

# NOTES

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## Show Me Groundwater: The Case for Proactive Groundwater Law Reform in Missouri

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INTRODUCTION

Missouri is a veritable wonderland of water resources. The mighty, muddy Missouri and Mississippi Rivers bookend and bisect the state. Alluvial aquifers and abundant annual precipitation have perennially provided Missourians with adequate water for domestic, agricultural, and municipal uses. Perhaps most emblematic of Missouri’s abundant waters are the freshwater springs found in the hollows of the Ozark Plateau—a geological area spanning roughly the lower two-thirds of the state. The geology of the Missouri Ozarks is karstic, meaning the bluffs and hills of the area are formed of soluble rocks such as limestone and dolomite. Karst regions are known for their losing streams, sinkholes, caves, and springs. In Missouri, abundant annual precipitation and the porosity of Ozark limestone have led to a profundity of massive freshwater springs. Some of the Missouri Ozarks’ springs are the largest in the United States. Take Big Spring, for instance, which discharges 286 million gallons of water every day<sup>1</sup> and, depending on its flow on any given day, is a contender for the largest spring in the United States.<sup>2</sup> Big Spring’s water—which travels as far as forty-five miles underground—carries the equivalent of seventy tons of dissolved limestone.<sup>3</sup> The clear, turquoise-hued waters of Big Spring have issued forth from the bowels of the earth every day for as long as written history recalls.

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<sup>1</sup> John W. Ragsdale Jr., *The Ozark National Scenic Riverways and the Sagebrush Rebellion in Missouri*, 49 URB. LAW. 1, 3 (2017).

<sup>2</sup> *Big Spring, Ozark National Scenic Riverways Missouri*, NAT’L PARK SERV., <https://www.nps.gov/ozar/planyourvisit/big-spring.htm> [https://perma.cc/NCP4-KA2R] (last updated July 5, 2023).

<sup>3</sup> *Id.*

Big Spring's pure, never-ending flow symbolizes how Missouri law conceives of and handles groundwater resources. As a pure riparian law state,<sup>4</sup> Missouri's water law is reactive rather than proactive. Tellingly, the Missouri Department of Natural Resources' website notes that "Missouri has an abundance of water resources and does not have a need to regulate water usage."<sup>5</sup> While it is true that present water needs are being met with the state's surface and groundwater resources, the Ozarks' karst geology makes its associated groundwater systems vulnerable to disruption. In other parts of the United States, groundwater pumping has disrupted hydrological systems, resulting in profound impacts.<sup>6</sup> Reckless groundwater pumping can irreparably damage subterranean hydrological systems. Tales of groundwater pumping's potentially deleterious consequences signal a need for taking proactive steps to protect the Ozarks' water resources. Cognizance of the Ozarks' importance to Missouri and the nation at large<sup>7</sup> merits taking proactive steps to mitigate potential harm to Missouri's groundwater resources.

While Missouri's groundwater resources are presently sufficient for its population's needs, the stresses to which the Ozarks' groundwater systems are subjected are increasing.<sup>8</sup> While the risk of damage to the

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<sup>4</sup> For a brief explanation of riparian law, see *infra* Sections III.A–B.

<sup>5</sup> *Major Water Users*, MO. DEP'T. OF NAT. RES., <https://dnr.mo.gov/water/business-industry-other-entities/reporting/major-water-users> [<https://perma.cc/67A4-R8XA>] (select the "Misconceptions" tab located under the subheading "Reporting") (last visited May 18, 2025); see *contra Missouri Water Resources Plan – Success Story*, MO. DEP'T. OF NAT. RES., <https://dnr.mo.gov/success-stories/water/missouri-water-resources-plan-success-story> [<https://perma.cc/MFN9-HL2U>] (last visited May 18, 2025) ("The Missouri Department of Natural Resources determined through . . . water planning that water demands in certain areas of the state cannot be met long term, especially under drought conditions.").

<sup>6</sup> See generally Robert Glennon, *The Perils of Groundwater Pumping*, 19 ISSUES SCI. & TECH. (Fall 2002), <https://issues.org/glennon/> [<https://perma.cc/AV9D-FSGE>] (discussing how groundwater pumping in the karstic region north of Tampa Bay led to calamitous consequences); *contra* Jules Bernstein, *Critical Groundwater Supplies May Never Recover from Drought*, U.C. RIVERSIDE NEWS (Sept. 30, 2021), <https://news.ucr.edu/articles/2021/09/30/critical-groundwater-supplies-may-never-recover-drought> [<https://perma.cc/5LRQ-N5AR>] (noting that groundwater resources more slowly from drought when subject to groundwater withdrawal).

<sup>7</sup> For additional information on the cultural and historical significance of the two federally protected (and spring-fed) Ozark National Scenic Riverways, see DONALD L. STEVENS JR., *A HOMETOWN AND A HINTERLAND: THE CURRENT AND JACKS FORK RIVERWAYS; HISTORIC RESOURCE STUDY, OZARK NATIONAL SCENIC RIVERWAYS* (1991).

<sup>8</sup> See PHILLIP D. HAYS ET AL., U.S. GEOLOGICAL SURV., *HYDROGEOLOGY AND HYDROLOGIC CONDITIONS OF THE OZARK PLATEAUS AQUIFER SYSTEM* 47–50 (2016)

Ozark Plateau's hydrology is not imminent, the potential consequences are severe. Unregulated major pumping on the Ozark Plateau increases the likelihood of change to its karst geology, disruption of its hydrological cycles, and impairment of its valuable groundwaters. The multifarious values associated with the Ozarks' groundwaters<sup>9</sup> merit sensible, proactive action to protect the Ozarks' groundwater resources.

This Article begins with section one's introduction to hydrology and examination of the Missouri Ozarks' karst topography and hydrology. Section two will tell the story of groundwater pumping's deleterious consequences in the karstic region north of Tampa Bay and explain why Missourians should pay heed to such stories. Section three will explain Missouri's water law, from pure riparian law principles to state statutes. Section four will examine spring water bottling as an exploitative water use, explore how Michigan's *Nestlé* case constitutes judicial recognition of holistic hydrological principles, and theorize how similar caselaw in Missouri could mitigate the failures of riparianism. However, caselaw that reflects the connection between groundwaters and surface waters is insufficient to protect Ozark groundwater. Accordingly, section five will explain the law and history of ballot measures in Missouri.

This Article will conclude with the assertion that karstic hydrology's vulnerability to groundwater pumping and Missouri law's inability to adequately protect the Ozarks' waters against harm illustrates that Missouri water law needs reform. A ballot measure is the best vehicle for that reform.

## I

### GROUNDWATER FUNDAMENTALS AND THE MISSOURI OZARKS' HYDROLOGY

A foundational understanding of groundwater fundamentals generally and the Missouri Ozarks' hydrology specifically is necessary to appreciate the need to act to preserve Missouri's groundwater resources.

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(Which concludes that "The future will bring changes in climate and hydrology and increasing societal need for water resources in the Ozarks.").

<sup>9</sup> For a fantastic account of the Ozarks' springs and rivers, as well as additional historical reading, see LEONARD HALL, *STARS UPSTREAM: LIFE ALONG AN OZARK RIVER* (Univ. of Mo. Press rev. ed. 1969) (Leonard Hall is credited as a significant influence in establishing the Ozark National Scenic Riverways—the inspiration for the Wild and Scenic Rivers Act. His advocacy for protecting and eloquence in describing the Current and Jack's Fork Rivers provided inspiration for this Article).

### ***A. Groundwater and the Hydrological Cycle in a Nutshell***

In the face of changing climate and associated shifts in hydrological systems, as well as burgeoning populations around the globe,<sup>10</sup> groundwater resources are becoming increasingly important.<sup>11</sup> Our Earth's waters—both surface waters and groundwaters—are finite resources,<sup>12</sup> and more than a third of the world's thirty-seven largest aquifers are being depleted by human use.<sup>13</sup> In America, almost fifteen percent of the population relies on groundwater as their sole source of water,<sup>14</sup> and the number is increasing.<sup>15</sup>

Due to ocean salinity, only 3.5% of the Earth's surface water is potable without treatment.<sup>16</sup> Of that 3.5%, less than 1%—about 0.8%—is accessible for consumption in its current form as a lake, stream, wetland, or groundwater.<sup>17</sup> Of the Earth's accessible, potable water, the vast majority takes the form of groundwater.<sup>18</sup> Because water on Earth is a finite resource,<sup>19</sup> a brief primer on how groundwater systems interact with surface waters will provide a foundation for the discussion to follow.

The mascot of groundwater resources is the aquifer, which is commonly conceived of as an underground body of water—not unlike a lake—confined in a subterranean hollow. In reality, “[m]ost aquifers are composed of layers of fine sand and silt, larger gravel particles,

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<sup>10</sup> *Global Issues Population*, UNITED NATIONS, <https://www.un.org/en/global-issues/population> [<https://perma.cc/9BJ9-ZLDQ>] (last visited May 18, 2025) (explaining that the world's population reached eight billion in November 2022 and is expected to reach nine billion in the next 30 years).

<sup>11</sup> See BARTON H. THOMPSON, JR. ET AL., *LEGAL CONTROL OF WATER RESOURCES* 446 (6th ed. 2018).

<sup>12</sup> Kimberly Mullen, *Information on Earth's Water*, NAT'L GROUND WATER ASS'N, <https://www.ngwa.org/what-is-groundwater/About-groundwater/information-on-earths-water> [<https://perma.cc/D8YN-XHUU>] (last visited May 18, 2025).

<sup>13</sup> See THOMPSON, JR. ET AL., *supra* note 11, at 448–89.

<sup>14</sup> *Id.* at 448. (“Almost all of the people in the U.S. not services by a public water provider . . . obtain their water from groundwater withdrawals.”).

<sup>15</sup> See Water Science School, *Groundwater Use in the United States*, U.S. GEOLOGICAL SURV. (June 18, 2018), <https://www.usgs.gov/special-topics/water-science-school/science/groundwater-use-united-states> [<https://perma.cc/VK92-2RWW>].

<sup>16</sup> ROBERT GLENNON, *WATER FOLLIES* 40 (2002) [hereinafter *WATER FOLLIES*].

<sup>17</sup> *Id.* (“Of the remaining 3.5 percent, 1.7 percent is tied up in polar ice. Another 1 percent of freshwater is less saline than ocean water but still too salty to be drinkable.”).

<sup>18</sup> Mullen, *supra* note 12; see also *WATER FOLLIES*, *supra* note 16, at 41 (“There is thirty times more potable water in the ground than there is in all the rivers and lakes on earth.”).

<sup>19</sup> Mullen, *supra* note 12.

fractured rock, and clay.”<sup>20</sup> The amount of water contained in an aquifer is not static; rather, it changes subject to recharge and discharge.<sup>21</sup> Recharge and discharge can happen both naturally and through human action. Natural recharge occurs when precipitation seeps downward through subsurface strata into an aquifer.<sup>22</sup> Human actions—such as irrigation—can also recharge aquifers if sufficient water remains to reach an aquifer below. Natural discharge occurs when an aquifer has a hydrological connection to a surface water that permits water to “exit” the aquifer and “enter” the surface water.<sup>23</sup> Springs with visible, abundant outflow—such as the Ozarks’ Big Spring—are the clearest example of natural discharge. Human action can also cause discharge. A farmer tapping an aquifer with a well and extracting its waters is the simplest illustration of human-caused discharge. The discharge and recharge of any given aquifer is shaped by its geologic setting. The geological makeup of subsurface material differs based on the geological history of the area containing the aquifer, and geologic makeup can have a profound impact on an aquifer’s recharge and discharge.<sup>24</sup>

Natural discharge and recharge of aquifers can be, and often are, connected to nearby surface waters.<sup>25</sup> The water table in the area containing the aquifer and its associated surface waters affects an aquifer’s discharge and recharge.<sup>26</sup> If a surface water’s water level is lower than the water table, then water will discharge from the associated aquifer into the surface water—under this set of circumstances, the surface water is “gaining.”<sup>27</sup> If a surface water’s water level is higher than the water table, then the water from the surface water will discharge into the surrounding earth and recharge the associated aquifer—this a “losing” surface water.<sup>28</sup> Accordingly, if the water table surrounding a surface water feature lowers enough, the surface water will begin to discharge water into the ground, which can result in damage to or complete destruction of the surface water feature.

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<sup>20</sup> WATER FOLLIES, *supra* note 16, at 41.

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> *See id.*

<sup>24</sup> *See id.*; *see also* Mullen, *supra* note 12.

<sup>25</sup> *See id.* at 42.

<sup>26</sup> *See id.*

<sup>27</sup> WATER FOLLIES, *supra* note 16, at 42–43.

<sup>28</sup> *Id.* at 43.

Human action can have profound effects on groundwater hydrology. Withdrawals of groundwater frequently lower the nearby water table<sup>29</sup> and can cause damage to underground hydrological systems and surface water features. In terms of surface waters, human withdrawals that lower the water table can transform a gaining body of surface water into a losing one, causing the impairment—such as substantially reduced streamflow—or even complete depletion of the surface water.<sup>30</sup> As for groundwaters, as human pumping causes the water table to drop, humans must dig deeper to maintain access to groundwaters.<sup>31</sup> As humans dig deeper, the risk that groundwater will become unpotable increases: “Poorer water quality may result [from deeper digging] because water pumped from lower levels frequently contains . . . arsenic, fluoride, and radon” and “[a]t deeper levels, the earth’s higher internal temperature dissolves more of these elements into solution.”<sup>32</sup> Further, pumping can cause contaminants of human origin to accumulate in an aquifer’s waters, resulting in concentrations unfit for human consumption.<sup>33</sup>

The mere digging of wells to access groundwater can disrupt groundwater hydrology. Aquifers, which typically consist of permeable or sedimentary rocks, can be categorized as either unconfined or confined. An unconfined aquifer’s upper boundary is delineated by the water table, whereas a confined aquifer’s boundaries consist of materials that are less permeable than those that make up the aquifer itself.<sup>34</sup> In certain hydrological settings, digging a well can disrupt the impermeable layer that separates a confined aquifer from nearby surface or groundwater resources.<sup>35</sup> Consider, in hypothetical, a

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<sup>29</sup> *See id.* at 45.

<sup>30</sup> *See id.*

<sup>31</sup> *See id.* at 32.

<sup>32</sup> *Id.*

<sup>33</sup> U.S. ENV’T PROT. AGENCY, WELLHEAD PROTECTION: A GUIDE FOR SMALL COMMUNITIES, 10 (1993) (“[P]umping can also cause the ground water (and associated contaminants) from another aquifer to enter the one being pumped.”); *see also* Josie Garthwaite, *Stanford Researchers Find Groundwater Pumping Can Increase Arsenic Levels in Irrigation and Drinking Water*, STANFORD REP. (June 5, 2018), <https://news.stanford.edu/stories/2018/06/overpumping-groundwater-increases-contamination-risk> [<https://perma.cc/8A9V-SWHA>].

<sup>34</sup> WATER FOLLIES, *supra* note 16, at 32.

<sup>35</sup> *See generally* U.S. ENV’T PROT. AGENCY, WELLHEAD PROTECTION: A GUIDE FOR SMALL COMMUNITIES, 17 (1993) (Noting that when a community’s aquifer is contaminated and it opts to access an uncontaminated groundwater resource with new wells, those new wells’ installation must be carefully planned “to ensure that contaminants do not more into the new water supplies.”).

confined aquifer underlying a contaminated aquifer. Digging a well or wells through the confined aquifer's impermeable layer can permit pollutants to seep from the contaminated aquifer into the confined aquifer. When this occurs, a previously pristine confined aquifer can become unfit for human consumption.

As water leaves an aquifer, the materials that make up the aquifer can settle or change in their arrangement, resulting in land subsidence,<sup>36</sup> reduced overall aquifer capacity,<sup>37</sup> and changes in how water moves into and within the aquifer.<sup>38</sup> Any one of these changes can disrupt access to the groundwater resource or alter the waters within in ways deleterious to human use. Depending on the nature of the change to a given hydrological system, the system's water may become unsuitable for human uses. Further, hydrological disruption can cause damage to natural resources and property. In sum, ground and surface waters are inherently interconnected, and human use of water resources can cause profound and unpredictable changes.

### *B. The Ozark Plateau's Karst Topography and Associated Hydrology*

The Ozark Plateau spans roughly 48,000 square miles, covering parts of northern Arkansas, southeast Kansas, northeastern Oklahoma, and southern Missouri.<sup>39</sup> The Ozark Plateau is delineated into three geologic regions: the Springfield Plateau, the Salem Plateau, and the Boston Mountains.<sup>40</sup> The Springfield and Salem Plateaus, whose landmasses are predominantly within Missouri, exhibit typical features of karst topography.<sup>41</sup> Karst topography is formed when water dissolves porous subsurface rock, creating the caves, sinkholes, losing

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<sup>36</sup> See Lois Henry, *The Central California Town That Keeps Sinking*, HIGH COUNTRY NEWS (May 25, 2021), <https://www.hcn.org/articles/south-water-the-central-california-town-that-keeps-sinking> [<https://perma.cc/JG8P-HCTD>].

<sup>37</sup> WATER FOLLIES, *supra* note 16, at 33; see THOMPSON, JR. ET AL., *supra* note 11, at 460–61.

<sup>38</sup> See generally L. M. POPE ET AL., U.S. GEOLOGICAL SURV., QUALITY CHARACTERISTICS OF GROUND WATER IN THE OZARK AQUIFER OF NORTHWESTERN ARKANSAS, SOUTHEASTERN KANSAS, SOUTHWESTERN MISSOURI, AND NORTHEASTERN OKLAHOMA, 2006–07, at 34–42 (discussing the movement of water within the Ozark Aquifer, which can be altered by the changed in subsurface geology that groundwater pumping may cause).

<sup>39</sup> JAMES. C. ADAMSKI ET AL., U.S. GEOLOGICAL SURV., ENVIRONMENTAL AND HYDROLOGICAL SETTING OF THE OZARK PLATEAUS STUDY UNIT, ARKANSAS, KANSAS, MISSOURI, AND OKLAHOMA, at 5 (1995).

<sup>40</sup> *Id.* at 1.

<sup>41</sup> *Id.*

streams, and springs that characterize karst topography.<sup>42</sup> Caves and sinkholes abound in the Salem Plateau and the region is home to tremendous springs and underground streams.<sup>43</sup> In recognition of Ozark riverways' import, Congress has designated four rivers within the Ozarks as National Riverways.<sup>44</sup> The Jacks Fork, Current, and Eleven Point rivers each feature first magnitude springs,<sup>45</sup> and the Current River's Big Spring is one of three contenders for the largest spring in the United States.<sup>46</sup> In total, the ten largest springs on the Ozark Plateau discharge a combined 1.3 *billion* gallons of water a day, frequently through subsurface, pipe-like conduits.<sup>47</sup> An Ozark spring's catchment area—the area from which the spring obtains its flow—can cover tens of square miles and often contains numerous sinkholes and losing streams.<sup>48</sup>

Missouri's water is not distributed equally across the state. Roughly eighty-eight percent of Missouri's groundwater resources lie south of the Missouri River, which cuts the state in half after its southeasterly path veers east near Jefferson City, Missouri.<sup>49</sup> The Ozark Aquifer is the largest groundwater resource in the state<sup>50</sup> and extends south from the Missouri River into parts of Arkansas, Oklahoma, and Kansas. The Ozark Aquifer is a confined aquifer: it is almost completely encased

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<sup>42</sup> *Karst*, SW. FLA. WATER MGMT. DIST., <https://www.swfwmd.state.fl.us/watersheds/withlacoochee-river/geology-the-watershed> [<https://perma.cc/4FAY-ZUE4>] (last visited May 18, 2025).

<sup>43</sup> See HAYS ET AL., *supra* note 8, at 15.

<sup>44</sup> See generally Ragsdale Jr., *supra* note 1, at 25 & 52. (The Ozark Plateau contains the Current and Jack's Fork Rivers (made national rivers by the Ozark National Scenic Riverways Act in 1964), the Eleven Point (designated a Wild and Scenic River under the Wild and Scenic Rivers Act of 1968), and the Buffalo River (designated as a National River in 1972)).

<sup>45</sup> Mike Gossett, *Ozark Springs Jewels of the Ozarks*, OZARK NAT'L SCENIC RIVERWAYS, NAT'L PARK SERV., <https://www.nps.gov/ozar/learn/nature/springs.htm> [<https://perma.cc/WY42-UGKF>] (last updated Jan. 14, 2020) (a first magnitude spring discharges at least 65 million gallons a day).

<sup>46</sup> *Big Spring*, *supra* note 2.

<sup>47</sup> J.L. IMES & L.F. EMMETT, GEOHYDROLOGY OF THE OZARK PLATEAUS AQUIFER SYSTEM IN PARTS OF MISSOURI, ARKANSAS, OKLAHOMA, AND KANSAS, at D86 (1994).

<sup>48</sup> *Id.*; see also JAMES C. PETERSEN ET AL., U.S. GEOLOGICAL SURV., WATER QUALITY IN THE OZARK PLATEAUS, ARKANSAS, KANSAS, MISSOURI, AND OKLAHOMA, 1992–95, at 9 (1998) (Noting that Ozarks springs, due to their hydrological connection to surface waters, “are vulnerable to contamination.”).

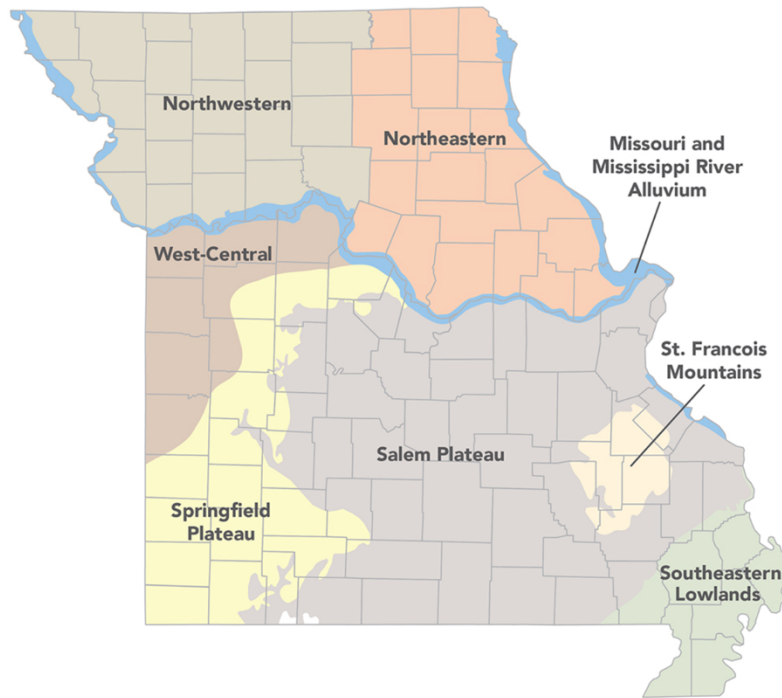
<sup>49</sup> See *Aquifer Information and Groundwater Availability*, MO. DEP'T OF NAT. RES., <https://dnr.mo.gov/water/how-water/state-water/groundwater/aquifer-information-ground-water-availability> [<https://perma.cc/P35Y-RQUR>] (last visited May 18, 2025).

<sup>50</sup> *Id.*

with less permeable rock except in its western portions, where its western boundary intersects with the saline waters of the Western Interior Plains aquifer system.<sup>51</sup>

The Missouri Department of Natural Resources divides the state into eight hydrological groundwater provinces, each of which has distinct hydrological or geological characteristics.<sup>52</sup> In total, Missouri's aquifers are estimated to contain five hundred trillion gallons of groundwater.<sup>53</sup> This Article focuses on the Salem Plateau and Springfield Plateau Groundwater Provinces because both provinces contain karst topography and karstic aquifers susceptible to damage if mismanaged.

Figure 1. Missouri's groundwater provinces<sup>54</sup>



<sup>51</sup> IMES & EMMETT, *supra* note 47, at D1.

<sup>52</sup> *Groundwater Provinces of Missouri: Salem Plateau Groundwater Province – PUB3000*, MO. DEP'T OF NAT. RES. (Aug. 10, 2021), <https://dnr.mo.gov/document-search/groundwater-provinces-missouri-salem-plateau-groundwater-province-pub3000/pub3000> [<https://perma.cc/RS9B-6KDL>].

<sup>53</sup> *Groundwater Levels*, MO. DEP'T OF NAT. RES., <https://dnr.mo.gov/water/how-water/state-water/groundwater/groundwater-levels> [<https://perma.cc/LX5K-9MG6>] (last visited May 18, 2025).

<sup>54</sup> *Aquifer Information and Groundwater Availability*, *supra* note 49.

The Salem Plateau Groundwater Province is the largest in Missouri and encompasses more than one-third of the state (see Figure 1).<sup>55</sup> The portion of the Ozark Aquifer that underlies the Salem Plateau holds an estimated 208 *trillion* gallons of water.<sup>56</sup> Accordingly, the Ozark Aquifer is one of Missouri's greatest groundwater resources and care should be exercised to protect its waters.

## II GROUNDWATER PUMPING CAN DAMAGE KARST HYDROLOGICAL SYSTEMS

Pumping groundwater can cause multifarious impacts with potentially dire consequences, particularly in karstic regions. Damage in the karstic region around Tampa Bay illustrates the potential consequences of unregulated groundwater pumping on the Ozark Plateau and the need for Missourians to take action.

### *A. Groundwater Depletion and Its Effects on North Tampa Bay's Karstic Region*

Florida is one of the wettest states in the United States,<sup>57</sup> and one could, accordingly, presume that Florida is unlikely to experience issues providing water to its citizens. Historically, Florida has treated its abundant waters as a nuisance.<sup>58</sup> However, events in the karstic region north of Tampa Bay show that failing to regulate groundwater pumping in karstic areas can harm individuals and their property, damage surface water features (both manmade and natural), and significantly disrupt hydrological systems.

Much like the Missouri Ozarks, the karstic region north of Tampa Bay consists of porous limestone, and the porosity of the subsurface geology causes surface water and groundwater to be "very closely

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<sup>55</sup> *Groundwater Provinces of Missouri: Salem Plateau Groundwater Province – PUB3000*, *supra* note 52.

<sup>56</sup> *Id.*

<sup>57</sup> See WATER FOLLIES, *supra* note 16, at 71; see also MORTON D. WINSBERG, NAT'L CLIMATIC DATA CTR., CLIMATE OF FLORIDA, at 3 ("Florida is among the wettest states in the nation" and, in regard to annual precipitation specifically, "Florida is only exceeded by Louisiana as the wettest state in the nation.").

<sup>58</sup> See WATER FOLLIES, *supra* note 16, at 71–72 (discussing the Swamp and Overflow Act of 1850, which attempted to "dry up" wetlands to create dry land for development).

interrelated.”<sup>59</sup> Also analogous to the Missouri Ozarks’ topography are the Tampa Bay area’s numerous sinkholes, springs, and creeks,<sup>60</sup> which make connections between the area’s surface water and groundwater resources more direct.

During the 1990s, increased groundwater pumping in the karstic region north of Tampa Bay caused substantial damage that illustrates how groundwater withdrawals can harm the natural resources and residents of karstic areas. In the 1970s and 1980s, Tampa Bay Water purchased tracts of lands north of Tampa and established three major well fields to supply fresh water to Tampa and St. Petersburg.<sup>61</sup> By 1996, groundwater withdrawals north of Tampa Bay had increased fourfold since the 1960s, and withdrawals are projected to increase further.<sup>62</sup> Increased groundwater withdrawals caused impairment<sup>63</sup> or destruction of surface waters;<sup>64</sup> reduced stream flows in springs, creeks, and rivers;<sup>65</sup> impairment of wetlands;<sup>66</sup> and increased incidence of subsidence and sinkholes.<sup>67</sup> Water impairment, subsidence, and sinkholes caused significant damage to private property owners’ lands and property rights.<sup>68</sup> The struggles experienced within the karstic

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<sup>59</sup> *Id.* (discussing how water moves through the area’s porous subsurface limestone, causing sinkholes that provide surface water ingress into subsurface hydrological systems. Essentially, the subsurface action of water in karstic geology causes increased connectivity between surface water and groundwater).

<sup>60</sup> *Id.* at 72, 74.

<sup>61</sup> *Id.* at 73.

<sup>62</sup> *Id.* at 74 (“Projections for the year 2020 anticipate . . . a nearly 170 percent increase over 1996 pumping levels.”).

<sup>63</sup> WATER FOLLIES, *supra* note 16, at 75, 77 (An “exhaustive” 1996 hydrological survey found that “[o]f the 153 lakes in the region . . . fewer than ten functioned as healthy lakes and over half were seriously impacted” and as of 2002 “[n]inety-five percent of the area’s lakes have been degraded by . . . groundwater pumping rates.”).

<sup>64</sup> *Id.* at 74, 78 (Due to groundwater pumping, “Prairie Lake dried up in the early 1990s,” in 1990 “Big Fish Lake, famous for its large bass, . . . went dry in 1990,” and Pasco Lake, which “once held eight feet of water and entertained recreational boaters. . . . went dry, thanks to groundwater pumping.”).

<sup>65</sup> *Id.* at 75 (noting specific springs and creeks with flows reduced by groundwater pumping and that “[r]eductions in spring and creek flow may ultimately harm major rivers”).

<sup>66</sup> *Id.* at 75–77 (explaining that groundwater pumping north of Tampa Bay has resulted “catastrophic impact[s] on the region’s wetlands”).

<sup>67</sup> See WATER FOLLIES, *supra* note 16, at 79–81 (providing specific instances in which groundwater pumping altered groundwater hydrology, causing increased limestone erosion that resulted in widespread land subsidence and a proliferation of sinkholes).

<sup>68</sup> *Id.* (noting that as a result of groundwater pumping’s disruption of the area’s hydrology, residents suffered destruction of buildings and other surface features (such as timber), decreased property values, dried up domestic wells, and impairment or destruction of surface water features).

region north of Tampa Bay illustrate the risks of unregulated groundwater withdrawal in the Ozark Plateau.

### ***B. Missouri Should Pay Heed to the Tale of North Tampa Bay***

As described previously in this Article, depletion of groundwater<sup>69</sup> and aquifer drawdown<sup>70</sup> can alter the action of hydrological systems. In karstic systems, where porous limestone forms the predominant subsurface strata through which groundwater moves, alterations of the hydrological system can have multifarious and deleterious consequences. Tampa Bay's water woes in the 1990s clearly illustrate the dire risk of allowing untrammelled pumping of the Ozark Plateau's groundwater resources. Without groundwater law reform or regulatory oversight, the Missouri Ozarks is at risk of being harmed by groundwater use.

Consider, for instance, the potential consequences of a commercial water bottler mining the Ozarks' groundwater resources. Due to lax regulation,<sup>71</sup> the Ozarks' springs are an attractive resource for commercial bottlers. If a bottler established wells near Big Spring, pumping from the area adjacent to the spring could alter its flow, causing decreased streamflow. Decreased streamflow would affect the stream's suitability for consumption, recreation (such as fishing, hiking, hunting, and equestrian pursuits), and aesthetic enjoyment.<sup>72</sup> Further, given the uncertainty surrounding hydrological systems in karstic regions,<sup>73</sup> the area could sustain harms like those seen north of

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<sup>69</sup> See discussion *supra* Section II.A.

<sup>70</sup> See discussion *supra* Section I.A.

<sup>71</sup> See *infra* Section III.A.

<sup>72</sup> A scholar of the Current River may object, "Surely the federal government will intervene in such an instance, Big Spring and the surrounding areas are under the care and protection of the National Parks Service!" While the objection has merit in this hypothetical, legal scholars have noted the uncertainties surrounding potential assertions of federal reserved water rights in eastern federal lands (i.e., in riparian or regulated-riparian jurisdictions). See Ryan Rowberry, *Drinking from the Same Cup: Federal Reserved Water Rights and National Parks in the Eastern United States*, 29 GA. ST. U. L. REV. 987 (2013); see also Eric H. Lord, *The Obed Wild and Scenic River of Tennessee: Asserting a Federal Reserved Water Right in a Riparian Jurisdiction*, 7 GREAT PLAINS NAT. RES. J. 1 (2003).

<sup>73</sup> Only recently have attempts to better understand the Ozarks' karstic hydrology's connection to major Ozarks springs' flows yielded reliable, but modest, results. See Shishir K. Sarker & Alan E. Fryar, *Characterizing Hydrological Functioning of Three Large Karst Springs in the Salem Plateau, Missouri, USA*, 9 HYDROLOGY 96 (2022) (using satellite data and spring discharge information to ascertain the hydrologic connection between three of the Ozarks' major springs' discharge and precipitation); see also Katherine J. Knierim et al., *Challenges for Creating a Site-Specific Groundwater-Use Record for the Ozark Plateaus*

Tampa Bay in the 1990s—destruction of surface water resources, impairment of wetlands, and damage to topography or personal property in the form of increased land subsidence and sinkholes.

The risk of a single major water user, such as a bottler, causing harm in the area of its withdrawals merits increased regulation of Ozark groundwater resources—if only regulation that increases understanding of Ozark hydrology. More importantly, the risk of harm increases with the number of water users making groundwater withdrawals in karstic regions. Accordingly, the risk of groundwater withdrawals disrupting Ozark Plateau hydrology and impinging upon its numerous benefits to the public and ecological interests underscores the need for sensible legal reform to mitigate potential harms and ensure Missourians' future use of surface and groundwater resources. Blind tampering with karstic hydrology is playing with fire.

### III

#### MISSOURI WATER LAW

A primer on Missouri's water law will inform later discussion of reforms necessary to protect Missouri's water resources. Generally, Missouri uses common law doctrines and a handful of statutes to regulate its groundwater.

##### *A. Riparianism and Surface Waters*

Missouri's western border roughly marks the boundary between eastern states—where precipitation has traditionally been adequate to support varied uses<sup>74</sup>—and western states, where water scarcity has been a perennial challenge.<sup>75</sup> In step with its seemingly water-laden eastern peer states, Missouri adopted common law riparianism to govern its surface waters.<sup>76</sup> While this Article focuses on Missouri's groundwater law and its related challenges, riparian principles inform

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*Aquifer System (Central USA) from 1900 to 2010*, 25 HYDROGEOLOGY J. 1779, 1791 (2017) (indicating that while historical records shine some light on how groundwater use affects Ozark groundwater systems, additional information-gathering is needed to create sensible water-use policy moving forward).

<sup>74</sup> Joseph W. Dellapenna, *The Evolution of Riparianism in the United States*, 95 MARQ. L. REV. 53, 53 (2011) [hereinafter Dellapenna, *The Evolution of Riparianism*] (“In states located largely to the east of Kansas City, water was readily available at little or no cost.”).

<sup>75</sup> Harry Styron, *Contrasts in Water Law in Missouri, Oklahoma, and Kansas*, STYRONBLOG, <https://styronblog.com/law/contrasts-in-water-law-of-missouri-kansas-and-oklahoma/> [<https://perma.cc/M583-KMG9>] (last visited May 18, 2025) [hereinafter *Contrasts in Water Law*].

<sup>76</sup> *Id.*

Missouri's groundwater law doctrine.<sup>77</sup> Accordingly, a brief primer on riparian law will inform the discussion of Missouri's groundwater law to come.

Riparianism is a common law doctrine dating back to the Roman Empire.<sup>78</sup> Under riparian law, a property owner “whose lands are contiguous with [a watercourse’s] edge” (hereinafter referred to as “a riparian” or “riparians”) has a right to use those waters.<sup>79</sup> A riparian’s right to exercise their water right is limited by “reasonable use” doctrine, under which a riparian may only make reasonable use of water that does not interfere with the reasonable use of water by other riparians on the same watershed.<sup>80</sup> Common reasonable uses include human consumption (drinking water), livestock watering, irrigation, and industry.<sup>81</sup> In Missouri, at least one appellate court has referred to the reasonableness factors provided by the Second Restatement of Torts for use in determining the reasonableness of riparian uses.<sup>82</sup>

### ***B. Reasonableness and Missouri’s Groundwater Law***

For legal purposes, groundwater resources are classified as either “underground streams” or “percolating groundwaters.”<sup>83</sup> Underground streams are allocated according to riparian doctrine.<sup>84</sup> Courts presume that groundwaters are percolating groundwaters unless evidence establishes the presence of an underground stream.<sup>85</sup> An underground stream “flows in a fixed and defined channel” and its “existence and

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<sup>77</sup> See Julie Jinkens McNitt, *A New Chapter in Missouri Percolating Groundwater Law: The Non-Severability of Water Rights from Land*, 59 MO. L. REV. 235, 240 (1994) [hereinafter McNitt].

<sup>78</sup> Amanda Waters & Erica Spitzig, *Water Rights Based on State Law*, in WATER RIGHTS AND ENVIRONMENTAL REGULATION: A LAWYER’S GUIDE 1, 5 (Robert Haskell Abrams & Latravia Smith eds., 2018) [hereinafter *Water Rights Based on State Law*].

<sup>79</sup> *Id.*; see also *Merritt v. Parker*, 1 N.J.L. 460, 463 (1795) (“when a man purchases a piece of land, through which a natural water-course flows, he has a right to make use of it in its natural state”).

<sup>80</sup> *Water Rights Based on State Law*, *supra* note 78, at 7.

<sup>81</sup> *Id.*

<sup>82</sup> *Contrasts in Water Law*, *supra* note 75, at 4. (citing to RESTATEMENT (SECOND) OF TORTS, §§ 850–850A in *Ripka v. Wansing*, 589 S.W.2d 333 (Mo. Ct. App. S.D. 1979)).

<sup>83</sup> Rhonda Churchill Thomas, *Groundwater Rights in Missouri—A Need for Clarification*, 37 MO. L. REV. 357, 358 (1972); McNitt *supra* note 77, at 240.

<sup>84</sup> McNitt, *supra* note 77, at 240; see *supra* Section II.A (outlining riparian law principles).

<sup>85</sup> McNitt *supra* note 77, at 240.

location” must be “known or ascertainable from surface indications or other means not requiring excavation.”<sup>86</sup>

Percolating groundwaters are those that “seep[], ooze[], filter[], and otherwise circulate[] through subsurface strata without a defined channel.”<sup>87</sup> In allocating percolating groundwaters, Missouri follows the “comparative reasonableness” rule.<sup>88</sup> The comparative reasonableness rule permits a riparian to make any use of percolating groundwater if their use does not unreasonably harm adjoining riparians’ ability to exercise their right to use percolating groundwaters.<sup>89</sup> Accordingly, in practice, the law governing competing claims to percolating groundwaters closely parallels riparian doctrine’s reasonableness rules.<sup>90</sup>

### *C. Missouri Groundwater Statutes*

By statute, all Missouri landowners have a right to establish private water systems for both surface water and groundwater.<sup>91</sup> Missourians’ rights to private water systems are limited only by riparian reasonableness principles, relevant city ordinances,<sup>92</sup> and statutes governing major water users.<sup>93</sup>

If a Missourian uses more than 100,000 gallons of water per day from a water source, they are deemed a “Major Water User” (MWU) and are required to register with the Missouri Department of Natural Resources’ (MDNR) Water Resources Center.<sup>94</sup> Common major uses of water in Missouri include municipal, commercial, industrial, fish and wildlife (including aquaculture), livestock (characterized as “livestock watering, feedlots, [and] dairy operations”), electrical power

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<sup>86</sup> Peter N. Davis, *Eastern Water Diversion Permit Statutes: Precedents for Missouri?*, 47 MO. L. REV. 429, 439 (1982).

<sup>87</sup> *Id.* at 439, n.44.

<sup>88</sup> McNitt, *supra* note 77, at 248 (discussing Missouri’s adoption of the comparative reasonableness rule in *Higday v. Nickolaus*, 469 S.W.2d 859 (Mo. Ct. App. 1971)).

<sup>89</sup> McNitt, *supra* note 77, at 242–43.

<sup>90</sup> McNitt, *supra* note 77, at 243 (citing to the RESTATEMENT (SECOND) OF TORTS § 850A (1979) (reasonableness factors)).

<sup>91</sup> MO. REV. STAT. § 640.648 (2016).

<sup>92</sup> *See id.* (while the statute does not mention riparian principles, they do govern disputes among private water users).

<sup>93</sup> MO. REV. STAT. §§ 256.410–256.420 (2016).

<sup>94</sup> MO. REV. STAT. § 256.410 (2016); *see also Major Water Users*, MO. DEP’T. OF NAT. RES., <https://dnr.mo.gov/water/business-industry-other-entities/reporting/major-water-users> [<https://perma.cc/834S-D296>] (last visited May 18, 2025).

generation, mining, and irrigation.<sup>95</sup> The statutes related to MWUs impose reporting requirements only, and if a MWU fails to report their use the state's sole recourse is via section 265.425 of the Missouri Revised Statutes.<sup>96</sup> Under 256.415, an unregistered MWU is a de facto nuisance, and the statute permits the director of the MDNR to request that the attorney general "file an action in the name of the state for an injunction to stop all water withdrawal or diversion from [the] water source."<sup>97</sup> The unregistered MWU may continue to withdraw or divert water while any injunction against their use is pending and, even if the user's use is enjoined, that injunction dissolves as soon as the user registers as a MWU.<sup>98</sup> Municipalities and private users who use less than 100,000 gallons per day are not required to report their use.<sup>99</sup>

Notably, neither the MWU statutes nor the statute allowing municipalities to report their use "shall be construed to limit the common law water rights of any person."<sup>100</sup> Accordingly, common law riparian principles, not statutory law, govern the adjudication of water uses in Missouri.

The creation of the Southwest Missouri Region Water District<sup>101</sup> (SMRWD) and related limits on water transfers<sup>102</sup> from that region represent the codification of riparian reasonableness principles by the Missouri Legislature. Under Mo. Rev. Stat. § 256.433, a MWU cannot convey water withdrawn from the SMRWD outside the district when such a withdrawal or conveyance "unduly interferes with the *reasonable* and customary activities of a [MWU] . . . located within [the SMRWD]."<sup>103</sup> If a major conveyance occurs, an affected MWU or the attorney general can seek an injunction against the offending MWU, provided that the injunction will not "be detrimental to public health or safety."<sup>104</sup> Mo. Rev. Stat. § 256.433's mention of

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<sup>95</sup> Scott Kaden, *Missouri Major Water Users*, MO. DEP'T. OF NAT. RES., <http://www.westernstateswater.org/wp-content/uploads/2019/10/11-Missouri-water-use-reporting.pdf> [<https://perma.cc/8YQZ-NUVP>] (last visited May 18, 2025).

<sup>96</sup> MO. REV. STAT. § 256.415 (2016).

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> See MO. REV. STAT. § 71.287 (2016) (allowing, but not requiring, municipalities to report water usage to the state).

<sup>100</sup> MO. REV. STAT. § 256.430.2 (2016).

<sup>101</sup> MO. REV. STAT. § 256.643 (2016).

<sup>102</sup> MO. REV. STAT. § 256.433 (2016).

<sup>103</sup> *Id.* (emphasis added).

<sup>104</sup> *Id.*

“reasonableness” in adjudicating disputes between MWUs demonstrates that common law riparian principles informed the legislators’ formulation of the statutory language. Perhaps more importantly, the statute’s prohibition on injunctions that “would be detrimental to public health or safety”<sup>105</sup> acknowledges that the public has an interest in how water within Missouri is used. Placing greater value on the public’s interest in the groundwater of Missouri is essential to enacting reforms that will better protect Missourians’ health and natural resources.

#### IV

### MISSOURI’S WATER LAW IS INSUFFICIENT TO PROTECT ITS GROUNDWATER FROM EXTRACTIVE INDUSTRIES AND OTHER HIGHLY CONSUMPTIVE USES

Karstic groundwater systems can be fragile, and Missouri’s regulation of its waters is lax due to its undeveloped water law.<sup>106</sup> Extractive groundwater use continues to increase, and Missouri caselaw fails to “fill the gaps” in its groundwater law. While Michigan’s *Nestlé*<sup>107</sup> was revolutionary in its judicial recognition of the connections between ground and surface waters, similar caselaw in Missouri would be insufficient to protect its groundwater from increasing groundwater extractions, such as bottling water.

#### *A. Americans’ Thirst for Bottled Water*

Americans love bottled water. In 2007, thirsty citizens consumed nine billion gallons of bottled water, nearly twenty-eight gallons per person per year.<sup>108</sup> By 2021, more than fifteen billion gallons of bottled water were being sold in the United States, making for roughly forty-seven gallons consumed per capita.<sup>109</sup> Regardless of some studies’

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<sup>105</sup> *Id.*

<sup>106</sup> 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> [<https://perma.cc/3JC5-ZL3V>] (noting that Missouri boasts it has “some of the loosest water laws in the country”).

<sup>107</sup> *Mich. Citizens for Water Conservation v. Nestlé Waters N. Am. Inc.*, 709 N.W.2d 174 (Mich. Ct. App. 2005) [hereinafter *Nestlé*].

<sup>108</sup> ROBERT GLENNON, UNQUENCHABLE 44 (2010) [hereinafter UNQUENCHABLE]; see also *Per Capita Consumption of Bottled Water in the United States from 1999 to 2023*, STATISTA, <https://www.statista.com/statistics/183377/per-capita-consumption-of-bottled-water-in-the-us-since-1999/> [<https://perma.cc/2FEV-S7S6>] (last visited May 18, 2025).

<sup>109</sup> *Sales Volume of Bottled Water in the United States from 2010 to 2023*, STATISTA, <https://www.statista.com/statistics/237832/volume-of-bottled-water-in-the-us/> [<https://>

dubious provenance, demand for bottled water will remain high.<sup>110</sup> The U.S. Food and Drug Administration has established four categories of bottled water: artesian well water, mineral water, spring water, and well water.<sup>111</sup> The FDA also allows companies to sell water from municipal sources so long as the water has been treated through distillation or filtration processes.<sup>112</sup> Some bottling companies have focused on marketing bottled spring water,<sup>113</sup> which Americans perceive as higher quality, and those companies have doggedly pursued opportunities to tap wells that allow them to bottle spring waters.<sup>114</sup>

FDA regulations set the requirements for bottled water to be sold as “spring water.”<sup>115</sup> Water that “flows naturally to the surface of the earth may be [labelled] ‘spring water’” and sold as such.<sup>116</sup> A bottler must collect spring water where the spring water surfaces (e.g., at the spring itself) or through a well “tapping the underground formation feeding the spring.”<sup>117</sup> Additionally, a “natural force” must “caus[e] the [spring] water to flow to the surface through a natural orifice.”<sup>118</sup> If a bottler wants to capture spring water distant from where it surfaces, it need only demonstrate that it has bored its well to tap an underground stream terminating in an identifiable surface spring.<sup>119</sup>

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perma.cc/L8P8-WAY5] (last visited May 18, 2025); *Per Capita Consumption of Bottled Water in the United States from 1999 to 2023*, STATISTA, <https://www.statista.com/statistics/183377/per-capita-consumption-of-bottled-water-in-the-us-since-1999/> [https://perma.cc/LX4D-ECTK] (last visited May 18, 2025).

<sup>110</sup> *See Consumers’ Preference for Bottled Water Is Growing and They Want It Available Wherever Drinks Are Sold*, INT’L BOTTLED WATER ASS’N (Jan. 8, 2019), <https://www.globenewswire.com/en/news-release/2019/01/08/1682157/0/en/Consumers-preference-for-bottled-water-is-growing-and-they-want-it-available-wherever-drinks-are-sold.html> [https://perma.cc/72QV-8YTT].

<sup>111</sup> *Bottled Water Everywhere: Keeping It Safe*, U.S. FOOD & DRUG ADMIN. (last updated Apr. 22, 2022), <https://www.fda.gov/consumers/consumer-updates/bottled-water-everywhere-keeping-it-safe> [https://perma.cc/8XYQ-AACA].

<sup>112</sup> *Id.*

<sup>113</sup> *See* UNQUENCHABLE, *supra* note 108, at 46.

<sup>114</sup> WATER FOLLIES, *supra* note 16, at 3–4 (noting that Perrier had, at that time, fifty sources from which it bottled and was seeking more).

<sup>115</sup> 21 C.F.R. § 165.110 (2023).

<sup>116</sup> 21 C.F.R. § 165.110(a)(2)(vi) (2023).

<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

<sup>119</sup> *Id.* (FDA regulations require that the spring be “identifiable” but do not require a bottler to bottle within a specific distance of the spring so long as they can “demonstrate . . . using a hydrogeologically valid method, that an appropriate hydraulic connection exists between the natural orifice of the spring and the bore hole.”).

Under FDA regulations, spring water can be relatively easy to capture, especially in jurisdictions with lax water laws.<sup>120</sup> In a riparian jurisdiction such as Missouri, where “reasonableness” principles govern groundwater, all a potential bottler must do is locate a parcel that contains an underground stream with a definable “natural orifice” that constitutes an “identifiable” spring. Given the significant resources of water bottling companies<sup>121</sup> and the increasing resistance to exploitative groundwater pumping,<sup>122</sup> commercial bottlers may look toward Missouri’s pristine Ozark springs as new sources of spring water.<sup>123</sup> All a bottler needs to do in a jurisdiction with water law as lax as Missouri’s is tap an underground stream and pump spring water to their heart’s content. A bottler’s pumping can continue unrestricted until disruption of the local groundwater system drives local riparians to seek an injunction against the bottler. Even if a court deems the bottler’s use unreasonable and grants an injunction, the area’s groundwater resources and karstic topography may be permanently harmed.

***B. Nestlé: A Model for Judicial Recognition of the Connection  
Between Surface and Ground Waters***

In *Michigan Citizens for Water Conservation v. Nestlé Waters North America, Inc.*, the Michigan Court of Appeals issued a limited injunction against a water bottler—Nestlé—after their groundwater withdrawals damaged nearby riparian landowners’ access to groundwater.<sup>124</sup> Nestlé had purchased groundwater rights from riparian landowners and was permitted by the Michigan Department of

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<sup>120</sup> See generally Caroline Winter, *Nestlé Makes Billions Bottling Water It Pays Nearly Nothing For*, BLOOMBERG (Sept. 21, 2017, 2:00 AM), <https://www.bloomberg.com/news/features/2017-09-21/nestl-makes-billions-bottling-water-it-pays-nearly-nothing-for> [https://perma.cc/9S5U-4E8C].

<sup>121</sup> Hannah Hammond, *Nestlé Sells Most of Nestlé Waters North America*, CSP (Feb. 17, 2021), <https://www.cspdailynews.com/beverages/nestle-sells-most-nestle-waters-north-america> [https://perma.cc/528H-DEEY] (“Nestlé’s global Waters sales amounted to \$7.8 billion in 2019.”).

<sup>122</sup> UNQUENCHABLE, *supra* note 108, at 46 (“The potentially devastating environmental consequences of Nestlé’s strategy . . . have driven citizens across the nation to resist Nestlé’s proposed plans.”); see also Tom Perkins, *The Fight to Stop Nestlé from Taking America’s Water to Sell in Plastic Bottles*, THE GUARDIAN (Oct. 29, 2019, 2:00 AM), <https://www.theguardian.com/environment/2019/oct/29/the-fight-over-water-how-nestle-dries-up-us-creeks-to-sell-water-in-plastic-bottles> [https://perma.cc/H48J-WBBC].

<sup>123</sup> WATER FOLLIES, *supra* note 16, at 9 (“The FDA rules create a perverse, though unintended, incentive to harm the environment by pumping groundwater from a well so close to a spring that it reduces the spring’s flow.”).

<sup>124</sup> See *Nestlé*, 709 N.W.2d.

Environmental Quality to withdraw 400,000 gallons per day.<sup>125</sup> In anticipation of withdrawing its permitted quantities of groundwater, Nestlé started construction on a bottling plant twelve miles from the springs.<sup>126</sup>

The riparian parcel from which Nestlé pumped groundwater was north of a spring that had been impounded to form a lake.<sup>127</sup> A stream, fed by springs underlying the impounded lake, flowed into other nearby waters.<sup>128</sup> The water features fed by the springs—the impounded lake and stream—had associated wetlands that had been impacted by groundwater withdrawals and would be further impaired by Nestlé’s planned withdrawals.<sup>129</sup>

Riparian landowners and other interested parties within the area near the springs formed a nonprofit corporation and sought to have Nestlé’s planned withdrawals enjoined.<sup>130</sup> At trial, expert evidence from a hydrologist led the court to find that Nestlé’s “pumping had harmed and [would] continue to harm plaintiffs’ riparian interests.”<sup>131</sup> Accordingly, the trial court granted the plaintiffs’ injunctive relief and ordered Nestlé to cease pumping groundwater from the vicinity of the springs.<sup>132</sup>

On appeal, the Michigan Court of Appeals accepted the trial court’s findings and proceeded to apply a reasonable use balancing test to adjudicate the issue.<sup>133</sup> The court noted that if, upon weighing relevant factors, a water use is found to be reasonable, then that use will be permitted. While a nonexhaustive list, the factors the court considered several factors in determining whether Nestlé’s withdrawals were reasonable:

- (1) the purpose of the use, (2) the suitability of the use to the location,
- (3) the extent and amount of the harm, (4) the benefits of the use,
- (5) the necessity of the amount and manner of the water use, and
- (6) any other factor that may bear on the reasonableness of the use.<sup>134</sup>

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<sup>125</sup> *Id.* at 184.

<sup>126</sup> *Id.* at 185.

<sup>127</sup> *Id.* at 184.

<sup>128</sup> *Id.*

<sup>129</sup> *See id.* at 188–89.

<sup>130</sup> *Nestlé*, 709 N.W.2d at 184.

<sup>131</sup> *Id.* at 186, 188–89.

<sup>132</sup> *Id.* at 184.

<sup>133</sup> *Id.* at 202.

<sup>134</sup> *Id.* at 203.

Regarding factor (1), the court explained a preference for “natural” uses, which it considered to be “all those uses necessary to the existence of the user.”<sup>135</sup> Additionally, the court noted that uses that benefit the water resources of the land from which groundwater is removed were preferred to off-tract uses,<sup>136</sup> such as bottling groundwater for sale in distance markets. As for factor (2), the suitability of a water use is to be judged in light of the disputed water resource’s nature and uses for which the particular water resource is typically used are favored.<sup>137</sup> In assessing the harm (factor (4)), economic harm to the parties involved is important, but the social benefits or costs of the use are also taken into account.<sup>138</sup> Community standards as to what a reasonable use of the water resource is should also be considered, and “the protection of existing water uses should be an important consideration.”<sup>139</sup> Finally, regarding factors (1), (3), and (5), the court posited that examination of the use’s “effects on the quantity, quality, and level of the water” must be considered.<sup>140</sup>

Having laid out the “reasonable use balancing test,” the court set out to weigh the riparian landowners’ use of surface water against Nestlé’s proposed withdrawals of groundwater. Regarding the plaintiff riparian landowners, the court noted that they used the watercourses adjoining their lands for “recreational boating, wildlife observation, swimming, and fishing”<sup>141</sup> and that, based on the expert hydrological evidence,<sup>142</sup> those uses as well as the aesthetic value of their lands would be impaired.<sup>143</sup> The court considered the riparian landowner’s uses reasonable.<sup>144</sup> Turning to Nestlé’s use of groundwater, the court noted that bottling groundwater would result in economic and social benefits such as “investment in the community and . . . tax revenue” and “provision of water to the general public.”<sup>145</sup> Accordingly, Nestlé’s bottling of groundwater was not, in and of itself, unreasonable and the

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<sup>135</sup> *Id.* at 204.

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> *Id.*

<sup>139</sup> *Id.*

<sup>140</sup> *Id.* at 205.

<sup>141</sup> *Id.*

<sup>142</sup> *See id.* at 188–92.

<sup>143</sup> *Id.* at 205.

<sup>144</sup> *Id.*

<sup>145</sup> *Id.*

court was mandated to balance the factors in light of the circumstances and the harm inflicted on the riparian landowners by Nestlé's use.<sup>146</sup>

Because the court considered both parties' uses "artificial" rather than "natural," neither was presumptively preferred.<sup>147</sup> However, because Nestlé's bottling was an out-of-basin use and the riparian landowners' use was directly related to their riparian lands, the court granted the riparian landowners "some measure of preference."<sup>148</sup> Nestlé's bottling of groundwater would have had a pronounced impact on surface water courses, particularly at the level of pumping it intended to sustain.<sup>149</sup> Noting that Nestlé chose its pumping location near springs "to facilitate its marketing of the extracted water as 'spring water'" and had options to obtain spring water from other locations, the court reasoned that Nestlé's pumping should be enjoined to a degree that would sustain surface stream flows for the riparian landowners.<sup>150</sup> Accordingly, because the riparian landowners would suffer substantial harm if Nestlé's proposed pumping was permitted, the court remanded the issue to the trial court to determine how much groundwater Nestlé could pump from the springs without impairing others' riparian uses.<sup>151</sup>

It is worth noting that *Nestlé* is unique in that the plaintiff riparian landowners alleged violations of their rights to surface waters because of groundwater pumping. In most riparian jurisdictions, the court would consider surface water and groundwater claims separately, but in *Nestlé* the court adjudicated the surface water and groundwater issues by applying its "reasonableness balancing test" to both water types.<sup>152</sup> As such, *Nestlé* illustrates a rare decision from a riparian jurisdiction in which the court recognized the hydrological connection between surface waters and groundwater. Additionally, the Michigan Appellate Court explicitly noted that the public interest should be considered when it remanded the case to the trial court for limited injunction.<sup>153</sup> In doing so, the *Nestlé* court provided a sensible model for legal management of interconnected hydrological systems while signaling that the general public—those who do *not* own land

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<sup>146</sup> *Id.*

<sup>147</sup> *Id.* at 206.

<sup>148</sup> *Id.*

<sup>149</sup> *See id.* at 206–07.

<sup>150</sup> *See id.* at 206–07.

<sup>151</sup> *Id.* at 208–09.

<sup>152</sup> *See* THOMPSON, JR. ET AL., *supra* note 11, at 50.

<sup>153</sup> *See Nestlé*, 709 N.W.2d at 208 (“[T]his Court will consider the following factors: . . . the interests of third persons and of the public.”).

connected to surface or ground waters—should be considered in adjudicating groundwater withdrawal disputes.

***C. Imagining Judicial Recognition of Hydrological Principles in Missouri: A Small Step Forward***

As explained earlier in this Article, surface waters and groundwater are inherently interconnected.<sup>154</sup> The consensus among water law scholars is that common law doctrines, such as pure riparianism, fail to adequately reflect prevailing scientific understanding of hydrology.<sup>155</sup> Because Missouri is a pure riparian state and applies riparian principles to groundwater,<sup>156</sup> its water law does not explicitly recognize the connection between groundwater and surface water. Further, Missouri statutes governing groundwater do not impose substantive regulation on groundwater withdrawals.<sup>157</sup> Without reform, Missouri's water law will be insufficient to protect the public's interest in access to water and preservation of water resources.<sup>158</sup>

Many states that were once riparian jurisdictions have, in an effort to mitigate pure riparianism's deleterious effects on shared water resources, shifted to regulated riparian systems.<sup>159</sup> Generally, "pure" riparianism has been criticized as a failing doctrine:

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<sup>154</sup> See *supra* Sections I.A–B (of particular significance to this Article is that Missouri law applies riparian reasonableness principles to both underground streams and percolating waters—at best, Missouri groundwater is governed by a smattering of riparian principles and reasonableness tests).

<sup>155</sup> WATER FOLLIES, *supra* note 16, at 9, 210 (Noting that "the law in most states has not kept pace with advances in the science of hydrology. As a consequence, the legal rules fail to conform with physical reality" and that "[a] complete misunderstanding of hydrology have been memorialized in many states, where groundwater and surface water are legally two unrelated things."); see generally Robert H. Abrams, *Charting the Course of Riparianism: An Instrumentalist Theory of Change*, 35 WAYNE L. REV. 1381 (1989) (concluding that a "future fraught with increasing doubts about the adequacy of the [East's] water supply in relation to the growing need for water" and the "precipitous decline in surface water supplies caused by the greenhouse effect, suggest an increase in the number of absolute shortage cases that riparianism has . . . been hard pressed to resolve adequately.").

<sup>156</sup> See *supra* Section III.

<sup>157</sup> Missouri's statutes governing groundwater withdrawals serve purely informational purposes. See *supra* Section II.C.

<sup>158</sup> See generally Dellapenna, *The Evolution of Riparianism*, *supra* note 74, at 85–86 ("With the demand for water for various uses continuing to increase in the East, even as population growth has stabilized or . . . gone into decline, recurring water shortwaves have become more frequent. The pressures for change will only accelerate under the impact of global climate change.").

<sup>159</sup> *Id.* at 85–87.

Riparian rights exhibit serious problems. These include the vagueness and unpredictability of the criteria of decision in any conflict over water, the lack of a process for managing water during extreme shortages or for protecting public values, a systematic bias in favor of large users, and the impracticality of developing markets under a legal regime that suffers from such shortcomings.<sup>160</sup>

Because Missouri, in essence, applies riparianism to its groundwater, these criticisms apply to Missouri's management of surface waters *and* groundwater.

Of particular concern is riparian principles' failure to "protect public values" and riparianism's "systematic bias in favor of large users."<sup>161</sup> Missouri's Major Water User (MWU) statutes fail to impose anything beyond reporting requirements on users making substantial withdrawals of groundwater. If an MWU's pumping causes an area's water supplies to become unavailable or contaminated, individuals can seek only judicial resolution. Litigation is expensive, and entities capable of withdrawing large quantities of water typically have resources available for litigation far beyond those of individuals or citizen groups. A court's balancing test "generally strongly favors large users over smaller users because the economic value of the water to the large user usually will outweigh the economic loss of the small user."<sup>162</sup> Similarly, if a bottler taps groundwater resources for spring water and disrupts karstic topography and hydrology, riparianism's inherent instability and uncertainty means individuals are not guaranteed to receive a judicial solution that adequately protects public values associated with water resources.<sup>163</sup>

*Nestlé* provides a model by which Missouri courts could advance improved protections for Missourians' water resources within Missouri's current pure riparian law. Missouri's groundwater caselaw is scant,<sup>164</sup> providing opportunity for judicial clarification as to how Missouri law might recognize the connectivity between surface waters

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<sup>160</sup> Joseph W. Dellapenna, *Adapting Riparian Rights for the Twenty-First Century*, 106 W. VA. L. REV. 539, 559 (2004) [hereinafter Dellapenna, *Adapting Riparian Rights*]; see T.E. Lauer, *Reflections on Riparianism*, 35 MO. L. REV. 1, 24 (1970) ("It is evident that an effort to solve the water crisis in the Eastern United States must involve some modification of the traditional riparian doctrine."); see generally Robert H. Abrams, *Replacing Riparianism in the Twenty-First Century*, 36 WAYNE L. REV. 93 (1989).

<sup>161</sup> Dellapenna, *Adapting Riparian Rights*, *supra* note 160, at 559.

<sup>162</sup> *Id.* at 560.

<sup>163</sup> *Id.* at 559.

<sup>164</sup> See Brian Hamilton, *It's Called Manufacturing: A Closer Look at Missouri's Groundwater Law*, 17 MO. ENV'T L. & POL'Y REV. 215 (2009).

and groundwaters. *Nestlé's* test suggests recognition of the public interest and provides a model that permits Missouri courts to recognize scientific consensus regarding hydrological principles.

However, a change in judicial precedent alone is not sufficient to protect the Ozark Mountain's waters in the long term.<sup>165</sup> As noted above, the injunctive relief provided by the *Nestlé* court fails to prevent harms before they occur. Accordingly, a "Missouri *Nestlé*" would fail to proactively protect the Ozarks' water resources. Overall, legal doctrines that consider competing water uses in terms of their relative "reasonableness" fail to preserve public interest values in the face of commercial entities' considerable resources. Accordingly, substantive legislative reform of Missouri water law is warranted.

## V

### THE BALLOT MEASURE:

#### A PROMISING VEHICLE FOR MISSOURI WATER LAW REFORM

A "Missouri *Nestlé*" is not enough. Even if Missouri courts formally recognize hydrological principles, Missouri law as it stands fails to address the risks of permitting unregulated groundwater pumping. Missouri is one of twenty-one states that allow citizens to propose statutes through ballot initiatives.<sup>166</sup> Accordingly, a citizen-led ballot initiative for groundwater law reform is Missouri's best bet for protecting the Ozarks' groundwater resources.

#### *A. The Ballot Initiative Process in Missouri*

Missouri's constitution allows citizens to propose constitutional amendments or laws, permitting citizens to create law without relying upon legislators.<sup>167</sup> Petitions proposing amendments to the Missouri constitution must be "signed by eight percent of the legal voters" from "two-thirds of the congressional districts in [Missouri]"<sup>168</sup>—meaning petitioners must collect the requisite signatures from at least six

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<sup>165</sup> See Lauer, *supra* note 160, at 24 ("It is equally clear that modification [of pure riparian law] is beyond the present ability of the judiciary").

<sup>166</sup> Univ. of S. Cal., *Direct Democracy in Your State*, INITIATIVE & REFERENDUM INST., <https://www.initiativeandreferenduminstitute.org/dd-in-your-state> [<https://perma.cc/7WQM-JGSH>] (last visited May 18, 2025).

<sup>167</sup> See MO. CONST. art. III, §§ 49–50.

<sup>168</sup> MO. CONST. art. III, § 50, cl. 1.

congressional districts.<sup>169</sup> Petitions proposing laws must be signed by five percent of legal voters from six of Missouri’s eight congressional districts.<sup>170</sup> Missouri has a “single subject rule” that applies to all ballot measures<sup>171</sup>—thus limiting the scope of legislation by ballot initiative to singular issues—and under which any amendment of or addition to the Missouri constitution must turn on one central issue.<sup>172</sup>

Petitioners for a ballot initiative must get approval from the secretary of state’s office before circulating their petition and collecting signatures.<sup>173</sup> The petitioner must submit their proposal to the secretary of state’s office “no less than six months before the election,”<sup>174</sup> which will complete a series of procedures to approve or deny a ballot initiative petition.<sup>175</sup> If the petition is approved and certified by the secretary of state, the secretary’s office will provide the petitioner with the official ballot title, summary ballot language, and a fiscal note summary.<sup>176</sup> Thereafter, the petitioner can begin circulating their petition for signatures.<sup>177</sup> Petition signees must be registered Missouri voters and petitions must be collected on documents that meet certain requirements.<sup>178</sup> Upon collecting the requisite number of signatures,<sup>179</sup>

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<sup>169</sup> Simple math—two-thirds of Missouri’s eight districts is six. *See Legislative Branch, MO.GOV*, <https://www.mo.gov/government/legislative-branch/> [<https://perma.cc/289Q-4MQR>] (last visited May 18, 2025).

<sup>170</sup> MO. CONST. art. III, § 50, cl. 1.

<sup>171</sup> *See* MO. CONST. art. III, § 23; *see also Laws Governing the Initiative Process in Missouri*, BALLOTPEDIA, [https://ballotpedia.org/Laws\\_governing\\_the\\_initiative\\_process\\_in\\_Missouri](https://ballotpedia.org/Laws_governing_the_initiative_process_in_Missouri) [<https://perma.cc/99WM-U84J>] (last visited May 18, 2025).

<sup>172</sup> MO. CONST. art. III, § 50, cl. 3.

<sup>173</sup> MO. SEC’Y OF STATE’S OFF., MAKE YOUR VOICE HEARD: MISSOURI’S INITIATIVE PETITION PROCESS 2 (2022), <https://www.sos.mo.gov/CMSImages/Elections/Petitions/MakeYourVoiceHeard.pdf> [<https://perma.cc/C7MG-LBBA>] [hereinafter MAKE YOUR VOICE HEARD].

<sup>174</sup> MO. CONST. art. III, § 50, cl. 2.

<sup>175</sup> *See* MAKE YOUR VOICE HEARD, *supra* note 173, at 2–3 (detailing the process by which the secretary of state’s office works with the attorney general’s office to approve or deny a petition and, if approval is granted, provides an official ballot title, language, and fiscal not summary to the petitioner).

<sup>176</sup> *Id.* at 2.

<sup>177</sup> *Id.* at 3.

<sup>178</sup> *See id.* at 2–3 (“Petition circulators . . . collect signatures on petition pages that contain the official ballot titles and the full and correct text of the proposed measure. Each petition page may only contain signatures of voters from one county. Signatures of voters from counties other than the one designated by the circulator in the upper right-hand corner of the petition page will not be counted.”).

<sup>179</sup> MO. CONST. art. III, § 50, cl. 1 (eight percent of legal voters in the district for constitutional ballot measures or five percent of legal voters in the district for statutory ballot

the petitioners must submit their collected signatures to the secretary of state's office no less than six months before the election in which the ballot measure will be considered.<sup>180</sup> The secretary of state's office works with local election authorities within the relevant districts to verify the collected signatures' validity.<sup>181</sup> If the number of valid collected signatures meets the constitutional requisite, then the secretary of state's office will issue a certificate of sufficiency and the initiative will appear on the ballot for voters to consider.<sup>182</sup>

A simple majority—50.1% or greater—approving the ballot measure will result in its passage.<sup>183</sup> However, the Missouri legislature is currently considering a bill that would require ballot measures amending the constitution to receive sixty percent of the vote or greater to pass.<sup>184</sup> If approved by the legislature,<sup>185</sup> Missourians will vote on the bill in 2024.

### ***B. The Parks, Soils and Waters Tax Illustrates Missourians' Support for Conservation***

Missourians view conservation of the state's natural resources favorably. Missouri's Department of Conservation has been lauded as exemplary.<sup>186</sup> Missouri established its state parks in 1924, when the Missouri legislature arranged for twenty-five percent of fishing and

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measures); *See also* MAKE YOUR VOICE HEARD, *supra* note 173, at 5–6 (table demonstrating the number of votes needed from each district to get a petitioned initiative in the ballot in 2022).

<sup>180</sup> MAKE YOUR VOICE HEARD, *supra* note 173, at 4.

<sup>181</sup> *Id.*

<sup>182</sup> *Id.* at 5.

<sup>183</sup> MO. REV. STAT. § 116.320.1 (2016).

<sup>184</sup> Galen Bacharier, *Plan Making It More Difficult to Approve Ballot Measures in Missouri Passes House*, SPRINGFIELD NEWS-LEADER (Feb. 2, 2023, 10:16 AM), <https://www.news-leader.com/story/news/politics/2023/02/02/mo-house-approves-plan-making-it-harder-to-pass-ballot-measures/69859590007/> [<https://perma.cc/S9X2-5NVE>].

<sup>185</sup> The bill has been approved by the Missouri House of Representatives and is currently being considered by the Senate. H.R.J. Res. 43, 102nd Gen. Assemb., 1st Reg. Sess. (Mo. 2023), <https://house.mo.gov/billtracking/bills231/hlrbillspdf/1722H.04P.pdf> [<https://perma.cc/LW8T-QGAZ>]. *See also* HJR 43, Mo. H.R. (Feb. 28, 2023), <https://house.mo.gov/Bill.aspx?bill=HJR43&year=2023&code=R> [<https://perma.cc/2RV8-XXVG>]. (Missouri state website for tracking the progress of proposed bills, showing H.J.R. 43 as being considered by the Missouri Senate).

<sup>186</sup> Susan Flader, *Building a Constituency for State Parks: The Missouri Experience*, 17 GEORGE WRIGHT F., no. 3, 2000, at 31 (“[Missouri] has long been recognized as a leader among the states in natural resource conservation . . . [H]istorically [Missouri] won regard largely for its pace-setting, highly professional conservation department.”).

hunting licensing fees to be diverted to fund state parks.<sup>187</sup> Pushback from fishermen and hunters in 1936 resulted in conservation and parks being split into separate departments.<sup>188</sup> The state parks system grew steadily on modest public funding and the contributions of state agencies and individuals.<sup>189</sup> Missouri's conservation department remained strongly supported by state citizens, and Missouri's state parks—at this point considered an interest separate from conservation—experienced a windfall of federal funds that allowed the state parks system to flourish in the 1970s.<sup>190</sup>

These conditions led to the best legal demonstration of Missourians' approval of conservation projects by setting the stage for the Parks, Soils and Water Sales Tax.<sup>191</sup> In the early 1980s, Missouri had “the second highest erosion rate of any state in the Union.”<sup>192</sup> At the same time, Missouri's state park system had started to suffer from reduced funding due to federal budget cuts.<sup>193</sup> In response to Missouri state parks' floundering in the early 1980s, citizens and advocacy groups sought to join forces with citizens who supported conservation related to hunting and fishing.<sup>194</sup> In response to continued pushback from hunting and fishing conservationists, who viewed Missouri's state parks as “a poor cousin of the conservation department,” the Missouri Parks Association was formed to advocate for Missouri's parks without “raid[ing] the [existing] conservation sales tax.”<sup>195</sup> After a series of advocacy actions, citizen groups coalesced around a plan to introduce a ballot measure that would provide for Missouri state parks and preserve their value for conservation of natural resources.<sup>196</sup>

Advocates for state park funding joined forces with soil conservation interests, and the coalition placed a ballot measure—Constitutional

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<sup>187</sup> *Id.*

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

<sup>191</sup> *History of the Parks, Soils and Water Sales Tax*, MO. DEP'T OF NAT. RES., <https://dnr.mo.gov/land-geology/soil-water-conservation/parks-soils-water-sales-tax> [<https://perma.cc/7MCW-WPGE>] (last visited May 18, 2025).

<sup>192</sup> *Id.*

<sup>193</sup> *Id.*

<sup>194</sup> Flader, *supra* note 186, at 32.

<sup>195</sup> *Id.*

<sup>196</sup> *Id.*

Amendment No. 2—on the 1984 ballot as the “Soils and Parks Tax.”<sup>197</sup> The ballot measure would increase sales tax by one-tenth of one percent, and the resulting funds would be split between state parks and soil and water conservation.<sup>198</sup> The 1984 Soils and Parks ballot measure passed by a narrow 50.1% margin,<sup>199</sup> but support for the tax has increased each time it has returned to the ballot for reapproval.<sup>200</sup> When up for renewal in 1988, 1996, and 2006, support for the tax hovered around seventy percent.<sup>201</sup> When the sales tax was last renewed in 2016, almost eighty percent of Missouri voters approved.<sup>202</sup>

The history of the Parks, Soils and Waters Tax illustrates that Missourians have always viewed conservation of state lands favorably and support for conservation efforts has grown with time. Additionally, the consistent approval of taxation for the conservation of soil and water and the maintenance of state parks shows that “tax averse” Missourians will gladly accept a minimal financial burden<sup>203</sup> in return for protection of state waters, natural resources, and wildlife. Accordingly, Missourians are likely to support legal reform that imposes minimal tax burdens to protect valuable state water resources.

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<sup>197</sup> MO. DEP'T OF NAT. RES., *supra* note 191, *see also* Flader, *supra* note 186, at 34 (discussing that in “tax-averse Missouri, there would be no chance to secure” a parks tax by appealing to legislators).

<sup>198</sup> *Missouri Conservation Sales Tax (1984)*, BALLOTPEDIA, [https://ballotpedia.org/Missouri\\_Conservation\\_Sales\\_Tax\\_\(1984\)](https://ballotpedia.org/Missouri_Conservation_Sales_Tax_(1984)) [<https://perma.cc/9M84-GFER>] (last visited May 18, 2025).

<sup>199</sup> *Id.*

<sup>200</sup> *See* MO. DEP'T. OF NAT. RES., *supra* note 191 (“The tax is placed on the ballot every 10 years to reaffirm the voter’s support of the park system and soil and water conservation efforts.”).

<sup>201</sup> In 1998, 68.66% of voters approved. *See Missouri Tax Extension for Parks, Amendment 7 (1988)*, BALLOTPEDIA, [https://ballotpedia.org/Missouri\\_Tax\\_Extension\\_for\\_Parks,\\_Amendment\\_7\\_\(1988\)](https://ballotpedia.org/Missouri_Tax_Extension_for_Parks,_Amendment_7_(1988)) [<https://perma.cc/VR7G-Y3WF>] (last visited May 18, 2025); 66.61% approved in 1996, *Missouri Conservation Tax, Amendment 8 (1996)*, BALLOTPEDIA, [https://ballotpedia.org/Missouri\\_Conservation\\_Tax,\\_Amendment\\_8\\_\(1996\)](https://ballotpedia.org/Missouri_Conservation_Tax,_Amendment_8_(1996)) [<https://perma.cc/5M3F-3S36>] (last visited May 18, 2025); by 2006, approval increased to 70.79%. *See Missouri Conservation Tax, Amendment 1 (August 2006)*, BALLOTPEDIA, [https://ballotpedia.org/Missouri\\_Conservation\\_Tax,\\_Amendment\\_1\\_\(August\\_2006\)](https://ballotpedia.org/Missouri_Conservation_Tax,_Amendment_1_(August_2006)) [<https://perma.cc/TG45-9JSA>] (last visited May 18, 2025).

<sup>202</sup> Approval by Missouri voters had risen to 79.88%. *See Missouri Sales Tax for Parks and Conservation, Amendment 1 (2016)*, BALLOTPEDIA, [https://ballotpedia.org/Missouri\\_Sales\\_Tax\\_for\\_Parks\\_and\\_Conservation,\\_Amendment\\_1\\_\(2016\)](https://ballotpedia.org/Missouri_Sales_Tax_for_Parks_and_Conservation,_Amendment_1_(2016)) [<https://perma.cc/HVF6-9UUJ>] (last visited May 18, 2025).

<sup>203</sup> *State Park Benefits — The Parks, Soils and Water Sales Tax*, MO. BIRD CONSERVATION INITIATIVE, <https://mobci.net/wp-content/uploads/2016/05/parks-soils-and-water-sales-tax-talking-points.pdf> [<https://perma.cc/ZB9P-NMCS>] (last visited May 18, 2025) (“The portion of the Parks, Soils and Water Sales Tax that supports state parks averages about \$7 a year per Missourian.”).

### CONCLUSION

A ballot measure is the best method for achieving the legal reform needed to protect Missouri groundwaters. Missouri legislators are reluctant to impose taxation on their constituency and regulatory burdens upon business entities or private landowners. Accordingly, citizens and advocacy groups should look to the history of the Parks, Soils and Waters Tax and propose a ballot measure establishing a modest tax for the management of groundwater resources in the Ozarks. Management of Ozarks groundwater can begin with monitoring hydrology and heightening regulation of Major Water Users (MWUs) on the Ozark Plateau.

If imposing minimal monitoring and more stringent MWU regulations within the Ozarks would prove expensive, any proposed law should be accompanied by a tax similar to the 1984 Parks, Soils and Waters Sales Tax.<sup>204</sup> With a minimal tax, Missouri could secure more than adequate long-term funding for the creation and management of Ozarks Water Districts.<sup>205</sup> As with the Parks, Soils and Waters Tax, a sales tax of only a fraction of a percent would provide for the costs of establishing agencies to manage the Ozarks Water Districts and finance hydrological studies of the region. With a better understanding of the Ozark Plateau's hydrology, Missouri could effectively manage the Ozarks' water resources moving forward, making groundwaters available for sensible uses while protecting them from the exploitation that Missouri law presently permits.

For example, a statute establishing a Salem Plateau Regional Water District would serve to protect spring-laden river basins that have been nationally recognized for their importance, such as the Current, Jack's Fork,<sup>206</sup> and Eleven Point rivers.<sup>207</sup> Within this hypothetical Salem

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<sup>204</sup> MO. CONST. art. IV, § 47(a).

<sup>205</sup> Andy Ostmeier, *Parks, Soils Tax on Ballot in Missouri*, JOPLIN GLOBE (July 16, 2006), [https://www.joplinglobe.com/news/local\\_news/parks-soils-tax-on-ballot-in-missouri/article\\_ed26688-a37a-5695-83fd-fa15e1c25d82.html](https://www.joplinglobe.com/news/local_news/parks-soils-tax-on-ballot-in-missouri/article_ed26688-a37a-5695-83fd-fa15e1c25d82.html) [<https://perma.cc/BL6F-PV6T>] (the Parks, Soils and Waters Sales Tax imposes a one-eighth of one-percent sales tax across the state, and provided eight-two million dollars of funding for parks and soil conservation in 2006).

<sup>206</sup> For an excellent historical accounting of the Current and Jack's Fork Rivers' enshrinement as the first national scenic riverways see Ragsdale Jr., *supra* note 1, at 21–26.

<sup>207</sup> The Eleven Point River was one of the original eight rivers included for protection in the National Wild and Scenic Rivers Act. *Eleven Point National Wild and Scenic River*, U.S. DEP'T AGRIC., <https://www.fs.usda.gov/recarea/mtnf/recarea/?recid=21676> [<https://perma.cc/4K54-9ZVZ>] (last visited Jan. 25, 2025).

Plateau Regional Water District, Missouri should require that MWUs report their groundwater withdrawals and obtain a permit to make withdrawals. Because the Salem Plateau's springs make it attractive for extractive water uses such as spring water bottling,<sup>208</sup> water conveyances out of basin should be restricted or prohibited. Commercial extractive pumping could disrupt the surrounding karstic geology and cause damage to the Ozark Plateau's groundwater and karst topography.<sup>209</sup> The statutes governing the Southeast Missouri Regional Water District (SMRWD) provide a starting point for restricting conveyances outside a water basin but fail to sufficiently regulate groundwater withdrawals.<sup>210</sup> The SMRWD permits conveyances rather freely and—due to the potential consequences of drawdowns<sup>211</sup>—any statutes governing the hypothetical Salem Plateau Water District should be more restrictive. Preventing highly extractive withdrawals of Ozarks groundwater will provide Missourians with long-term access to potable groundwater while mitigating the potential harms associated with excessive groundwater drawdown. Further, preservation of the Salem Plateau's water resources would be in the interest of the region's locals, Missourians across the state, and the nation at large. There is plentiful water within the Salem Plateau region to satisfy municipal, domestic, and agricultural uses, and prohibiting highly extractive uses such as bottling will protect those uses and other Ozarks interests.

Even if Missouri establishes water districts in the Ozarks that require well registration and regulate MWUs, ongoing information gathering will be necessary to ensure the state can effectively manage the Ozarks' groundwater systems moving forward.<sup>212</sup> Because every groundwater system is distinct in its characteristics, withdrawals affect different groundwater sources differently.<sup>213</sup> Accordingly, any ballot measures should include provisions to promote a greater understanding of the Ozarks' groundwater resources and how they change in response to groundwater pumping. To best simulate the effects of registered well withdrawals on Ozark groundwater resources, Missouri should create

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<sup>208</sup> See discussion *supra* Section IV.A.

<sup>209</sup> See *supra* Section II.A.

<sup>210</sup> See *supra* Section III.C.

<sup>211</sup> See *supra* Section II.A; see also *supra* note 6.

<sup>212</sup> See THOMPSON, JR. ET AL., *supra* note 11, at 466 (citing Joseph W. Dellapenna, *Physical and Social Bases of Quantitative Groundwater Law*, 2 WATERS AND WATER RIGHTS § 18.04, pp. 18–60 (Amy K. Kelley ed., 3rd ed. 2017)).

<sup>213</sup> See *id.* (citing NAT'L RSCH. COUNCIL, GROUNDWATER MODELS: SCI. AND REGULATORY APPLICATIONS 219 (1990)).

a working group or agency that gathers information and develops hydrological models to help manage Ozark groundwater resources moving forward.<sup>214</sup> Again, a modest sales tax could provide the requisite funds for ongoing management of Ozark groundwater resources.<sup>215</sup>

Interested parties must act now to protect the Ozarks' streams, aquifers, and associated natural areas by crafting and proposing law prohibiting the exploitation of the Ozarks' water resources and enhancing understanding of Ozarks hydrology. Establishing a water district or districts within the Ozark Plateau is the simplest method of achieving conservation. By ballot measure or legislative act, Missouri could adopt laws that designate areas within the Ozark Plateau for regulation and monitoring.

Recognizing the value of Ozark Plateau water resources and that those resources could suffer irreparable harm from unregulated groundwater use warrants action by Missouri citizens to protect the Ozarks' groundwater. Missourians have demonstrated an interest in the conservation of natural resources and funded state programs to further those interests.<sup>216</sup> History demonstrates that Missourians will approve of programs that impose minimal burdens on individuals to preserve natural resources.<sup>217</sup> Missourians cherish the Ozarks' waters for the recreation opportunities, aesthetic enjoyment, and tourism dollars they afford. Additionally, Missourians disfavor federal regulation of Missouri's natural resources,<sup>218</sup> and a failure to safeguard the Ozarks' water resources from future harms poses a risk of federal agencies

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<sup>214</sup> Because "ground water systems are difficult to observe and describe" and it is difficult to determine the effect of groundwater pumping on an associated aquifer, groundwater models are essential for predicting groundwater resources' reactions to withdrawal. *See id.* at 465 (citing NAT'L RSCH. COUNCIL, GROUNDWATER MODELS; SCI. AND REGULATORY APPLICATIONS 22, 219 (1990); *see also* JACK WHITMAN ET AL., WHITMAN HYDRO PLAN. ASSOCS., FINAL REPORT SOURCE OF SUPPLY INVESTIGATION FOR JOPLIN, MISSOURI 62-65 (Feb. 11, 2003) (concluding that additional information is needed to manage southwest Missouri's groundwater and that community involvement will be necessary to achieve informational regulation)).

<sup>215</sup> *See* UNQUENCHABLE, *supra* note 108, at 320 ("A phased in, graduated tax on all surface water and ground water use will not only encourage conservation but also generate funds to underwrite expensive infrastructure repairs, conservation programs, and environmental restoration.").

<sup>216</sup> *See* discussion *supra* Section V.B.

<sup>217</sup> Missourians have demonstrated approval of taxation providing for conservation by thrice renewing the Parks, Soils and Waters Sales Tax. *See* Ostmeier, *supra* note 205; *see also supra* Section V.B.

<sup>218</sup> *See* Ragsdale Jr., *supra* note 1, at 1.

taking action to protect federal interests in the region.<sup>219</sup> Because Missouri caselaw cannot be relied on to protect groundwater resources,<sup>220</sup> statutory reform is needed. While the Missouri legislature could, and should, pass statutes to protect the state's waters, the most effective method for shifting Missouri groundwater law from reactive to proactive is for Missourians to create regulatory statutes via ballot measure.

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<sup>219</sup> *See supra* note 72.

<sup>220</sup> *See* discussion *supra* Section IV.C.