/projects/asr.shtml (last visited May 12, 2012) [hereinafter *Twin Oaks ASR*].
74. *See id.*
75. *See* Gregg Eckhardt, *Aquifer Storage and Recovery*, The Edwards Aquifer Website, http://www.edwardsaquifer.net/asr.html (last visited May 12, 2012) [hereinafter Eckhardt, *ASR*].
76. *See id.*

with an estimated price tag of $215 million.[77] In its first year of operation, the Twin Oaks ASR stored approximately 10,000 acre-feet, which increased to over 80,000 acre-feet in 2010.[78] The South Central Texas Regional Water Planning Group has proposed an even larger ASR than the Twin Oaks ASR that could provide 50,000 acre-feet per year.[79]

Another alternative is to use groundwater pumped as part of mining operations. Alcoa, a Pennsylvania-based mining company, operated a lignite mining operation in Milam County, but due to coal supply quickly running out at that site, Alcoa proposed to expand its operation into Lee County.[80] City Public Service (CPS), San Antonio's power utility, owned the land where Alcoa was going to locate the new mine.[81] In a three-way agreement, CPS agreed to sell the mineral rights to Alcoa in return for Alcoa allowing SAWS to pump water from both the old and new mining sites.[82] The terms of the contract obligated SAWS to mitigate any damage to wells that resulted from the project.[83] The agreement required the Texas Railroad Commission (TRRC) to regulate water pumped for mining purposes, but it did not regulate any excess water pumped, meaning that well owners could not complain to the TRRC if their wells went dry because of excess pumping.[84] In response to public outcry against this proposed plan, the area's state representative filed legislation to create a GCD capable of "limit[ing] the exportation of groundwater outside of the district."[85]

IV. ADMINISTRATIVE REGULATION OF WATER IN TEXAS

A. Edwards Aquifer

The Edwards Aquifer is an artesian aquifer that meets the water needs of more than 1.7 million Texans in Central Texas, most notably the city of San Antonio, the nation's seventh largest city.[86] An artesian aquifer is a geologic formation in which water is under sufficient hydrostatic pressure to discharge to the surface without pumping.[87] The availability of water from the Edwards

77. *See* Twin Oaks ASR, *supra* note 73; Eckhardt, *ASR*, *supra* note 75.
78. *See* Twin Oaks ASR, *supra* note 73; Eckhardt, *ASR*, *supra* note 75.
79. *See* Eckhardt, *ASR*, *supra* note 75.
80. *See* Williams, *supra* note 5, at 819; Nate Blakeslee, *Coal Hard Cash*, AUSTIN CHRON., Sept. 3, 1999, *available at* http://www.austinchronicle.com/news/1999-09-03/73710/.
81. *See* Blakeslee, *supra* note 80.
82. *See id.*
83. *See id.*
84. *See id.*
85. Williams, *supra* note 5, at 820; H.B. 3588, 77th Leg. Reg. Sess. (Tex. 2001).
86. *See* Gregg Eckhardt, The Edwards Aquifer Website, http://www.edwardsaquifer.net/index.html (last visited May 12, 2012) [hereinafter Eckhardt, *Edwards Aquifer Website*]; Texas Commission on Environmental Quality, *Regulatory History of the Edwards Aquifer*, http://www.tceq.texas.gov/field/eapp/history.html (last visited May 12, 2012) [hereinafter *Regulatory History of the Edwards Aquifer*].
87. *See* Eckhardt, *Glossary of Water Resource Terms*, *supra* note 56.

Aquifer contributed to the region's growth during Spanish colonization.[88] Today, the Edwards Aquifer produces approximately 800,000 acre-feet annually to meet the urban and rural needs of many Central Texans.[89]

The Edwards Aquifer consists of sinkholes, caves, and an extensive underground drainage system, and is one of the highest producing aquifers in the nation.[90] The porous properties of the limestone that forms the Edwards Aquifer make it more permeable than sandstone, sand, or gravel aquifers.[91] This limestone formation is able to recharge quickly due to its porous properties, which allows the aquifer to produce a large amount of water; however, the same properties that allow the Edwards Aquifer to recharge quickly also permit surface pollutants to enter the aquifer and quickly travel throughout its water supply.[92] Use and transportation of hazardous materials along the recharge zone and urban runoff present dangers to the water quality of the Edwards Aquifer.[93]

B. Edwards Aquifer Authority

The Texas legislature created the Edwards Underground Water District (EUWD) in response to severe droughts in the 1950s.[94] The EUWD provided information not previously available and assisted with licensing; however, the legislature did not give EUWD the authority to regulate pumping from the aquifer.[95] This lack of control led to a legal challenge under the Endangered Species Act (ESA) in 1991.[96]

Seven endangered species and one threatened species are dependent on the Edwards Aquifer for their survival, including the Texas Blind Salamander, Fountain Darter, San Marcos Gambusia, San Marcos Salamander, and Texas Wild Rice.[97] In *Babbitt*, the Sierra Club sued the United States Fish and Wildlife Service (FWS), claiming the FWS's failure "to develop and disseminate information about the minimum springflows necessary to protect the endangered species" constituted a violation of the ESA.[98] The district

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88. *See* Eckhardt, *Edwards Aquifer Website*, *supra* note 86.

89. *See* Dennis Trombatore, *The Edwards Aquifer, Central Texas*, The Walter Geology Library, http://www.lib.utexas.edu/geo/fieldguides/edwardsaquifer.html (last visited May 12, 2012).

90. *See* Edwards Aquifer Authority, *Hydrology of the Edwards Aquifer*, http://www.edwardsaquifer.org/display_science_research_m.php?pg=geology (last visited May 12, 2012) [hereinafter *Hydrology of the Edwards Aquifer*].

91. *See id.*

92. *See Regulatory History of the Edwards Aquifer*, *supra* note 86.

93. *See Hydrology of the Edwards Aquifer*, *supra* note 90.

94. *See* Gregg Eckhardt, *Laws and Regulations Applicable to the Edwards Aquifer*, The Edwards Aquifer Website, http://www.edwardsaquifer.net/rules.html (last visited May 12, 2012).

95. *See id.*; *Regulatory History of the Edwards Aquifer*, *supra* note 86.

96. *See* Sierra Club v. Babbitt, 995 F.2d 571 (5th Cir. 1993).

97. *See* 50 C.F.R. § 17.11-.12; *see also* Gregg Eckhardt, *Endangered Species of the Edwards Aquifer*, The Edwards Aquifer Website, http://www.edwardsaquifer.net/species.html (last visited May 12, 2012).

98. *Sierra Club*, 995 F.2d at 573.

court concluded that the FWS had neglected its nondiscretionary duty by failing to "'develop and implement . . . recovery plans' for [the] endangered species".[99] The district court also held that the FWS had affected a taking of Fountain Darters because of its failure to create springflow limits.[100] FWS was "enjoined . . . to develop and disseminate information about the springflows necessary to sustain the endangered species at San Marcos and Comal Springs."[101] The court also enjoined the Texas Water Commission (TWC) "to prepare a comprehensive Edwards management plan."[102] The FWS voluntarily dismissed its appeal after the "plaintiffs agreed to certain semantic changes in the district court's findings and judgment," but several other defendant-intervenors persisted in the appeal.[103] The Fifth Circuit held that the previous holding did not injure the appellants, recognizing that the appellants had no right to participate in the FWS's administrative duties to promulgate springflow determinations.[104]

In response to the holding in *Babbitt*, the Texas legislature created the Edwards Aquifer Authority (EAA) in 1993 to control pumping from the Edwards Aquifer through a permitting process.[105] The EAA's mission is to "manage, enhance, and protect the Edwards Aquifer system."[106] Under the Edwards Aquifer Authority Act (Act), the legislature gave the EAA

> all of the powers, rights, and privileges necessary to manage, conserve, preserve, and protect the aquifer and to increase the recharge of, and prevent the waste or pollution of water in, the aquifer. The authority has all of the rights, powers, privileges, authority, functions, and duties provided by the general law of this state . . . .[107]

This grant of authority only applies to water in or withdrawn from the Edwards Aquifer.[108] The Act limited pumping to 572,000 acre-feet annually to protect water quality, species, habitat, and resources.[109] The Act also sought to protect the rights of landowners, explaining that any

> action taken pursuant to this Act may not be construed as depriving or divesting the owner or the owner's lessees and assigns . . . of these ownership rights or as impairing the contract rights of any person . . . . The legislature

99. *Id.* at 574 (quoting 16 U.S.C. § 1538).
100. *See id.*; *see also* 16 U.S.C. § 1538.
101. *Sierra Club*, 995 F.2d at 574.
102. *Id.* at 574 n.4.
103. *Id.* at 574.
104. *See id.* at 575.
105. *See* Williams, *supra* note 5, at 819; S.B. 1477, 73rd Leg., Reg. Sess. (Tex. 1993).
106. Edwards Aquifer Authority, *Mission: Manage, Enhance, and Protect*, http://www.edwardsaquifer.org/display_authority_m.php?pg=mission (last visited May 12, 2012).
107. Edwards Aquifer Authority, *Edwards Aquifer Authority Act*, § 1.08(a), *available at* http://www.edwardsaquifer.org/files/EAAact.pdf [hereinafter *EAA Act*].
108. *See id.* § 1.08(b).
109. *See* Williams, *supra* note 5, at 819; *EAA Act*, *supra* note 107, at § 1.14.

> intends that just compensation be paid if implementation of this article causes a taking of private property or the impairment of a contract in contravention of the Texas or federal constitution.[110]

In recognition of the basis for the legal challenge in *Babbitt*, the Act called for the development of a recovery implementation program "for the species that are: (1) listed as threatened or endangered species under federal law; and (2) associated with the aquifer."[111] Texas A&M University assisted the EAA in implementing the program, using input from the FWS, federal agencies, and interested stakeholders including the Texas Commission on Environmental Equality (TCEQ) and TWDB.[112] The impact of the recovery implementation program and the effects it has had on endangered species dependent on the Edwards Aquifer for survival are beyond the scope of this paper.

In *Barshop v. Medina County Underground Water Conservation District*, numerous plaintiffs challenged the Act's constitutionality.[113] The plaintiffs claimed that the Act was "distinctly different from prior regulations [because] it actually deprives the landowner of a vested property right," an argument that relied on earlier Texas cases that adopted the rule of capture.[114] The Texas Constitution's takings clause provides that

> No person's property shall be taken, damaged or destroyed for or applied to public use without adequate compensation being made, unless by the consent of such person; and, when taken, except for the use of the State, such compensation shall be first made, or secured by a deposit of money . . . .[115]

The plaintiffs argued that the Act violated the takings clause because "certain provisions of the Act [would] immediately operate upon the Act's effective date to result in a taking [and] that language of the Act require[d] the Authority to apply the Act in a manner that [was] unconstitutional."[116] However, the court concluded "that the 'use' of water runs with the land and, as such, does not constitute a taking of the landowners' property," and that the plaintiffs had failed to show "under all circumstances, the Act [would] deprive them of their property in violation of the Texas Constitution."[117] The *Barshop* holding was

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110. EAA Act, *supra* note 107, at § 1.07.
111. Id. at § 1.26A.
112. *See* id.
113. *See* Barshop v. Medina County Underground Water Conservation Dist., 925 S.W.2d 618 (Tex. 1996).
114. *Id.* at 625; *see also* Houston & Tex. Cent. R.R. Co. v. East, 81 S.W.279, 279 (Tex. 1904).
115. *Barshop*, 925 S.W.2d at 628 (quoting TEX. CONST. art I, § 17).
116. *Id.*
117. *Id.* at 630–31.

important to the continuation of the EAA because it upheld the Act's validity.[118]

V. BARNETT SHALE

As of 2009, Texas is the top natural gas producing state and produces more natural gas than the Federal Offshore Gulf of Mexico.[119] This distinction is due in large part to the Barnett Shale natural gas field, which is the largest of its kind in Texas, covering an approximate area of 5,000 square miles of North Texas, and one of the largest in the United States with an estimated total potential production in excess of thirty-nine trillion cubic feet (Tcf).[120] The Department of Energy (DOE) estimates that the United States has 1,338 Tcf of natural gas reserves, of which 374 Tcf is recoverable shale gas.[121]

Shale is a sedimentary rock composed of fine-grained sediments that compacted and solidified.[122] The formation of shale results in an almost impermeable rock that does not allow for easy movement of natural gas throughout the formation.[123] Because of this impermeability, shale is considered an unconventional reservoir for natural gas.[124]

There are currently 14,401 wells drilling in the Barnett Shale, which produced 1,025 billion cubic feet (Bcf) of natural gas and accounted for 27% of the natural gas produced in Texas through the first half of 2010.[125] Drilling operations in the Barnett Shale occur in twenty-three counties, but only fifteen of those counties are a part of a GCD.[126] The TWDB has issued drilling permits for a twenty-fourth county, Hamilton, which is not a part of a GCD.[127]

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118. *See generally* Hunter Burkhalter, *Overview of Groundwater Regulation in Texas*, BASIC OKLAHOMA WATER LAW SEMINAR, p. 11 (July 28-29, 2008), *available at* http://www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/waterlawseminar/Burkhalter.pdf.

119. *See* U.S. Energy Information Administration, *Natural Gas Explained: Where Our Natural Gas Comes From*, http:/www.eia.gov/energyexplained/index.cfm?page=natural_gas_where (last visited May 12, 2012).

120. *See* Jennifer Warren, *The Barnett Shale: A Winning Play*, D CEO, Aug. 13, 2008, *available at* http://www.dmagazine.com/Home/2008/08/13/The_Barnett_Shale_A_Winning_Play.aspx; United States Department of Energy, *Modern Shale Gas Development in the United States: A Primer*, p. 18, *available at* http://www.fossil.energy.gov/programs/oilgas/publications/naturalgas_general/ShaleGasPrimer_Online_4-2009.pdf [hereinafter *Modern Shale Gas Development*].

121. *See* United States Environmental Protection Agency, *Natural Gas*, http://www.epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html (last visited May 12, 2012) [hereinafter *Natural Gas*]; U.S. Energy Information Administration, *Annual Energy Outlook: Natural Gas Demand*, http://www.eia.gov/oiaf/aeo/gas.html (last visited May 12, 2012).

122. *See Modern Shale Gas Development*, *supra* note 119, at 13.

123. *See id.*

124. *See id.* at 14.

125. *See* Railroad Commission of Texas, *Newark, East (Barnett Shale) Field*, http://www.rrc.state.tx.us/data/fielddata/barnettshale.pdf (last visited May 12, 2012) [hereinafter *East (Barnett Shale) Field*].

126. *See id.*; *Groundwater Conservation Districts*, *supra* note 41.

127. *Compare East (Barnett Shale) Field*, *supra* note 125 (indicating that drilling permits have been issued for Hamilton county) *with Groundwater Conservation Districts*, *supra* note 41 (illustrating the counties in Texas in or a part of a GCD).

The economic benefits of these operations are undeniable.[128] In 2007, natural gas production in the Barnett Shale accounted for $8.2 billion of Fort Worth's economic output and almost 84,000 jobs.[129] Dallas/Fort Worth International Airport received $186 million because of drilling operations that same year.[130] Natural gas also has environmental benefits compared to other energy sources, as natural gas-fired plants emit 50% less carbon dioxide than coal-fired plants.[131] Natural gas-fired plants also emit less nitrogen oxides and sulfur oxides than their coal-fired counterparts.[132]

A myriad of federal laws apply to shale gas production, including the Clean Water Act (CWA), Clean Air Act (CAA), and National Environmental Protection Act (NEPA).[133] The federal government has limited resources to enforce these laws and recognizes that a one-size-fits-all approach to regulation cannot effectively address local activities. The government has granted states the ability to develop their own standards and given the states jurisdiction to enforce those standards so long as they are equivalent to the federal program.[134] In Texas, the TRRC regulates the state's oil and gas activity.[135]

Unfortunately, the economic and environmental benefits of shale gas come at a steep price in terms of water use. Hydraulic fracturing, or "fracing", has increased natural gas production in the Barnett Shale, but the technique requires 2,000–3,200 gallons of water per foot of fractured shale.[136] Hydraulic fracturing has been used since the 1940's to increase the permeability of shale formations to facilitate shale gas recovery.[137] Hydraulic fracturing requires the injection proppants mixed with water-based fluids into a shale formation with sufficient pressure to create fractures in the shale thus releasing natural gas.[138] Depending on the area where a natural gas producer engages in hydraulic fracturing, the producer will add different chemicals to the water and proppant mixture for such purposes as friction reduction, pH adjustment, and corrosion inhibition.[139] The chemical additives generally make up less than 2% of the hydraulic fracturing fluid mixture and can consist of hydrochloric acid, citric

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128. *See generally* Warren, *supra* note 120.
129. *See id.*
130. *See id.*
131. *See Natural Gas*, *supra* note 121.
132. *See id.*
133. *See Modern Shale Gas Development*, *supra* note 120, at 25.
134. *See id.*
135. *See id.* at 28.
136. *See* Texas Water Development Board, *Assessment of Groundwater Use in the Northern Trinity Aquifer Due To Urban Growth and Barnett Shale Development*, p. 14, *available at* http://rio.twdb.state.tx.us/RWPG/rpgm_rpts/0604830613_BarnetShale.pdf [hereinafter *Assessment of Groundwater Use in the Northern Trinity Aquifer*].
137. *See id.*; *Modern Shale Gas* Development, *supra* note 120, at 56.
138. *See Modern Shale Gas Development*, *supra* note 120, at 56.
139. *See id.* at 61–62.

acid, and ethylene glycol.[140] After removal of the water-based fluids, the proppants keep the fractures "propped up."[141] The process is multi-staged, and each stage requires hundreds of thousands of gallons of water to complete, with a well in the Barnett Shale requiring an estimated 2.7 million gallons of water to complete.[142] An example from the Marcellus Shale required 578,000 gallons of water for a single stage of the fracturing process.[143] From 2000 to 2005, natural gas producers completed over 4,000 wells in the Barnett Shale, requiring the use of approximately 11 trillion gallons of water.[144]

The Dallas/Fort Worth metroplex and surrounding counties account for approximately 27% of the Texas population and are growing quickly.[145] The demand for water by an increasing population coupled with demand from natural gas operations in the Barnett Shale raises serious concerns about the availability of water in the coming years.[146] The TWDB estimates that water demand will increase to 2.1 million acre-feet, or over 684 trillion gallons of water, by 2025, with most of that increase due to municipal demand.[147] In 2000, municipal demand accounted for 77% of the 1.3 million acre-feet used.[148] Before a growing population outstripped its ability to meet the water demands of the area, the Trinity Aquifer served as the main water source for Dallas/Fort Worth residents.[149] This demand resulted in development of surface water sources to keep pace with the area's growing population.[150]

Approximately 60% of the water used in Barnett Shale hydraulic fracturing operations comes from groundwater sources, but it could be as low as 45% and as high as 90% between counties.[151] In 2010, the Bureau of Economic Geology (BEG) estimated hydraulic fracturing operations in the Barnett Shale will require approximately 12,000 acre-feet of groundwater, or nearly 4 trillion gallons of water.[152] Because well completions are dependent on natural gas prices, the BEG estimates also included a low and high estimate of groundwater demand.[153] For 2010, the BEG estimates that groundwater demand could be as low as approximately 2,500 acre-feet, or nearly 815 billion gallons, and as high as approximately 18,500 acre-feet, or over 6 trillion

140. *See id.* at 62–63. The possible negative effects to the environment and human health from the use of these and other chemicals in the hydraulic fracturing process are beyond the scope of this paper.

141. *See id.* at 56; Railroad Commission of Texas, *Water Use in the Barnett Shale*, http://www.rrc.state.tx.us/barnettshale/wateruse_barnettshale.php [hereinafter *Water Use in the Barnett Shale*].

142. *See Modern Shale Gas Development*, *supra* note 120, at 56, 64.

143. *See id.* at 56.

144. *See Assessment of Groundwater Use in the Northern Trinity Aquifer*, *supra* note 136*,* at 16.

145. *See id.* at 7.

146. *See id.*

147. *See id.* at 8.

148. *See id.*

149. *See id.*

150. *See id.* The Trinity Aquifer is still the primary, if not sole source, of water for rural areas in the Dallas/Fort Worth area. *Id.*

151. *See id.* at 14.

152. *See id.* at 17.

153. *See id.*

gallons.[154] The TWDB assumes that natural gas prices will support either the medium or high demand estimate.[155] BEG estimates that demand for groundwater by hydraulic fracturing operations will continue to be high over the next fifteen years, with those operations requiring approximately 6,500 acre-feet of groundwater, or over 2 trillion gallons, in 2025.[156] For 2025, the BEG estimates that groundwater demand could be as low as approximately 1,000 acre-feet, or over 325 billion gallons, and as high as approximately 19,000 acre-feet, or over 6 trillion gallons.[157] This estimate indicates that hydraulic fracturing operations will account for 7%–13% of groundwater use by 2025.[158] These estimates demonstrate the need for natural gas producers and GCDs to communicate to develop water management plans and identify water sources that can meet the needs of both the citizenry and the development of natural gas in the Barnett Shale. However, that communication cannot take place if a hydraulic fracturing operation is producing natural gas in an area where no GCD exists.[159] Of the twenty-three counties atop the Barnett Shale where hydraulic fracturing operations are producing natural gas, eight counties are not in a GCD.[160]

To complicate matters further, under the current statutory scheme in Texas a GCD cannot restrict the groundwater taken by a natural gas producer, thus effectively making communication optional between natural gas producers and local water managers to ensure the continued availability of water for both municipal and natural gas production needs.[161]

VI. STRENGTHENING GROUNDWATER CONSERVATION DISTRICTS

Unfortunately, bringing all of the state's groundwater resources under the regulation of a GCD cannot stop the use of a vast amount of groundwater in areas such as the Barnett Shale.[162] The inability of GCD to require that an oil and gas operation obtain a permit before pumping water prevents a GCD from effectuating its purpose—conserving groundwater.[163] Without teeth, a GCD cannot regulate a significant user of its groundwater resources.[164] This shifts the burden onto the citizens of the GCD to find ways to conserve what the

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154. *See id.* at 17–18.
155. *See id.*
156. *See id.* at 17.
157. *See id.* at 17-18. It is worth repeating that the TWDB assumes that natural gas prices will support either the medium or the high estimate. *Id.* at 17–18.
158. *See Water Use in the Barnett Shale*, *supra* note 141.
159. *See Modern Shale Gas Development*, *supra* note 120, at 66.
160. *Compare East (Barnett Shale) Field*, *supra* note 125 (listing the twenty-three counties where natural gas production is taking place in the Barnett Shale) *with Groundwater Conservation Districts*, *supra* note 41 (illustrating the counties in Texas in or a part of a GCD).
161. *See* TEX. WATER CODE ANN. § 36.117(b)(2) (Vernon 2008).
162. *See* discussion *supra* Part II.C, V.
163. *See* discussion *supra* Part II.C.
164. *See* discussion *supra* Part V.

legislature has prevented the GCD from doing with regard to oil and gas operations. The legislature must remove this statutory obstruction to conservation of groundwater resources if water is to be readily available to future generations.

A. The Halliburton Loophole

In 2005, the Energy Policy Act (EPAct) amended the Safe Drinking Water Act to exclude "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities" from the term underground injection.[165] Some call this exemption for the fracing process, which was first used by Halliburton in the first half of the twentieth century, the Halliburton Loophole because its inclusion into the EPAct came at the request of Halliburton's former chief executive and then-Vice President Dick Cheney.[166] This statutory exclusion, reports from landowners about flammable tap water and contaminated wells due to nearby fracing operations, and the oil and gas industry's opposition to disclosure of the chemicals used in the fracing process have fueled speculation that fracing places groundwater resources in danger of contamination.[167] What is just as concerning, if not more so, is the effect that the exclusion has on the amount of water that an oil and gas operation can use without limitation, which is not speculative.[168] Legislators in the senate and house of representatives have proposed legislation that would eliminate the exclusion and require the disclosure of non-proprietary chemicals used by oil and gas operations in their fracing processes.[169]

B. Texas's Halliburton Loophole

The Texas legislature has similarly created an exclusion favoring the oil and gas industry over the states own GCDs.[170] On the one hand, the Texas legislature gives GCDs the power to limit groundwater use "to provide for conserving, preserving, protecting, and recharging of the groundwater" and requires that those same GCDs develop a plan to "provid[e] the most efficient use of groundwater," while on the other hand limiting that grant of power by preventing GCDs from meeting its goals by immunizing oil and gas operations from efforts to conserve, preserve, and recharge.[171] Similar to the effort legislators in Washington are making to remove the exclusion in the EPAct

165. 42 U.S.C. § 300h(d)(1) (2006).

166. *See The Halliburton Loophole*, N.Y. TIMES, Nov. 3, 2009, at A28, *available at* http://www.nytimes.com/2009/11/03/opinion/03tue3.html?_r=2.

167. *See id.*

168. *See* discussion *supra* Part V.

169. *See* S.B. 1215, 111th Cong. (2009); H.R. 2766, 111th Cong. (2009).

170. *See* TEX. WATER CODE ANN. § 36.117(b)(2) (West 2008).

171. WATER §§ 36.101, 36.1071; *see also* § 36.117(b)(2).

favoring the oil and gas industry over the safety of the nation's drinking water resources, legislators in Austin are making legislation to stop favoring the oil and gas industry over the state's groundwater resources.[172] There is little doubt that the oil and gas industry is important to both the Texas and national economy, but there is no doubt that available water is of paramount importance to every Texan. If the legislature does not take action, there might be very little whiskey left for drinking or water left for fighting.[173]

C. Proposed Action

The first step towards strengthening GCDs so that they can effectuate their goal of conservation is the removal of exclusions that can render a GCD impotent to conserve the groundwater within its control, specifically the exclusion granted to the oil and gas industry.[174] Without the removal of such hindrances to conservation, the GCDs are little more than a reemergence of the ineffective EUWD.[175] As they currently exist, the GCDs have similar power to that of the EAA.[176] Furthermore, a plain reading of the grant of power to the two entities demonstrates that the distinguishing factor between the EAA and the GCDs—that of an artesian aquifer as opposed to a groundwater source—are of little importance.[177] The primary difference between power of the EAA and the GCDs is the limitation on regulation with regard to oil and gas operations' consumption of water from groundwater sources.[178] There is no logical reason to limit consumption of water from the Edwards Aquifer to 450,000 acre-feet annually while creating a path to subvert a similar limitation imposed by a GCD.[179]

Similar to the federal government's recognition that a one-size-fits-all approach to regulation cannot effectively address local activities, this proposed

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172. *See, e.g.*, S.B. 1215, 111th Cong. (2009) (containing the Fracturing Responsibility and Awareness of Chemicals Act).

173. *See* Williams, *supra* note 5, at 817.

174. *See* WATER § 36.117(b)(2).

175. *See* discussion *supra* Part IV.B.

176. *Compare* EAA Act, *supra* note 107, at § 1.08(a) (granting the EAA "all of the powers, rights, and privileges necessary to manage, conserve, preserve, and protect the aquifer and to increase the recharge of, and prevent the waste or pollution of water in, the aquifer"), *with* WATER § 36.101 (giving the GCDs the power "to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater . . .").

177. *Compare* EAA Act, *supra* note 107, at § 1.08(a) (making the goal of the EAA to "*conserve, preserve, and protect* the aquifer and to increase the *recharge* of, and *prevent the waste or pollution* of water . . .") (emphasis added), *with* WATER § 36.101 (giving the GCDs the goal of "*conserving, preserving, protecting* [groundwater resources to allow for] *recharging* . . . in order to . . . *prevent degradation of water quality*, or *prevent waste* . . .") (emphasis added).

178. *Compare* discussion *supra* Part II.C (discussing the GCDs limited authority to regulate groundwater for oil and gas purposes), *with* discussion *supra* Part IV.B (discussing the broad power that the Act gave the EAA); *see also* WATER § 36.117(b)(2).

179. *See* EAA Act, *supra* note 107, at § 1.14.

action does not presume a one-size-fits-all approach to the GCD regulation.[180] What this proposed action does assume is a cooperative effort between the GCDs and the TNRCC, the TWDB, and the TRRC.[181] Landowners would still submit petitions for the creation of the GCD to the TNRCC and the subsequent GCD has to submit a management plan to TWDB.[182] With this proposed action, the legislature would eliminate the current exclusion and replace the exclusion with a framework for cooperation between the TRRC in its capacity as the state regulator of oil and gas activity and the GCDs in their capacity as regulators of the state's groundwater resources.[183] This cooperative effort between the TRRC and the GCDs would allow for presentation of the interests of the citizens of a given the GCD and the interests of the oil and gas operations in that given the GCD.[184] In keeping with the recognition that a one-size-fits-all approach is not feasible on either a national or a state level, especially when that state encompasses 261,797 square miles, contains ten areas of vegetation, and expands 773 miles east to west and 801 miles north to south, this action would permit individual the GCDs to create pumping limitations that meet the needs of its respective citizenry while at the same time ensuring that oil and gas operations can continue.[185]

Also, this approach does not assume a utopian atmosphere of cooperation between the entities involved.[186] This approach does recognize the real possibility that the respective interests of those represented by the GCDs and the TRRC will at times conflict and may be incompatible in some instances.[187] However, the Fifth Circuit has recognized the need for regulation of water resource consumption.[188] Furthermore, the Texas Supreme Court has held that regulation of water consumption does not result in a deprivation of property.[189] The Texas Supreme Court has even gone so far as to admit that compelling reasons exist to regulate groundwater.[190] In *Sipriano*, the court explained that it lacked the authority to supplant the rule of capture with the rule of reasonable use despite the admission.[191] This proposed action does not require a rule replacement that the court believed it was without authority to do because this proposed action places the burden on the GCDs and the TRRC to create regulations on groundwater based on the needs of each GCD and the

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180. *See* discussion *supra* Part V.
181. *See* discussion *supra* Part VI.C.
182. *See* WATER §§ 36.013, 36.1071–.1072.
183. *See* Modern Shale Gas Development, *supra* note 120, at 28; WATER § 36.101.
184. *See* discussion *supra* Part VI.C.
185. *See Environment*, TEX. ALMANAC, http://www.texasalmanac.com/topics/environment/environment (last visited May 12, 2012).
186. *See* discussion *supra* Part VI.C.
187. *See* discussion *supra* Part VI.C.
188. *See* Sierra Club v. Babbitt, 995 F.2d 571 (5th Cir. 1993).
189. *See* Barshop v. Medina Cnty. Underground Water Conservation Dist., 925 S.W.2d 618 (Tex. 1996).
190. *See* Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75 (Tex. 1999).
191. *See id.* at 80.

requirements of oil and gas operations within each GCD.[192] A realization that Texas is the last adherent to the rule of capture, coupled with case law that indicates a need for regulation, demonstrates promise for acceptance and success of this proposed action.[193]

Furthermore, this proposed action would permit citizens affected by water consumption in their GCD to utilize the democratic process to ensure that their interests are being addressed by the TRCC and their respective GCD.[194] Consequently, under this proposed action, citizens could use the political process in lieu of the judicial process to ensure the conservation of the state's groundwater resources. The proposed action would allow for an administrative solution to the need for groundwater conservation, which "always lingers in the face of ever-increasing demands for water."[195]

VII. Utilization of Other Water Sources

As demand for water has increased, cities and industrial users have turned to reclaimed water, desalinization, and ASR to help meet that demand.[196] Of these options, reclaimed water and desalinization can provide sources of water to oil and gas operations that would reduce their dependence and usage of groundwater.[197]

A. Reclaimed Water

By utilizing reclaimed water directly, oil and gas operations could achieve the goal of reduced use of groundwater.[198] Using reclaimed water for fracing purposes would allow the same groundwater to be used for both drinking water and in fracing operations.[199] This would be possible because the groundwater, once used as a source of drinking water, can be treated and piped directly to oil and gas operations for fracing purposes.[200] Concerns

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192. *See* discussion *supra* Part VI.C.

193. *See* City of San Marcos v. Tex. Comm'n on Envtl. Quality, 128 S.W.3d 264, 271 (Tex. App.—Austin 2004, pet denied); *see also Sierra Club*, 995 F.2d 571; *Barshop*, 925 S.W.2d 618; *Sipriano*, 1 S.W.3d 75.

194. *See* TEX. WATER CODE ANN. § 36.051 (West 2008) (requiring members of a GCD board of directors to be elected for four-year terms); Act of March 25, 1927, 40th Leg., R.S., ch. 140, § 1, 1927 Tex. Gen. Laws 209, *repealed by* Act of May 20, 2009, 81st Leg., R.S., ch. 86, § 5.01(a), 2009 Tex. Gen. Laws 153, 205.

195. *Barshop*, 925 S.W.2d at 626; *see also* Williams, *supra* note 5, at 819 (discussing the push for legislation to prevent SAWS from pumping water from an Alcoa mine located in Lee County and the inability of the TRRC to enforce contractual obligations of SAWS to mitigate damage to wells caused by the pumping).

196. *See* discussion *supra* Part III.A–C; *see also* Williams, *supra* note 5, at 819 (stating that a popular source for meeting future water needs is desalination).

197. *See* discussion *supra* Part III.A–C.

198. *See* discussion *supra* Part III.A.

199. *See* discussion *supra* Part III.A.

200. *See* discussion *supra* Part III.A.

about the quality of reclaimed water for fracing use are not likely because current treatment methods already produce water that complies with drinking water standards despite the fact that no entity currently uses reclaimed water for that purpose.[201]

Reclaimed water could possibly meet the water needs of oil and gas operations' fracing processes single-handedly when comparing projected demand to projected supply.[202] This possibility becomes more realistic when TWDB adds water management strategies to its projection for reclaimed water supply.[203] The reclaimed water is economically viable because of its proximity to users.[204] It is unlikely that every acre-foot of reclaimed water, or even enough of the projected acre-feet, will be close enough to every oil and gas operations to make this an economically viable alternative for every oil and gas operation located in the state. However, this possible alternative water source could be used by the GCDs and the TRRC when deciding on water use limitations.

B. Desalinization

Use of desalinization techniques is expanding despite the high cost of this water source.[205] Oil and gas operations are likely in a better position economically to incur the costs of desalinization projects than municipalities. For example, Halliburton currently has eighteen locations in the U.S. where it engages in shale gas activities, and is either engaged in or exploring options for shale gas operations in Europe, South America, the Middle East, Africa, and China.[206] This puts Halliburton and other similarly situated members of the oil and gas industry in a much better position to fund a $67 million desalinization plant than approximately 397,000 Brownsville residents.[207] Members of the oil and gas industry are also more likely to be able to keep pace with technological advancement better than municipalities.[208]

Any increase in the cost of shale gas production due to expenses incurred through research and development of desalinization as a water source for fracing operations will likely be passed along to the consumer by the oil and

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201. *See* discussion *supra* Part III.A.

202. *Compare* discussion *supra* Part III.A (noting TWDB projection that reclaimed water supply will be 358,000 acre-feet by 2050), *with* discussion *supra* Part V (noting BEG high estimate for groundwater demand for fracing operations as 19,000 acre-feet in 2025).

203. *See* discussion *supra* Part III.A (noting TWDB projection that reclaimed water supply will be over 1.5 million acre-feet by 2050 with the use of water management strategies).

204. *See* discussion *supra* Part III.A.

205. *See* discussion *supra* Part III.B.

206. *See Project Experience*, HALLIBURTON, http://www.halliburton.com/ps/default.aspx?navid=1519&pageid=3167 (last visited May 12, 2012); *Global Shale Gas*, HALLIBURTON, http://www.halliburton.com/ps/default.aspx?navid=1519&pageid=3892 (last visited May 12, 2012).

207. *See* discussion *supra* Part III.B; *Estimated Texas Population by Area, 2009*, TEX. DEP'T OF ST. HEALTH SERVS., http://www.dshs.state.tx.us/chs/popdat/ST2009.shtm (last visited May 12, 2012).

208. *See* discussion *supra* Part III.B.

gas industry. But, when given the option to reduce oil prices or have potable water readily available, it is doubtful that many will choose the former over the latter.

VIII. CONCLUSION

Texas benefits from its vast oil and gas resources, especially those natural gas resources contained in the Barnett Shale, but this benefit can only continue if oil and gas production coexists with the state's groundwater resources.[209] Water is a finite resource necessary for the continued existence of the human race and for which there is no known alternative.[210] Texans can adapt to life without oil and gas, however unlikely or painful that possibility may be, but Texans cannot adapt to life without water.[211] In order to preserve this most precious of resources, Texans must develop alternatives to the statutory exclusion for a significant user of groundwater resources as well as explore the use of other water sources to meet demand. Through cooperative administrative regulation of groundwater resources, Texans can have a voice in the regulation of their drinking water sources, and all parties interested in the use of Texas's groundwater can have a seat at the table to create a system of regulation that conserves water, while allowing the benefits that flow from oil and gas resources to continue.[212]

by Philip McLemore

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209. *See* discussion *supra* Part V.
210. *See* Williams, *supra* note 5, at 817.
211. *Id.*
212. *See* discussion *supra* Part IV.