NATURAL RESOURCES JOURNAL

Volume 64
Issue 2 *Summer*

Summer 2024

Climate Change Will Make the Final Call in New Mexico's Groundwater Appropriation

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CASE NOTE

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CLIMATE CHANGE WILL MAKE THE FINAL CALL IN NEW MEXICO'S GROUNDWATER APPROPRIATION

INTRODUCTION

In December 2022, the New Mexico Court of Appeals called upon the New Mexico Office of the State Engineer (OSE) and the New Mexico Legislature to formulate standards that take climate change into account for assessing water allocation requests.[1] This marks the first time a New Mexico appellate court has prompted the state's water management entity and legislative body to integrate climate change considerations into the water appropriation process, indicating a growing recognition of climate change's impacts in the state.

This case note begins by describing the two primary approaches to addressing climate change: adaptation and mitigation. Subsequently, it delves into the existing status of water law in New Mexico and the adverse impacts climate change is already exerting on the state's water resources. Next, it evaluates *Aquifer Science, LLC v. Verhines* and its potential consequences. This note then puts these developments in context by surveying some of New Mexico's neighboring states' legislative or regulatory responses to climate change as it affects groundwater. Lastly, it offers suggestions for crafting groundwater appropriation policies to address the influence of climate change for the New Mexico State Engineer and Legislature's consideration.

BACKGROUND

I. Climate Change Adaptation and Mitigation, Broadly

The increasingly intense effects of climate change present an urgent demand for changes to environmental laws and policies. However, progress toward recognizing climate change in the law has been slow. In part, this is because climate change manifests differently in different places, resulting in the phenomenon of

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1. Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 47, 527 P.3d 667 [hereinafter Aquifer Sci.].

climate change denialism.[2] The slow pace of progress is also due to a split between support for climate adaptation and climate mitigation.[3]

Climate adaptation refers to the process of adjusting to the climate changes already occurring, or "already in the pipeline," while climate mitigation focuses on limiting the levels of "heat-trapping greenhouse gases" in the atmosphere to prevent additional climate change from occurring.[4] In the context of water resources, adaptation often includes the use of tools such as drought monitoring systems and irrigation technologies as well as the development or re-development of wetlands to provide flood defense for at-risk cities.[5] On-the-ground mitigation strategies include agroforestry to promote more efficient use of water in line with agroecological principles or "circular systems of reusing and recycling water."[6]

Despite the tendency among scientists and policymakers to advocate for *either* adaptation *or* mitigation, it is apparent both are needed, "even if they fundamentally are different and sometimes competing policy thrusts."[7] Adaptation and mitigation cannot be exclusive because the time when proactive mitigation policies could have precluded adaptation has already passed—we need mitigation to prevent further climate change, but we must also adapt to the changes that are already occurring.[8] Mitigation policy can prompt a more stable climate regime.[9] Adaptation policy advances at least one of the following three strategies: (1) resisting the effects of climate change to maintain the status quo, (2) transforming physical, social, environmental, or economic conditions to minimize harm or maximize benefits associated with climate change, or (3) moving humans or other species to locate better adaptive capacities.[10]

Water resources present some of the greatest challenges in climate adaptation and mitigation. For the law to adequately fulfill the needs of competing water usage—municipal, industrial, agricultural, etc.—it must update the "centuries old" system of water allocation and conservation currently in use.[11]

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2. *See* Robin Kundis Craig, *Water Law and Climate Change in the United States: A Review of the Scholarship*, UTAH L. DIGIT. COMMONS (2020), https://dc.law.utah.edu/cgi/viewcontent.cgi?article=1197&context=scholarship; John Letzing, *Is Climate Denialism Dead?*, WORLD ECON. F. (Aug. 15, 2022), https://www.weforum.org/agenda/2022/08/is-climate-denialism-dead/.

3. *See* J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENV'T L. 363, 366 (2010).

4. *Responding to Climate Change*, NASA, https://climate.nasa.gov/solutions/adaptation-mitigation/ (last visited May 2, 2023).

5. INT'L WATER MGMT. INST., TRANSFORMATION OF WATER SYSTEMS FOR CLIMATE CHANGE ADAPTATION AND RESILIENCE 3 (2021).

6. *Why Water Is Crucial to Climate Mitigation*, STOCKHOLM INT'L WATER INST. (June 4, 2021), https://siwi.org/latest/why-water-is-crucial-to-climate-mitigation/.

7. Ruhl, *supra* note 3, at 370.

8. *See id.* at 370–71.

9. *Id.* at 375.

10. *Id.* at 386.

11. *See id*. at 403.

II. The Current State of Water Resources and Water Law in New Mexico

Groundwater accounts for about seventy-eight percent of New Mexico's drinking water, making it an essential resource for the state's residents.[12] Groundwater is the only practicable source of water for much of the state and provides half of all water withdrawn annually for all uses in the state.[13] The New Mexico Environment Department oversees water quality across the state, including water infrastructure systems.[14] The OSE oversees water quantity, in part by administering the appropriation and distribution of surface and groundwaters.[15]

Keeping the significance of New Mexico's groundwater in mind, it is helpful to consider how the effects of climate change in New Mexico are being felt across the state with increasing intensity. New Mexico's average annual temperature has increased about 2.7 degrees Fahrenheit since 1970.[16] Drought has reduced the water available to farmers; for example, in 2013, farmers along the Rio Grande River "received allotments of only 3.5 inches of water per acre, compared with a full allotment of 36 inches in normal years."[17] Along with drier and warmer conditions come wildfires that are "more frequent and more destructive"—New Mexico's fire season has extended from five months to seven over the past forty years.[18] The state's summer monsoon season has also seen an increasing number of irregular, shorter-term, higher-intensity rainfalls.[19]

Climate change is also affecting groundwater resources. For example, climate change threatens the recharge process that supplies aquifers.[20] Warmer temperatures impact precipitation patterns, which affect the amount of water sinking into the ground.[21] Additionally, when land uses change, such as with agricultural or residential development, the displacement of native vegetation can affect the amount of water that returns to the atmosphere through evapotranspiration—ultimately exacerbating the effects on precipitation patterns.[22] The combination of a slowed recharge process with increased groundwater pumping by humans places increased stress on aquifers.[23] One study even found that groundwater pumping (and the eventual transfer of pumped water into the oceans) between 1993 and 2010 actually

12. *Water Resources & Management*, N.M. ENV'T DEP'T, https://www.env.nm.gov/water/ (last visited May 2, 2023).

13. *Id.*

14. *Id.*

15. *Id.*

16. UNION OF CONCERNED SCIENTISTS, CONFRONTING CLIMATE CHANGE IN NEW MEXICO 2 (May 2, 2016), https://www.ucsusa.org/sites/default/files/attach/2016/04/Climate-Change-New-Mexico-fact-sheet.pdf.

17. *Id.* at 4–5.

18. *Id.* at 5–6.

19. *Id.* at 4.

20. Daisy Dunne, *Climate Change's Impact on Groundwater Could Leave 'Environmental Timebomb'*, CARBONBRIEF (Jan. 21, 2019, 4:00 PM), https://www.carbonbrief.org/climate-change-impact-groundwater-environmental-timebomb/.

21. *Id.*

22. *Id.*

23. *Id.*

shifted Earth's axis of rotation by about 2.6 feet.[24] This shift resulted from substantial mass displacement caused by groundwater extraction on the Earth's surface, particularly concentrated in high-impact middle latitudes.[25] Any ongoing efforts to ignore climate change would be futile as changes in precipitation, temperature, and ecology are occurring with increasing intensity and decreasing predictability.[26]

Environmental justice is also a pivotal consideration regarding groundwater resources because of New Mexico's arid climate and demographic characteristics. The U.S. Environmental Protection Agency found "the most severe harms from climate change fall disproportionately upon underserved communities who are least able to prepare for, and recover from, heat waves, poor air quality, flooding, and other impacts."[27] As of 2020, about eighteen percent of New Mexicans had incomes below the poverty line,[28] and the state's diversity index reached sixty-three percent.[29] This means that much of New Mexico's population will struggle to adapt to ongoing climate change. Therefore, environmental justice must be a central consideration in New Mexico climate policymaking going forward.

New Mexico's water code, originally enacted in 1907, acknowledges water scarcity but does not directly address the role of climate change in contributing to water scarcity.[30] Under this enduring law that predates New Mexico's admission to statehood, beneficial use determines "the basis, the measure and the limit of the right to the use of water. . . ."[31] Regarding conservation, "New Mexico statutes do not expressly label conserved water as a beneficial use," but they also do not "subject [conservation] to the same penalties as nonuse, at least in the agricultural context."[32] In 2003, the New Mexico Legislature explicitly prohibited diminishing an owner's

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24. Will Sullivan, *Humans Have Shifted Earth's Axis by Pumping Lots of Groundwater*, SMITHSONIAN MAG. (June 22, 2023), https://www.smithsonianmag.com/smart-news/humans-have-shifted-earths-axis-by-pumping-lots-of-groundwater-180982403/.

25. *Id.*

26. *See, e.g.*, Andy Rowell, *Scientists: It Looks Like We Underestimated Climate Breakdown & Are Heading for 2 Degrees of Warming*, OIL CHANGE INT'L (July 20, 2023), https://priceofoil.org/2023/07/20/scientists-it-looks-like-we-underestimated-climate-breakdown-are-heading-for-2-degrees-of-warming/; Alison Bosman, *Dangerous Climate Feedback Loops Have Been Underestimated*, EARTH.COM (Mar. 10, 2023), https://www.earth.com/news/dangerous-climate-feedback-loops-have-been-underestimated/.

27. *EPA Report Shows Disproportionate Impacts of Climate Change on Socially Vulnerable Populations in the United States*, U.S. ENV'T PROT. AGENCY (Sept. 2, 2021), https://www.epa.gov/newsreleases/epa-report-shows-disproportionate-impacts-climate-change-socially-vulnerable.

28. *New Mexico 2020 Report*, CTR. FOR AM. PROGRESS, https://talkpoverty.org/state-year-report/new-mexico-2020-report/index.html (last visited May 2, 2023).

29. A higher percentage indicates a greater variety of racial and ethnic characteristics among residents of the state. America Counts Staff, *New Mexico Population Grew 2.8% Last Decade*, U.S. CENSUS BUREAU (Aug. 25, 2021), https://www.census.gov/library/stories/state-by-state/new-mexico-population-change-between-census-decade.html.

30. *See* Hon. Manuel I. Arrieta, *Climate Litigation: The Future is Now*, 63 NAT. RES. J. 139, 143 (2023).

31. N.M. STAT. ANN. § 72-1-2 (1907).

32. ADAM SCHEMPP, WESTERN WATER IN THE 21ST CENTURY: POLICIES AND PROGRAMS THAT STRETCH SUPPLIES IN A PRIOR APPROPRIATION WORLD 8 (2009), https://www.eli.org/sites/default/files/eli-pubs/western-water-21st-century-eli.pdf.

water rights where improved irrigation methods resulted in water conservation.[33] Then, in 2007, the Legislature granted the State Engineer the authority to "approve a change of use, place of use, or point of diversion for conserved irrigation water" and protected water rights where changes in agricultural practices resulted in water conservation.[34] In 2021, the Legislature considered House Bill 95, which would have required the OSE to "consider climate change implications when making water rights decisions. . . ."[35] The bill passed the House Energy, Environment and Natural Resources Committee but did not receive a floor vote.[36] Therefore, the Legislature is gradually incorporating conservation values into the state water code but has not adopted clear mitigation or adaptation strategies in response to climate change.

Although New Mexico's water code does not currently acknowledge the realities of climate change, there are still opportunities for impactful climate adaptation and mitigation policy, including through the judiciary. As Judge Manuel Arrieta, District Court Judge for the Third Judicial District in Doña Ana County, New Mexico and member of the Judicial Leaders in Climate Science program, articulated, "the best thing we can do" to incorporate climate science in our legal system is to establish a precedent for considering climate change when evaluating modern water cases.[37] Indeed, New Mexico's courts have begun taking note of climate change in their decision-making.

In 2006, for example, the New Mexico Court of Appeals considered whether to enforce the doctrine of prior appropriation in the face of "rampant usage" coinciding with water shortages along the Pecos River.[38] The court declined to interpret the New Mexico Constitution or the Pecos River Compact as requiring strict prioritization of senior water rights as the exclusive response to water shortage concerns.[39] Instead, the court found that greater flexibility is permissible under New Mexico law so long as senior users were still protected through other means.[40]

In 2007, the New Mexico Supreme Court considered the State Engineer's approval of developers' transfer applications to provide water for a residential development.[41] Noting the State Engineer's "statutory obligation to determine if existing water rights will be impaired when a transfer application is filed," the court remanded the case to the district court to consider fully the extent of impairment for existing users, as well as "whether the applications [were] contrary to water conservation or detrimental to the public welfare of the state."[42]

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33. *Id.*

34. *Id.* at 8–9.

35. Kendra Chamberlain, *Bills Addressing Water Management and Utility Securitization Pass Committees*, N.M. POL. REP. (Feb. 19, 2021), https://nmpoliticalreport.com/nmleg/bills-addressing-water-management-and-utility-securitization-pass-committees/.

36. *2021 Regular Session – HB 95*, N.M. LEGISLATURE, https://www.nmlegis.gov/Legislation/Legislation?Chamber=H&LegType=B&LegNo=95&year=21 (last visited May 2, 2024).

37. *See* Arrieta, *supra* note 30, at 139, 152.

38. State ex rel. Off. of the State Eng'r v. Lewis, 2007-NMCA-008, ¶¶ 1–2, 141 N.M. 1, 150 P.3d 375.

39. *Id.* at ¶ 38.

40. *Id.* at ¶ 39.

41. Montgomery v. Lomos Altos, Inc., 2007-NMSC-002, ¶ 1, 141 N.M. 21, 150 P.3d 971.

42. *Id.* at ¶¶ 28, 39.

In 2013, the New Mexico Supreme Court reiterated a previous rule that new water appropriations do not constitute per se impairment.[43] The court also held that impairment to one's water rights must be actual or imminent "or at least something more than a speculative inference from the fact of a closed and fully appropriated basin. . . ."[44]

While the state's higher courts have acknowledged that water scarcity requires us to rethink our water allocation procedures, climate change itself has remained a relatively taboo topic for the higher courts. This evolution of New Mexico's water law sets the stage for the New Mexico Court of Appeals' 2022 decision in *Aquifer Science, LLC v. Verhines*, which applies the factor of climate change to questions of groundwater impairment and conservation.

III. Background of *Aquifer Science, LLC v. Verhines*

Aquifer Science's appeal to the New Mexico Court of Appeals marks the most recent development in water law in New Mexico. Essentially, this case raised the question of whether there were any significant opportunities left for new water allocations within New Mexico's Sandia Underground Water Basin (Sandia Basin). Aquifer Science initially sought to obtain water for its proposed Campbell Ranch Master Plan Project, to be situated north of Edgewood, New Mexico and spanning the boundaries of Bernalillo, Sandoval, and Santa Fe Counties.[45] Aquifer Science planned to construct four residential villages with commercial and resort elements, including two golf courses.[46] The town of Edgewood approved the plan and annexed Villages 2, 3, and 4 but did not annex Village 1.[47] Village 1 remained subject to Bernalillo County's planning, and the County had not approved the plan or annexed Village 1 at the time the case was filed.[48]

After establishing its plan, Aquifer Science applied to the OSE in June 2009 for a groundwater appropriation permit, requesting 1,500 acre-feet per year (a.f.y.) of groundwater for 25,000 acres of land.[49] Aquifer Science amended its application for the first time in September 2011 and reduced its request to 1,010 a.f.y. of water.[50] Aquifer Science amended its application a second time in March 2013, reducing the planned geographic area from 25,000 acres to approximately 8,000 acres.[51] Aquifer Science later amended its application a third and final time in June 2013, reducing its requested appropriation to 717 a.f.y. of water.[52] The State Engineer ultimately denied Aquifer Science's application upon a finding that there was no unappropriated groundwater available in the Sandia Basin.[53]

43. Bounds v. State ex rel. D'Antonio, 2013-NMSC-037, ¶ 15, 306 P.3d 457, 462.
44. *Id.* at 470.
45. Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 3, 527 P.3d 667.
46. *Id.*
47. *Id.*
48. *Id.*
49. *Id.* at ¶ 4.
50. *Id.*
51. *Id.*
52. *Id.*
53. *Id.*

Following the State Engineer's decision, Aquifer Science filed a de novo appeal to the district court, and the court allowed Aquifer Science to amend its application again—this time to a mere 350 a.f.y. of water.[54] Aquifer Science made this amendment after acquiring other permitted water.[55] The OSE then reversed its position, "align[ing] itself with Aquifer Science's position on all of the issues."[56] Multiple parties, including several local residents in the project area, opposed the application.[57] In an opinion authored by Justice C. Shannon Bacon prior to her appointment to the New Mexico Supreme Court, the district court found the permit application to be too speculative and unpersuasive regarding Aquifer Science's conservation goals. The court concluded that Aquifer Science did not consider climate change when it prepared its application despite the data suggesting that the availability of surface water would decline during the project's development.[58] Additionally, the court noted that the OSE conditioned the granting of groundwater appropriation permits on the use of the best technology available for ensuring water conservation but did not have any written guidelines or policies explaining how to satisfy this condition or how it would determine whether a permit application is "contrary to water conservation."[59]

The district court denied the application, finding that although there was sufficient unappropriated water in the Sandia Basin to fulfill the application's 350 a.f.y. request, the application was inconsistent with statutory conservation goals and "the magnitude of the impairment to existing water rights [was] significant."[60]

Aquifer Science subsequently appealed to the Court of Appeals, which produced an opinion authored by Judge Michael D. Bustamante, sitting by designation. At issue was the district court's decision concerning conservation and impairment of existing water rights.[61]

ANALYSIS

I. The *Aquifer Science, LLC v. Verhines* Decision

The district court's decision was appealed on two primary grounds. The first primary issue that the Court of Appeals considered was the district court's denial of Aquifer Science's groundwater appropriation request.[62] Under this issue, the Court of Appeals first considered Aquifer Science's argument that the district court's

54. *Id.* at ¶¶ 4–5.

55. *Id.* at ¶ 5.

56. *Id.* The change in the OSE's position was accompanied by a change in leadership. Within a week of the OSE's initial denial of the application, then-State Engineer and named defendant in this case, Scott Verhines, was replaced by Tom Blaine. Blaine supported Aquifer Science and its application. *Campbell Ranch Master Plan: Timeline and History*, E. MOUNTAINS PROT. ACTION COAL. (Dec. 19, 2021), https://theempac.org/campbell-ranch-master-plan-timeline-and-history/.

57. Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 5, 527 P.3d 667.

58. Aquifer Sci., LLC v. Verhines, No. D-202-CV-2014-07209, 60–61 (N.M. Dist. Ct. 2019).

59. *Id.*

60. *Id.* at 57, 59, 61. *See also infra* note 75 for the relevant statutory language.

61. *Aquifer Sci., LLC*, 2023-NMCA-020, at ¶ 9.

62. *Id.* at ¶ 1.

impairment analysis was incomplete and not supported by substantial evidence.[63] The Court ultimately affirmed the district court's impairment determination, holding that it would neither reweigh the evidence nor substitute its judgment for the district court's on this issue.[64] The Court found it significant that the "State Engineer has not promulgated any rules or regulations regarding impairment and there is no statutory definition of impairment."[65] Next, when addressing Aquifer Science's technical claims about the district court's error in the impairment analysis, the Court of Appeals determined that one issue raised (regarding the hydrologic qualities of the Sandia Basin) was not preserved, as the district court had not been notified about it.[66] While the Court found that the other issue raised (regarding the determined number of wells that would be impaired by the application's approval) did correctly identify an error in the district court's evaluation of expert testimony, the district court's determination was supported by substantial evidence and was not so significant as to undermine its ultimate findings.[67] The Court of Appeals found the district court's error to be "surplusage" that could be "excised without altering the fundamental agreement between the district court's decision and the testimony it credited."[68]

The Court then considered Aquifer Science's argument that the district court used an "unduly strict interpretation" of New Mexico's statutory water conservation concept.[69] This portion of the Court's opinion is the central focus of this note's analysis and is discussed in greater detail below. Finally, the Court considered Aquifer Science's argument that the district court "improperly required Aquifer Science to obtain land-use authorization for the entire project" as a condition of approval for the water appropriation application.[70] The Court determined that Aquifer Science misinterpreted the district court's decision, which did not require demonstration of land-use authorization.[71] The second primary issue the Court of Appeals considered was the district court's order "granting costs to certain protesting parties as the prevailing parties below. . . . "[72]

Regarding conservation, Aquifer Science argued that the district court "adopted an unduly strict interpretation" of section 72-12-3(E) of the New Mexico Water Code in its finding that Aquifer Science's application was inconsistent with conservation.[73] Aquifer Science argued the district court misinterpreted the provision by imposing "an affirmative burden of proof not found in the statute."[74] This portion of New Mexico's groundwater permit application statute provides the following:

63. *Id.*

64. *Id.* at ¶ 25.

65. *Id.* at ¶ 12.

66. *Id.* at ¶ 20.

67. *Id.* at ¶¶ 26–28.

68. *Id.* at ¶ 28.

69. *Id.* at ¶ 1.

70. *Id.*

71. *Id.* at ¶¶ 52, 54.

72. This second issue is not discussed in this note, but the Court of Appeals affirmed the district court's order. *Id.* at ¶ 2.

73. *Id.* at ¶¶ 1, 29.

74. *Id.* at ¶ 31.

> After the expiration of the time for filing objections, if no objections have been filed, the state engineer shall, if the state engineer finds that there are in the underground stream, channel, artesian basin, reservoir or lake unappropriated waters and that the proposed appropriation *would not impair existing water rights* from the source, *is not contrary to conservation of water* within the state *and is not detrimental to the public welfare* of the state, grant the application and issue a permit to the applicant to appropriate all or a part of the waters applied for, subject to the rights of all prior appropriators from the source.[75]

This statutory language requiring consideration of conservation in approving groundwater applications was added by the Legislature in 1983.[76] Aquifer Science interpreted this language to mean that "an application to appropriate groundwater is 'not contrary to conservation' as long as the proposed use is beneficial and no more water is appropriated than is needed to achieve the beneficial purpose."[77] The Court of Appeals addressed this issue because no New Mexico cases had discussed the conservation prong of section 72-12-3(E), so the Court found it "appropriate to provide guidance as to its meaning and application."[78]

First, the Court of Appeals concluded that "in context, the phrase 'not consistent with conservation' [the district court's phrasing] is no more than a synonym for the statutory phrase 'not contrary to conservation of water.'"[79] Next, the Court noted that Aquifer Science's definition of "not contrary to conservation" was the result of combining language from cases unrelated to the concerns of conservation with the dictionary definition of "conserve."[80] The Court called this definition "a standard that could improperly prevent the State Engineer and the courts from considering evidence other than an applicant's best efforts evidence."[81] Additionally, the Court determined that Aquifer Science's reliance on a dictionary definition of "conserve" was inappropriately detached from context.[82] The Court reasoned that Aquifer Science did not acknowledge aspects of conservation including minimal use, prevention of waste, or "broader concerns for planned management of and caring for resources to prevent exploitation, destruction, and depletion."[83] It noted that Aquifer Science's omissions made its statutory construction "too narrow—and, frankly, too self-serving—to credit."[84] Furthermore, the Court warned that Aquifer Science's approach "would improperly restrict the type of evidence the State Engineer and the district courts would be able to rely on."[85]

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75. N.M. STAT. ANN. § 72-12-3(E) (2019) (emphasis added).
76. Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 38, 527 P.3d 667.
77. *Id.* at ¶ 37 (internal citation omitted).
78. *Id.* at ¶ 29.
79. *Id.* at ¶ 33.
80. *Id.* at ¶ 37.
81. *Id.*
82. *Id.* at ¶ 39.
83. *Id.* at ¶ 40.
84. *Id.*
85. *Id.* at ¶ 41.

The Court of Appeals acknowledged the district court's conclusion that Aquifer Science's application was contrary to conservation of water, highlighting the lower court's reasoning that "the predicted higher temperatures and severe droughts were likely to have a negative effect on the supply of water in the next fifty years" and "Aquifer Science did not consider the impacts of climate change in its analysis."[86] Although "Aquifer Science's projected per capita water use [met the] OSE's Conservation Guide for Public Utilities," the district court raised concern about enforcement because "[t]he State Engineer does not enforce the Conservation Guide [for Public Utilities] nor does it deal with building permits."[87] Furthermore, Aquifer Science did not plan to "condition its permit on imposition of a [per capita cap on usage]."[88] Among other factual concerns, the district court determined Aquifer Science's request of 100 a.f.y. of pumped potable water for golf courses to be inconsistent with conservation.[89] The Court of Appeals found these determinations reasonable "[g]iven the consistent general decline of well water levels in the Sandia Basin."[90]

The Court of Appeals affirmed the district court's conservation determination because "Aquifer Science [had] failed to demonstrate that the district court misunderstood the statutory standard it was applying,"[91] and "[t]he district court's finding of fact that Aquifer Science did not consider climate change in preparing its water demand or hydrologic analyses [was] supported by substantial evidence."[92] Ultimately, the Court of Appeals reasoned that the district court was "clearly aware of the statute and its requirements" and its "mere usage of nonidentical terminology as that found in the statutory phrase [did] not suggest its misunderstanding of the applicable standard."[93]

Despite affirming the district court's findings, the Court of Appeals reasoned that as a matter of judicial caution, it would not rely on the district court's finding regarding climate change as a basis for affirming the conservation decision.[94] Significantly, the Court wrote that its decision "provides the State Engineer and the Legislature the opportunity to provide guidance regarding climate change and conservation before it is judicially imposed."[95]

II. Potential Impact on New Mexico Law

Through *Aquifer Science*, the New Mexico Court of Appeals, for the first time, called upon the OSE and the Legislature to develop climate change standards for use in deciding whether to grant water rights permits.[96] This decision breaks from

86. *Id.* at ¶ 46.
87. *Id.* at ¶ 48.
88. *Id.*
89. *Id.* at ¶ 50.
90. *Id.*
91. *Id.* at ¶ 36.
92. *Id.* at ¶ 46.
93. *Id.* at ¶¶ 33, 35.
94. *Id.* at ¶ 47.
95. *Id.* Aquifer Science did not file a petition for certiorari with the New Mexico Supreme Court.
96. *Id.*

the tradition of water law, which typically disregards the connection between groundwater and surface water—meaning the decision acknowledges a crucial link between law and science.[97]

To avoid the ongoing degradation of water resources, significant reform is necessary.[98] Such reform must take place now rather than later because "groundwater pumping that has already occurred will cause environmental damage in the future."[99] The Court of Appeals' decision alerted the OSE and the Legislature to the judiciary's likely trajectory of climate-oriented decision-making going forward. The OSE may respond by developing a more contemporary framework for its appropriation decision-making or by adopting a more climate-cautious approach to making determinations on applications akin to the one in *Aquifer Science*. It is entirely possible the OSE and the Legislature will shift standards for granting water allocations toward recognizing climate change and its effects on water resource availability in the state. In considering how to do so, these entities may draw upon some of the approaches used in neighboring states, discussed below.

III. Climate Change Considerations in Other States

The federal government has a minimal role in regulating groundwater pumping, while "individual states have implemented a dizzying array of often weak rules."[100] Among the states, there is a general lack of coordination on data and regulations surrounding groundwater and environmental matters at large.[101] This irregularity has resulted in "a patchwork of state and local rules so lax and outdated that in many places oversight is all but nonexistent."[102] For example, some states—particularly in the lower Mississippi River region—have little to no restrictions on groundwater pumping despite significant agricultural irrigation.[103] Other states, including Kentucky, Vermont, and Oregon, have groundwater pumping limits but make exceptions for prominent industries, emergency use, or everyday activities.[104]

Oklahoma is one state with relaxed policies allowing for groundwater "mining," or extracting groundwater "at rates that exceed an aquifer's ability to recharge."[105] Oklahoma allows groundwater pumping from some regions "until it's gone."[106] The state is currently determining how much water remains available,

97. *See* Robert Glennon, *The Perils of Groundwater Pumping*, ISSUES SCI. & TECH. (2002), https://issues.org/glennon/.

98. *Id.*

99. *Id.*

100. Mira Rojanasakul et al., *America Is Using Up Its Groundwater Like There's No Tomorrow*, N.Y. TIMES (Aug. 28, 2023), https://www.nytimes.com/interactive/2023/08/28/climate/groundwater-drying-climate-change.html.

101. Dionne Searcey & Delger Erdenesanaa, *A Tangle of Rules to Protect America's Water Is Falling Short*, N.Y. TIMES (Nov. 2, 2023), https://www.nytimes.com/interactive/2023/11/02/climate/us-groundwater-depletion-rules.html.

102. *Id.*

103. *Id.*

104. *Id.*

105. *Id.*

106. Rojanasakul et al., *supra* note 100.

which will help its state legislature set appropriate limits on groundwater pumping.[107] However, one concern with this approach is that residents "might not necessarily welcome the government telling them that their land is running out of groundwater," as it could impact their property values.[108]

Additionally, the Oklahoma Legislature does not appear to be aligned with the goal of limiting groundwater pumping. In 2023, both chambers of Oklahoma's Legislature passed a bill that "would throw out protests of permits from the Oklahoma Water Resources Board" where complaints center on the industry or entity applying for water.[109] The co-authors of the bill stated that its purpose was to enhance government efficiency and shield industries from "'frivolous protests.'"[110] Critics of the bill warned that it could "take away the [Oklahoma Water Resources Board]'s ability to fully consider permitting issues."[111] Oklahoma's governor signed the bill into law in early June 2023.[112] Oklahoma therefore represents one of New Mexico's neighbors that remains obstinate in the face of climate change's effects on groundwater resources.

Unlike Oklahoma, California has taken a stronger stance on groundwater protection. As in New Mexico, groundwater is an essential resource in California, making up sixty percent of the latter's water supply during drought.[113] In 2014, California passed its Sustainable Groundwater Management Act (SGMA), establishing a framework for long-term protection of groundwater resources.[114] The SGMA requires formation of groundwater sustainability agencies for high- and medium-priority groundwater basins.[115] These agencies are then responsible for developing and implementing groundwater sustainability plans that will "mitigate overdraft within 20 years."[116] Basins designated low- or very low-priority are also encouraged to develop plans, but are not required to.[117] By 2017, all high- and medium-priority basins had formed their groundwater sustainability agencies, and by 2022, all critically overdrafted, high-, and medium-priority basins had submitted their groundwater sustainability plans.[118] The SGMA has successfully prompted

107. *Id.*

108. *Id.*

109. Graycen Wheeler, *Bill to Limit Opposition to Industrial Water Permits Has Stalled in the Oklahoma Legislature*, KOSU (May 10, 2023, 7:00 AM), https://www.kosu.org/energy-environment/2023-05-10/a-measure-to-limit-opposition-to-industrial-water-permits-has-stalled-in-the-legislature.

110. *Id.*

111. *Id.*

112. *Bill Information for HB 2053*, OKLA. STATE LEGISLATURE, http://www.oklegislature.gov/BillInfo.aspx?Bill=hb2053&Session=2300 (last visited May 2, 2024).

113. CAL DEP'T OF WATER RES., SUSTAINABLE GROUNDWATER MANAGEMENT ACT BROCHURE 1 (2023), https://resources.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Files/SGMA-Brochure_Online-Version_FINAL_updated.pdf [hereinafter SGMA BROCHURE].

114. *Sustainable Groundwater Management Act (SGMA)*, CAL. DEP'T OF WATER RES., https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management (last visited May 2, 2024).

115. *Id.*

116. *Id.*

117. SGMA BROCHURE, *supra* note 113, at 2.

118. *Id.* at 5.

statewide action to protect groundwater resources, and, significantly, has done so by supporting localized management.[119]

Arizona's reliance on groundwater is similar to that of the rest of the Southwest: groundwater provides forty-one percent of the state's water supply.[120] In 2023, Arizona's governor used an executive order to begin modernizing groundwater management in the state.[121] The governor established the Governor's Office of Resiliency to coordinate stakeholders in pursuing water, energy, and land use solutions at a variety of scales.[122] The executive order established the Governor's Water Policy Council, which is responsible for modernizing the Arizona Groundwater Management Act.[123] Like Oklahoma, Arizona has minimal restrictions on groundwater pumping and provides minimal support for smaller communities, enabling out-of-state actors to use groundwater to produce products that end up overseas.[124] In response, the governor sought to allocate funds to better support rural communities in seeking long-term conservation solutions.[125]

Finally, Colorado's San Luis Valley has recently implemented a new strategy for groundwater conservation in the form of groundwater conservation easements.[126] Prior to using this tool, the San Luis Valley administered a groundwater pumping fee and used government funds to pay farmers for fallowing.[127] Still, aquifer levels continued declining, leading the state legislature to "mandate a basin-wide reduction in pumping to reach sustainable levels."[128] In 2022, Colorado Open Lands, a nonprofit land trust, completed the Valley's first groundwater conservation easement agreement.[129] The easement fully retired a local farming operation, reducing groundwater pumping by more than 1,700 a.f.y. to sustain other farms and ranches in the Valley.[130]

Unfortunately, when considering matters beyond groundwater alone, litigation in other Western states has not yielded many outcomes indicating a significant shift in legal emphasis towards climate considerations.[131] That said,

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119. *Id.* at 4.

120. *Governor Hobbs Announces Actions to Modernize Arizona's Groundwater Management*, OFF. OF THE GOVERNOR KATIE HOBBS (Jan. 9, 2023), https://azgovernor.gov/office-arizona-governor/news/2023/01/governor-hobbs-announces-actions-modernize-arizonas-groundwater.

121. *Id.*

122. *Id.*

123. *Id.*

124. *See id.*

125. *Id.*

126. Katherine Wright et al., *Groundwater Conservation Easements: Evaluating an Innovative New Tool for Aquifer Sustainability*, PROP. & ENV'T RSCH. CTR. (Mar. 22, 2024), https://www.perc.org/2024/03/22/groundwater-conservation-easements/.

127. *Id.*

128. *Id.*

129. *Id.*

130. *Id.*

131. *See, e.g.*, Chernaik v. Brown, 475 P.3d 68 (Or. 2020) (holding that the public trust doctrine did not extend to claims of waterway and atmosphere impairment); Kanuk v. State, Dep't of Nat. Res., 335 P.3d 1088 (Alaska 2014) (holding that claims of atmosphere impairment were nonjusticiable political questions); Cnty. of Butte v. Dep't of Water Res., 306 Cal. Rptr. 3d 860 (Cal. Ct. App. 2023) (holding that the California Department of Water Resources was not required to study climate change in depth because the information would be too speculative).

climate advocates have achieved some successes through litigation. Notably, in *Held v. State of Montana*, a Montana district court found for sixteen young Montanans who "claimed that state laws promoting fossil fuel extraction and forbidding the consideration of climate impacts during environmental review violate[d] their constitutional environmental right" in August 2023.[132] This right has existed in the Montana State Constitution since the 1970s.[133] This was the first case in the United States "to rely on a state's constitutional right to a clean and healthful environment to challenge state policies that fuel climate change."[134]

In the 1970s, four other states besides Montana—Pennsylvania, Hawaii, Massachusetts, and Illinois—added "green amendments" to their state constitutions, recognizing the right to "a clean and healthful environment."[135] While litigants initially faced limited success in asserting this right in state courts, there is now a trend of courts beginning to uphold it, notably in Montana, Pennsylvania, and Hawaii.[136] Now, several more states, including New Mexico, are considering adopting green amendments in their constitutions.[137]

Overall, and unsurprisingly, Western states have been gradually recognizing the imperative role that climate change plays in adapting our legal systems. This slow yet forward-moving pace may be attributed to various factors, such as a deeper comprehension of climate change and its impacts, reluctance to alter entrenched legal doctrines, prioritization of industry and development interests, or, most likely, a combination of these factors. Still, the movement toward climate progress cannot be overlooked. Interestingly, legislative and regulatory guidance for environmental protection at the state level has developed more quickly and prevalently than federal guidance.[138] A variety of tools implemented at a variety of scales demonstrate the flexibility available in groundwater conservation efforts. The slow pace at which states are moving to expressly acknowledge the need for consideration of climate change makes the New Mexico Court of Appeals' explicit language in *Aquifer Science* particularly unique.

IV. Next Steps for New Mexico's Water Authorities

The New Mexico Court of Appeals has called upon the OSE and the Legislature to create standards for analyzing climate change impacts of water

132. Amber Polk, *Montana kids win historic climate lawsuit – here's why it could set a powerful precedent*, THE CONVERSATION (Aug. 15, 2023, 8:35 AM), https://theconversation.com/montana-kids-win-historic-climate-lawsuit-heres-why-it-could-set-a-powerful-precedent-207907#:~:text=Success%20in%20Montana&text=On%20these%20grounds%2C%20she%20struck,invoked%20to%20elicit%20environmental%20change.

133. *Id.*

134. *Id.*

135. *Id.*

136. *Id.*

137. *Id.*; *see also 2023 Regular Session - HJR 4*, N.M. LEGISLATURE, https://www.nmlegis.gov/Legislation/Legislation?Chamber=H&LegType=JR&LegNo=4&year=23 (last visited May 2, 2024) (more information on New Mexico's green amendment legislation).

138. Jessica Ferrell & Steven G. Jones, *Project Development in the Shadow of Climate Change*, 54 ROCKY MTN. MIN. L. INST. § 8.04 (2008).

appropriations.[139] This call to action prompts the question: how should these governmental entities proceed with this momentous task? According to Professor Robert Glennon, meaningful groundwater policy reform must do two things: protect the rights of existing users by creating transferable quantified water rights and break free of the "relentless cycle" of increased use by restricting groundwater pumping.[140]

Regarding the first transferability-focused task, Glennon recommends fostering a water rights market in which existing users whose uses are for "extremely low-value economic activities" can easily transfer their rights to newcomers whose uses are higher-value.[141]

Regarding the second regulatory-focused task, Glennon provides eight recommendations for states pursuing stricter groundwater regulation. First, and most broadly, Glennon argues it is better for states to pursue "simple" conservation standards that are easily administered and implemented, rather than elaborately detailed standards over which regulated groups "will fight tooth and nail."[142]

Second, Glennon advocates for the establishment of minimum stream flows protected from pumping of hydrologically connected groundwater, as has been done in Washington.[143]

Third, and perhaps more contentiously, Glennon recommends prohibiting drilling of new wells in areas hydrologically connected to surface flows, as has been done in Oregon.[144] Glennon offers two potential routes for states: "[t]hey can make the ban on wells near watercourses turn on a hydrologic analysis of the particular region," or "they can use a bright-line rule that simply prohibits drilling wells within, for example, a mile of the river."[145]

Glennon's fourth recommendation is that states impose an "extraction tax on water pumped from any well within a certain distance of a river, spring, or lake."[146] Such a tax would encourage water conservation among existing users and would incentivize new users to locate their wells further from surface water sources.[147]

Fifth, Glennon argues that states should require new pumpers to offset or mitigate their environmental impact, as has been done in Arizona.[148] One route for this regulation is the required purchase and retirement of existing rights.[149]

Sixth, Glennon recommends that states make financial incentives a significant part of water policy, because "we are not paying the true cost of water"

139. Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 47, 527 P.3d 667.

140. *See* Glennon, *supra* note 97.

141. *Id.*

142. *Id.*

143. *Id.*

144. *Id.*

145. *Id.*

146. *Id.*

147. *Id.*

148. *Id.*

149. *Id.*

in monthly water bills.[150] This is because water bills normally only reflect extraction, energy, infrastructure, and administrative costs—the water itself is free.[151]

Seventh, when a water rights transfer occurs, Glennon recommends that states "require that a small percentage of the water be dedicated for environmental [restoration] purposes."[152]

Eighth, Glennon argues that both state and federal governments should commit resources to "purchasing and retiring groundwater rights to protect critical watersheds and habitat."[153]

Glennon's recommendations for groundwater regulation are perhaps more useful for the state legislature than for regulatory bodies because they do not directly address how the New Mexico State Engineer can adequately consider climate change when deciding whether to grant applications for groundwater use. Bernalillo County's Water Conservation Ordinance more directly addresses how the OSE might approach this task.[154] The County's water conservation standards for higher-density development provide detailed technical expectations for water conservation for new development, as would be applicable to Aquifer Science in its planned project.[155] Bernalillo County's standards could serve as a useful small-scale model for the OSE.

As described in the previous section, New Mexico's neighboring states have employed a variety of tools at varying scales to pursue innovative and effective groundwater conservation strategies. The OSE and the Legislature might consider adopting similar tools adapted to New Mexico's unique needs and characteristics.[156]

Perhaps most important in crafting specifications for consideration of climate change is flexibility. Not only must legal standards be pliable enough to adjust without having to continuously start from scratch, but they also must be rigid enough to withstand policy fluctuations resulting from changes in leadership.[157] This is because the high variability of climate change "dramatically expands the scale" —geographically, temporally, socially, and administratively—that conservation policy must cover.[158]

As Professor Holly Doremus put it, "[w]e need standards that better match a world in transition, which means we need standards that can change to reflect new realities."[159] These standards must be broad enough apply to a variety of cases while also being stringent enough to enforce long-term climate consideration among

150. *Id.*

151. *Id.*

152. *Id.*

153. *Id.*

154. BERNALILLO CNTY. CODE, ch. 30, art. VII, § 30-241 et seq. (2010) (Water Conservation Requirements).

155. BERNALILLO CNTY., WATER CONSERVATION DEVELOPMENT STANDARDS AND GUIDELINES 173 (2021), https://www.bernco.gov/public-works/wp-content/uploads/sites/76/2021/04/4wc.pdf.

156. *See* Wright et al., *supra* note 126 (explanation of how New Mexico's legal framework may allow for the establishment of groundwater conservation easements).

157. *See* Holly Doremus, *Adapting to Climate Change with Law that Bends Without Breaking*, 2 SAN DIEGO J. CLIMATE & ENERGY L. 45, 47 (2010).

158. *See id.* at 62.

159. *Id.* at 84.

applicants. Such standards would allow the OSE to account for climate mitigation and adaptation in its assessment of water applications that would further deplete New Mexico's precious groundwater resources.

CONCLUSION

Although legal systems across the U.S. are slow to make room for contemporary climate change considerations, the New Mexico Court of Appeal's decision in *Aquifer Science* shows that progress is making its way—at least in the judiciary. By calling on the Office of the State Engineer and the Legislature "to provide guidance regarding climate change and conservation before it is judicially imposed," the Court suggested that it may be willing to judicially impose such guidance in future cases if these entities do not take action.[160]

Going forward, climate change will make the final call in New Mexico's groundwater appropriations decisions. As the effects of climate change unfold in real time, the State Engineer and the Legislature should seize the opportunity to heed the Court of Appeals' invitation and establish meaningful standards for considering climate change in groundwater appropriations determinations.

160. *See* Aquifer Sci., LLC v. Verhines, 2023-NMCA-020, ¶ 47, 527 P.3d 667.