COMMENT

The Nature of Interstate Groundwater Resources and the Need for States to Effectively Manage the Resource Through Interstate Compacts

*Justin Newell Hesser**

I. INTRODUCTION 25
II. BACKGROUND 27
A. *Groundwater Hydrology* 28
B. *Groundwater Resources* 30
C. *Groundwater Legal Doctrines* 31
1. *Absolute Ownership Rule* 31
2. *Reasonable Use Rule* 32
3. *Correlative Rights Rule* 32
4. *Prior Appropriation Doctrine* 32
5. *Restatement Approach* 33
D. *Resolving Interstate Water Disputes* 33
1. *Interstate Compacts and Agreements* 34
2. *Doctrine of Equitable Apportionment* 36
3. *Congressional Apportionment* 37
III. ANALYSIS 37
A. *Policy* 38
B. *Equitable Apportionment* 40
C. *The Best Solution is for States to Compact* 41
D. *Forming Interstate Compacts* 43
E. *Administering Interstate Compacts* 45
IV. CONCLUSION 45

I. INTRODUCTION

Mark Twain once said, "Whiskey is for drinking; water is for fighting over."[1] While individuals fight over water every day at the state level, the bigger fights

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[1] MARK TWAIN QUOTATIONS, http://www.twainquotes.com/WaterWhiskey.html (last visited Nov. 21, 2010). While this quote is often attributed to Mark Twain, it has not been verified. *Id.*

exist between the states.[2] Wyoming and other states in the West fought for their fair share of water, and many of these fights continue today.[3] In these fights the focus is on the water everyone can see: surface water.[4] The next big fight among states will concern what cannot be seen: groundwater.[5]

For years, states lacked proper groundwater management laws, partly because the inability to see groundwater inhibited states from understanding the resource.[6] While states slowly developed a legal framework for groundwater, large-scale groundwater development surged in the 1950s—depleting many groundwater aquifers.[7] In many respects, states have not adequately addressed the problems

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[2] *See* John B. Draper, *Water Rights Litigation for the Natural Resources Practitioner*, 42A ROCKY MTN. MIN. L. INST. 8-1, 8-9 to -15 (1996) (describing the nature of interstate water litigation). Interstate water litigation began in the early twentieth century when Kansas sued Colorado. *See infra* notes 86–87 and accompanying text (discussing *Kansas v. Colorado*).

[3] *See* Draper, *supra* note 2, at 8-9 to -15 (citing a number of cases involving interstate water disputes). Wyoming's first fight for water began in 1911 when it sued Colorado to stop a proposed diversion on the Laramie River. Wyoming v. Colorado, 259 U.S. 419, 455 (1922). Nebraska sued Wyoming in 1934 alleging Wyoming was violating the rule of priority and depriving Nebraska of water to which it was entitled. Nebraska v. Wyoming, 325 U.S. 589, 591–92 (1945). Wyoming's most recent fight began in 2007 when Montana filed a Motion for Leave to File Bill of Complaint against Wyoming alleging it is acting in violation of the Yellowstone River Compact. Bill of Complaint at 4, Montana v. Wyoming, No. 137 Original (U.S. Jan. 31, 2007).

[4] *See* John D. Leshy, *Interstate Groundwater Resources: The Federal Role*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1475, 1486–87 (2008). In recent years, interstate water disputes began to focus in part on the interconnection between surface water and groundwater. *Id.* at 1486–88 & nn.45–46. However, the United States Supreme Court has not apportioned any interstate groundwater aquifers. *Id.* at 1486–87.

[5] *See* Arthur H. Chan, *Outline of a Three-Stage Policy of Interstate Groundwater Allocation that Promotes Equity, Efficiency, and Orderly Development*, 26 LAND & WATER L. REV. 149, 150 (1991) ("[J]udicial policy regarding interstate groundwater allocation is still in its infancy."); Leshy, *supra* note 4, at 1477–78. This comment refers to groundwater as one word, unless quoting material.

[6] Gary L. Widman, *Groundwater-Hydrology and the Problem of Competing Well Owners*, 14 ROCKY MTN. MIN. L. INST. 523, 523 (1968) ("Perhaps nothing has contributed more to the development of a confusing, and too often inadequate, groundwater law than the failure of courts, legislators, or attorneys to appreciate the factual sources of groundwater conflicts."); *see also* John Leshy, *Notes on a Progressive National Water Policy*, 3 HARV. L. & POL'Y REV. 133, 137–38 (2009) (referring to water law as "primitive" compared to property law); Raphael J. Moses, *Basic Groundwater Problems*, 14 ROCKY MTN. MIN. L. INST. 501, 501 (1968) (describing how groundwater is misunderstood).

[7] *See* JEFFREY S. ASHLEY & ZACHARY A. SMITH, GROUNDWATER MANAGEMENT IN THE WEST 7 (1999) (stating the total amount of groundwater withdrawn for western irrigation went from "small amounts in the early 1930s to about 10.7 million acre-feet by 1945 and up to 56 million acre-feet by 1975"). Several events led to large scale groundwater pumping, including rural electrification, development of high capacity centrifugal pumps, and development of center-pivot irrigation systems. *Id.* at 6–7.

caused by large scale pumping.[8] One of those problems is the interstate aspect of groundwater—including how to manage and divide the resource.[9]

This comment addresses how states should approach interstate groundwater management and allocation.[10] The primary focus is on the West, but the principles are applicable throughout the United States.[11] This comment argues states should be proactive in resolving potential interstate groundwater disputes by interstate compact or some form of agreement.[12]

II. BACKGROUND

This section begins by explaining general groundwater hydrology.[13] Next, it provides a description of Wyoming's groundwater resources and other major groundwater sources in the West.[14] A description of legal doctrines and principles applicable to groundwater allocation and management follows.[15] Finally, this background discusses the three primary methods used to resolve interstate water disputes.[16]

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[8] John D. Leshy, *The Federal Role in Managing the Nation's Groundwater*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1323, 1324 (2008) ("State law generally has not been adequate to the task of managing the nation's groundwater."); *see also* PATRICK T. TYRELL, STRATEGIC PLAN FOR THE WYOMING STATE ENGINEER'S OFFICE & WYOMING STATE BOARD OF CONTROL 17 (2009), *available at* http://seo.state.wy.us/PDF/Strategic_Plan_2009.pdf (stating the engineer's office plans to accomplish "[d]evelopment of a statewide water management strategy for groundwater" during the 2013–2014 biennium). Wyoming recognizes that effective groundwater management is "a long overdue necessity." STATE ENG'R ET AL., STATE OF WYOMING 2009 ANNUAL REPORT 66 (2009), *available at* http://seo.state.wy.us/PDF/2009AnnualReport.pdf.

[9] Leshy, *supra* note 4, at 1481–82 ("[G]roundwater likely has a more common interstate character than might first be appreciated."). Leshy suggests that pumping from a groundwater aquifer connected to a surface water source may affect all the states along the river. *Id.* at 1481. The Wyoming Framework Water Plan recognizes the interstate nature of groundwater. WYO. WATER DEV. COMM'N, WYOMING FRAMEWORK WATER PLAN VOL. 1 § 4.4.1 (Oct. 2007), *available at* http://waterplan.state.wy.us/frameworkplan-index.html ("Groundwater enters and leaves the state in the subsurface, but no estimates of rates or locations have been compiled.").

[10] *See infra* notes 109–22 and accompanying text.

[11] The "West" in this comment is defined as the seventeen contiguous states located on and west of the 100th meridian. *See* W. WATER POLICY REVIEW ADVISORY COMM'N, WATER IN THE WEST: CHALLENGE FOR THE NEXT CENTURY 2-1 (1998) [hereinafter WATER IN THE WEST]. These states are Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. *Id.* While water disputes are a common issue in the West, these types of disputes are becoming more common in the Southeast because of droughts and significant population increases. Stephen E. O'Day et al., *Wars Between the States in the 21st Century: Water Law in an Era of Scarcity*, 10 VT. J. ENVTL. L. 229, 230 (2009).

[12] *See infra* notes 139–51 and accompanying text.

[13] *See infra* notes 17–40 and accompanying text.

[14] *See infra* notes 41–50 and accompanying text.

[15] *See infra* notes 51–69 and accompanying text.

[16] *See infra* notes 70–99 and accompanying text.

A. Groundwater Hydrology

Adequate policies and laws cannot be developed without a clear understanding of groundwater hydrology.[17] Water exists under the earth's surface in two different zones: the unsaturated and saturated zones.[18] Immediately below the surface is the unsaturated zone, which contains both water and air.[19] Water in this zone is incapable of withdrawal.[20] Below the unsaturated zone is the water table, signifying the top of the saturated zone.[21] The saturated zone is completely filled with water capable of being withdrawn and therefore properly classified as groundwater.[22] This is not the legal definition of groundwater; instead, many states have defined groundwater or underground water by statute.[23]

Groundwater is part of a hydrologic cycle that keeps all water in constant motion.[24] While there is no beginning or end to this cycle, one could consider evaporation the starting point.[25] Water evaporates from vegetation and exposed

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[17] A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 4:5 (2006) ("An understanding of the basic principles of groundwater hydrology is necessary to understanding the problems of developing efficient and fair allocation rules."); Widman, *supra* note 6, at 523. Groundwater hydrology is defined as the science dealing "with the occurrence, movement, and quality of water beneath the Earth's surface." RALPH C. HEATH, U.S. GEOLOGIC SURVEY, BASIC GROUND-WATER HYDROLOGY 1 (Water-Supply Paper 2220, 10th prtg. 2004 revised), *available at* http://pubs.er.usgs.gov/djvu/WSP/wsp_2220.pdf.

[18] WILLIAM M. ALLEY ET AL., U.S. GEOLOGIC SURVEY, SUSTAINABILITY OF GROUND-WATER RESOURCES 6–7 (Circular 1186, 1999); HEATH, *supra* note 17, at 4; WELLS A. HUTCHINS, SELECTED PROBLEMS IN THE LAW OF WATER RIGHTS IN THE WEST 24–25 (U.S. Dep't of Agric., Misc. Publ'n No. 418, 1942); PAUL L. YOUNGER, GROUNDWATER IN THE ENVIRONMENT 5 (2007).

[19] HEATH, *supra* note 17, at 4; *see* HUTCHINS, *supra* note 18, at 24–25.

[20] ALLEY ET AL., *supra* note 18, at 7; *see* HEATH, *supra* note 17, at 4 (stating water in the unsaturated zone has negative hydraulic pressure).

[21] ALLEY ET AL., *supra* note 18, at 7; YOUNGER, *supra* note 18, at 5. There is a transition zone between the unsaturated zone and the water table referred to as the capillary fringe. ALLEY ET AL., *supra* note 18, at 7; YOUNGER, *supra* note 18, at 5.

[22] ALLEY ET AL., *supra* note 18, at 6–7; HEATH, *supra* note 17, at 4; *see* HUTCHINS, *supra* note 18, at 24–26 (discussing the nature of water in the saturated zone).

[23] *See, e.g.*, COLO. REV. STAT. ANN. § 37-90-103(19) (2010) ("'Underground water' and 'ground water' are used interchangeably in this article and mean any water not visible on the surface of the ground under natural conditions."); NEB. REV. STAT. § 46-706(2) (2010) ("Ground water means that water which occurs in or moves, seeps, filters, or percolates through ground under the surface of the land."); WYO. STAT. ANN. § 41-3-901(a)(ii) (2010) ("'Underground water' means any water, including hot water and geothermal steam, under the surface of the land or the bed of any stream, lake, reservoir, or other body of surface water, including water that has been exposed to the surface by an excavation such as a pit."). Colorado divides groundwater into designated ground water, nontributary ground water, and "not nontributary ground water." COLO. REV. STAT. ANN. § 37-90-103(6)(a), (10.5), (10.7).

[24] TARLOCK, *supra* note 17, § 2:3; Widman, *supra* note 6, at 523.

[25] HEATH, *supra* note 17, at 5.

surfaces, including the ocean, and through the process of transpiration rises into the atmosphere to form clouds.[26] The moisture in the atmosphere then returns to land in the form of precipitation.[27] Precipitation then returns to the atmosphere through evapotranspiration, provides moisture to vegetation and soil, or infiltrates the ground.[28] The water that infiltrates the ground first provides moisture to the soil and then filters down to the water table where it forms the groundwater supply.[29]

Groundwater existing in usable quantities is contained in aquifers—geological formations that hold and allow groundwater to move through them.[30] These geologic formations have the ability to store water because there are void spaces or fractures within them.[31] Aquifers are either confined or unconfined.[32] A confined aquifer is one in which the water exists under pressure, commonly referred to as artesian pressure.[33] An unconfined aquifer, or water-table aquifer, is one partially filled with water that permits water to move to other formations.[34]

Pumps and wells allow users to extract groundwater.[35] When groundwater is pumped from an aquifer, the water table is lowered in the shape of an inverted cone—referred to as a cone of depression.[36] The effects each cone of depression

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[26] *Id.*; TARLOCK, *supra* note 17, § 2:3. Transpiration is the "release of water vapor to the atmosphere by plants." YOUNGER, *supra* note 18, at 29. Often, evaporation and transpiration are hard to distinguish from each other and therefore they are collectively referred to as evapotranspiration. *Id.*

[27] HEATH, *supra* note 17, at 5; TARLOCK, *supra* note 17, § 2:3. Precipitation occurs in many forms, including rain, snow, and hail. HEATH, *supra* note 17, at 5.

[28] HEATH, *supra* note 17, at 5; TARLOCK, *supra* note 17, § 2:3.

[29] HEATH, *supra* note 17, at 5; TARLOCK, *supra* note 17, § 2:3; Widman, *supra* note 6, at 523.

[30] HEATH, *supra* note 17, at 6; Widman, *supra* note 6, at 525; *see also* YOUNGER, *supra* note 18, at 9 ("An aquifer is a body of saturated rock that both stores and transmits important quantities of groundwater.").

[31] James W. Crosby, III, *A Layman's Guide to Groundwater Hydrology*, *in* CASES AND MATERIALS ON WATER LAW 325–28 (7th ed. 2005); *see also* Ward H. Fischer, *Equitable Apportionment of Interstate Ground Waters*, 21 ROCKY MTN. MIN. L. INST. 721, 721–22 (1976) (describing the formation of the Madison aquifer that exists in Wyoming and South Dakota).

[32] HEATH, *supra* note 17, at 6.

[33] *Id.*; Crosby, *supra* note 31, at 326–28; YOUNGER, *supra* note 18, at 11.

[34] Crosby, *supra* note 31, at 326–28; YOUNGER, *supra* note 18, at 11.

[35] HEATH, *supra* note 17, at 30. Large-scale pumping of groundwater was not possible until the late 1940s when high speed centrifugal pumps were developed and rural electrification occurred to provide power to the pumps. ASHLEY & SMITH, *supra* note 7, at 6–8 (discussing the historical development of groundwater); Leshy, *supra* note 8, at 1333. Prior to the centrifugal pump, groundwater was mainly extracted by use of windmills. ASHLEY & SMITH, *supra* note 7, at 6.

[36] HEATH, *supra* note 17, at 30, 44; Ronald Kaiser & Frank F. Skillern, *Deep Trouble: Options for Managing the Hidden Threat of Aquifer Depletion in Texas*, 32 TEX. TECH L. REV. 249, 255 (2001).

has on the water table vary by aquifer, but withdrawals of large quantities of water lower the water table.[37] Groundwater mining occurs when the rate of groundwater discharge exceeds the aquifer's rate of recharge.[38] The National Water Commission identified groundwater mining as a problem of national concern in 1973.[39] If groundwater mining occurs for a long period of time, the negative effects include increased cost of pumping, increased threat to water quality through salt water intrusion, and the possibility that industries dependent on the groundwater resource will lose economic viability.[40]

B. Groundwater Resources

Groundwater is a critical natural resource—accounting for about ninety percent of the fresh water in the United States and providing about forty percent of the nation's public water supply.[41] Wyoming does not rely on groundwater as much as other states, but its use is increasing.[42] Irrigation is the largest use of groundwater in Wyoming—accounting for about sixty percent of withdrawals.[43] More than one hundred aquifers exist in Wyoming, but there are four primary aquifers.[44] These aquifers are usually described in general categories rather than by individual name, because the geological materials creating the aquifer are not consistent throughout large areas of the state.[45] The four primary aquifers in Wyoming are the alluvial aquifer, the Ogallala aquifer, the structural basin aquifer, and the carbonate and sandstone aquifer.[46]

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[37] Ella Foley-Gannon, *Institutional Arrangements for Conjunctive Water Management in California and Analysis of Legal Reform Alternatives*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1105, 1120 (2008); Douglas L. Grant, *Conjunctive Management of Hydrologically Connected Surface Water and Ground Water: The Problem of Sustainable Use*, 54 ROCKY MTN. MIN. L. INST. 14-1, 14-3 to -4 (2008).

[38] TARLOCK, *supra* note 17, § 6:13.

[39] NAT'L WATER COMM'N, WATER POLICIES FOR THE FUTURE 8–9 (1973).

[40] *Id.* at 238–39.

[41] ALLEY ET AL., *supra* note 18, at 1; ASHLEY & SMITH, *supra* note 7, at 3.

[42] *See* ASHLEY & SMITH, *supra* note 7, at 128. In the mid-1990s about five percent of the water used in Wyoming was groundwater and the rest was surface water. *Id.* Rural domestic water supplies rely almost exclusively on groundwater. U.S. GEOLOGICAL SURVEY, NATIONAL WATER SUMMARY 1984, 453 (Water-Supply Paper 2275, 1984) [hereinafter NATIONAL WATER SUMMARY], *available at* http://pubs.er.usgs.gov/publication/wsp2275 (noting groundwater supplied about ninety percent of rural domestic water in 1980).

[43] *See* ASHLEY & SMITH, *supra* note 7, at 128 (stating sixty-two percent of groundwater withdrawals were for irrigation); NATIONAL WATER SUMMARY, *supra* note 42, at 456 (noting that in 1980 sixty-nine percent of groundwater withdrawals were for irrigation). The second largest use of groundwater is industrial supply. NATIONAL WATER SUMMARY, *supra* note 42, at 456.

[44] RALPH J. ANCTIL, THE AQUIFERS AND AQUIFER SYSTEMS OF WYOMING 3 (EPA, drft. 1990).

[45] WYO. WATER DEV. COMM'N, *supra* note 9, § 4.4.2.

[46] NATIONAL WATER SUMMARY, *supra* note 42, at 453–56; *see also* ANCTIL, *supra* note 44, at 3 (categorizing the geologic units of Wyoming); WYO. WATER DEV. COMM'N, WYOMING WATER ATLAS 40–41 (1990) (diagramming aquifer types in Wyoming).

The largest and most well-known aquifer in the United States is the High Plains or Ogallala aquifer.[47] The aquifer underlies eight states, including southeastern Wyoming.[48] About fifty percent of Wyoming's groundwater withdrawals are from the Ogallala.[49] The water levels of the Ogallala have declined more in other states than they have in Wyoming.[50]

C. Groundwater Legal Doctrines

Laws allocating groundwater are unique to each state.[51] In many states the laws allocating groundwater differ from those governing surface water.[52] While states have different expressions of governing law, there are five primary doctrines states use to allocate groundwater: (1) the absolute ownership rule, (2) the reasonable use rule, (3) the correlative rights rule, (4) the prior appropriation doctrine, and (5) the Restatement approach.[53]

1. Absolute Ownership Rule

The absolute ownership rule, or English rule, is based on the common law and was the first doctrine followed by courts in the United States.[54] This is a rule of capture allowing a landowner to extract groundwater for any purpose and in any amount regardless of the effects on neighbors.[55] Only a few states follow this doctrine.[56]

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[47] Rex A. Mann, Note, *A Horizontal Federalism Solution to the Management of Interstate Aquifers: Considering an Interstate Compact for the High Plains Aquifer*, 88 TEX. L. REV. 391, 393 (2009).

[48] *Id.*; NATIONAL WATER SUMMARY, *supra* note 42, at 454. The Ogallala aquifer exists under Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. *Id.*; Mann, *supra* note 47, at 393. The aquifer is estimated to cover 8190 square miles within Wyoming. ANCTIL, *supra* note 44, at 11. The entire Ogallala aquifer holds enough water to fill Lake Huron. Leshy, *supra* note 4, at 1482. An estimated 200,000 wells pump from the aquifer. *Id.*

[49] ANCTIL, *supra* note 44, at 2.

[50] NATIONAL WATER SUMMARY, *supra* note 42, at 456.

[51] James H. Davenport, *Less is More: A Limited Approach to Multi-State Management of Interstate Groundwater Basins*, 12 U. DENV. WATER L. REV. 139, 158 (2008); Dean Baxtresser, Note, *Antiques Roadshow: The Common Law and the Coming Age of Groundwater Marketing*, 108 MICH. L. REV. 773, 777–78 (2010).

[52] TARLOCK, *supra* note 17, § 4:1; Davenport, *supra* note 51, at 158. In many states landowners originally had an absolute or quasi-absolute privilege to pump groundwater. TARLOCK, *supra* note 17, § 4:1. As states eliminated this privilege through legislation or court opinions, the doctrines adopted varied from surface water doctrines. *See id.*

[53] Davenport, *supra* note 51, at 159.

[54] TARLOCK, *supra* note 17, § 4:6.

[55] *Id.*; J. David Aiken, *The Western Common Law of Tributary Groundwater: Implications for Nebraska*, 83 NEB. L. REV. 541, 550–58 (2004) (discussing early English and American cases applying the absolute ownership doctrine).

[56] TARLOCK, *supra* note 17, § 4:6 (listing Connecticut, Louisiana, Maine, Rhode Island, and Texas as the states that follow the absolute ownership doctrine).

2. *Reasonable Use Rule*

States developed the reasonable use rule, or American rule, in the late nineteenth and early twentieth century as a limitation on the absolute ownership rule.[57] This doctrine allows a landowner to use "an amount of water as may be necessary for some useful or beneficial purpose in connection with the land from which it is taken."[58] Many eastern states apply the reasonable use rule.[59]

3. *Correlative Rights Rule*

California rejected the absolute ownership doctrine in 1903 and created the correlative rights doctrine.[60] This doctrine is based on the concept of basins and gives each groundwater user a correlative or coequal right to the groundwater in the basin.[61] States in both the East and West follow this doctrine.[62]

4. *Prior Appropriation Doctrine*

Many states in the West follow the doctrine of prior appropriation.[63] States developed this doctrine for surface water and later modified the doctrine to accommodate for groundwater characteristics.[64] Prior appropriation resolves

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[57] *Id.* § 4:7; Aiken, *supra* note 55, at 558–64 (discussing the main cases applying the reasonable use doctrine); Moses, *supra* note 6, at 506–10.

[58] State v. Michels Pipeline Constr., 217 N.W.2d 339, 349 (Wis. 1974); *accord* Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128 (Neb. 2005); TARLOCK, *supra* note 17, §§ 4:7–8; Moses, *supra* note 6, at 506. A use on the overlying land is per se reasonable, while a use on non-overlying land is per se unreasonable. TARLOCK, *supra* note 17, § 4:9.

[59] TARLOCK, *supra* note 17, § 4:7 (listing Alabama, Florida, Kentucky, Maryland, New York, North Carolina, and Tennessee as the states following the American rule).

[60] Katz v. Walkinshaw, 74 P. 766, 772 (Cal. 1903).

[61] *Spear T Ranch*, 691 N.W.2d at 128; TARLOCK, *supra* note 17, § 4:14. The correlative rights rule differs from the reasonable use rule because a landowner is not entitled to more than his or her fair share. *Spear T Ranch*, 691 N.W.2d at 128; Moses, *supra* note 6, at 515–16. Under the reasonable use rule, a landowner can take as much water as he or she wants as long as it is reasonable, which effectively rewards the person with the deepest well. Moses, *supra* note 6, at 516.

[62] TARLOCK, *supra* note 17, § 4:15 (listing Arkansas, Delaware, Hawaii, Minnesota, Missouri, Nebraska, and New Jersey as the states following the correlative rights doctrine).

[63] *Id.* § 6:4 (listing Idaho, Kansas, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming as the states following the prior appropriation doctrine). Colorado also applies the prior appropriation doctrine but only to certain types of groundwater. *Id.* The states in the West that do not follow prior appropriation are Arizona, California, Nebraska, and Texas. *Id.*

[64] *Id.* § 6:3; Willis H. Ellis, *Water Rights: What They Are and How They Are Created*, 13 ROCKY MTN. MIN. L. INST. 451, 469–70 (1967). States apply the prior appropriation doctrine differently to groundwater because the resource moves at a slower speed compared to surface water. Ellis, *supra*, at 469–70. Surface water moves quickly, and therefore when a junior appropriator's diversion is shut, water will be available within a day to nearby senior appropriators. *Id.* If a junior groundwater pumper is stopped, it could take years before a senior pumper sees any effect in the water table. *Id.*

conflicts between users by giving senior appropriators, as the first user of the water, priority over junior appropriators.[65]

5. *Restatement Approach*

The most recently developed doctrine is from the Restatement (Second) of Torts, section 858.[66] This doctrine allows users to pump groundwater unless the withdrawals will cause any of three problems: (1) unreasonably cause harm to neighboring landowners through lowering of the water table; (2) exceed the pumper's reasonable share of annual supply or total store of groundwater; or (3) have a direct and substantial effect on surface waters and unreasonably cause harm to a surface water user.[67] The Restatement applies several factors to determine what is reasonable.[68] This doctrine is applied in a few states.[69]

D. *Resolving Interstate Water Disputes*

There are three major ways in which interstate water resources can be allocated: (1) interstate compact or agreement, (2) equitable apportionment, or

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[65] Baxtresser, *supra* note 51, at 783.

[66] *See* RESTATEMENT (SECOND) OF TORTS § 858 (1979).

[67] *Id.* This doctrine is based in principles of nuisance law. Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 129 (Neb. 2005).

[68] RESTATEMENT (SECOND) OF TORTS § 850A. This section provides:

> The determination of the reasonableness of a use of water depends upon a consideration of the interests of the riparian proprietor making the use, of any riparian proprietor harmed by it and of society as a whole. Factors that affect the determination include the following:
>
> (a) The purpose of the use,
> (b) the suitability of the use to the watercourse or lake,
> (c) the economic value of the use,
> (d) the social value of the use,
> (e) the extent and amount of the harm it causes,
> (f) the practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other,
> (g) the practicality of adjusting the quantity of water used by each proprietor,
> (h) the protection of existing values of water uses, land, investments and enterprises and
> (i) the justice of requiring the user causing harm to bear the loss.

Id.

[69] TARLOCK, *supra* note 17, § 4:18 (listing Nebraska, Michigan, Ohio, and Wisconsin as the states following the Restatement). Nebraska applies the doctrine with regard to disputes between surface water and groundwater users. *Spear T Ranch*, 691 N.W.2d at 131. Nebraska still follows a hybrid rule which combines the reasonable use and correlative rights doctrines for disputes between two or more groundwater users. Olson v. Wahoo, 248 N.W. 304, 308 (Neb. 1933).

(3) congressional apportionment.[70] Of these three, the United States Supreme Court encourages interstate compacts as the preferred method.[71]

1. *Interstate Compacts and Agreements*

The Compact Clause of the United States Constitution provides that "[n]o State shall, without the Consent of Congress . . . enter into any Agreement or Compact with another State."[72] Despite the broad language of the clause, the United States Supreme Court does not require Congressional consent for every compact or agreement between states.[73] The Court requires the consent of Congress when the agreement increases a state's political power at the expense of the federal government.[74] States can therefore enter into some agreements without the consent of Congress.[75] Regardless of whether a compact is approved by Congress, it is still a contract and is interpreted as such.[76] Interstate compacts

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[70] TARLOCK, *supra* note 17, § 10:1; Josh Clemons, *Interstate Water Disputes: A Road Map for States*, 12 SOUTHEASTERN ENVTL. L.J. 115, 118 (2004); *see* Douglas L. Grant, *The Future of Interstate Allocation of Water*, 29 ROCKY MTN. MIN. L. INST. 977, 979 (1983) (listing extraconstitutional and constitutional methods for resolving interstate problems). Some commentators suggest the Commerce Clause could serve as a way to address interstate groundwater allocation. *See* Chan, *supra* note 5, at 151; Albert E. Utton, *In Search of An Integrating Principle for Interstate Water Law: Regulation Versus the Market Place*, 25 NAT. RESOURCES J. 985, 985 (1985).

[71] Colorado v. Kansas, 320 U.S. 383, 392 (1943) (stating that controversies can, and should if possible, be decided by compact, rather than by invoking the Supreme Court's power); Sporhase v. Nebraska *ex rel.* Douglas, 458 U.S. 941, 960 n.20 (1982) ("[T]his Court has encouraged States to resolve their water disputes through interstate compacts rather than by equitable apportionment adjudication.") (citing Colorado v. Kansas, 320 U.S. at 392).

[72] U.S. CONST. art. 1, § 10, cl. 3. Two types of controversies can lead to the formation of compacts: (1) controversies that cannot be litigated, and (2) controversies that can be litigated but are not well suited for litigation because of the range and technical issues involved. Felix Frankfurter & James M. Landis, *The Compact Clause of the Constitution—A Study in Interstate Adjustments*, 34 YALE L. J. 685, 704–05 (1925).

[73] CAROLINE N. BROUN ET AL., THE EVOLVING USE AND THE CHANGING ROLE OF INTERSTATE COMPACTS: A PRACTITIONER'S GUIDE 47–48 (2006) (stating compacts are divided into two groups—those that require consent and those that do not); Duncan B. Hollis, *Unpacking the Compact Clause*, 88 TEX. L. REV. 741, 743 (2010); Michael S. Smith, Note, *Murky Precedent Meets Hazy Air: The Compact Clause and the Regional Greenhouse Gas Initiative*, 34 B.C. ENVTL. AFF. L. REV. 387, 390 (2007).

[74] BROUN ET AL., *supra* note 73, at 48; Clemons, *supra* note 70, at 129–30. Compacts regarding state boundaries are perhaps the most common example of compacts that require Congressional consent. BROUN ET AL., *supra* note 73, at 49. This does not mean that all contracts or agreements between states amount to compacts. *See* TARLOCK, *supra* note 17, §10:24; FREDERICK L. ZIMMERMAN & MITCHELL WENDELL, THE INTERSTATE COMPACT SINCE 1925, at 37 (1951).

[75] ZIMMERMAN & WENDELL, *supra* note 74, at 37. States may also enter into contracts that are called compacts but do not require the consent of Congress. *Id.*

[76] Texas v. New Mexico (*New Mexico II*), 482 U.S. 124, 128 (1987). Once Congress consents to the compact, no court can grant relief inconsistent with the terms of the compact. Texas v. New Mexico (*New Mexico I*), 462 U.S. 554, 564 (1983).

do not eliminate court battles over meaning or enforcement.[77] However, proper drafting of compacts can eliminate many of the problems which lead to litigation.[78]

The first compact allocating water was the 1922 Colorado River Compact.[79] Many states developed or considered other compacts soon after the Colorado River Compact.[80] Compacts allocating surface water can take many forms, including allocation of a percentage of flow or specific quantity.[81] Due to the differing nature of groundwater and surface water, these methods may not be adaptable to groundwater resources.[82] Some compacts refer specifically to groundwater, but none of them are devoted exclusively to allocation or management of an interstate aquifer.[83]

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[77] *New Mexico I*, 462 U.S. at 567–68 ("[T]he mere existence of a compact does not foreclose the possibility that we will be required to resolve a dispute between the compacting states."). Montana's suit against Wyoming provides an example of this. *See* Bill of Complaint at 1–4, Montana v. Wyoming, No. 137 Original (U.S. Jan. 31, 2007).

[78] *See* Jerome C. Muys et al., *Utton Transboundary Resources Center Model Interstate Water Compact*, 47 NAT. RESOURCES J. 17, 21–24 (2007) (discussing problems with current compacts and solutions to those problems).

[79] TARLOCK, *supra* note 17, § 10:25; Frankfurter & Landis, *supra* note 72, at 701–02. The compact allocates the water of the Colorado River between the upper and lower basins. TARLOCK, *supra* note 17, § 10:25.

[80] Frankfurter & Landis, *supra* note 72, at 702. The most recent large scale interstate compact entered into involves the Great Lakes. Nicholas T. Stack, Note, *The Great Lakes Compact and an Ohio Constitutional Amendment: Local Protectionism and Regional Cooperation*, 37 B.C. ENVTL. AFF. L. REV. 493, 493–94 (2010). The Great Lakes-St. Lawrence River Basin Water Resources Compact was signed into law in 2008 after four and a half years of interstate negotiations and three more years of intrastate debates. *Id.* This compact establishes regional standards but leaves individual implementation to the states, creating a "balance of regional protection and state autonomy." *Id.* at 517. The compact addresses both surface water and groundwater. *Id.* at 504.

Wyoming is a party to seven interstate water compacts: (1) Colorado River Compact of 1922, (2) Belle Fourche River Compact of 1943, (3) Upper Colorado River Basin Compact of 1948, (4) Snake River Compact of 1949, (5) Yellowstone River Compact of 1950, (6) Upper Niobrara River Compact of 1962, and (7) Amended Bear River Compact of 1978. WYO. STATE ENG'R'S OFFICE, WYOMING'S COMPACTS, TREATIES AND COURT DECREES 1–6 (2006).

[81] Muys et al., *supra* note 78, at 65. The Utton Transboundary Resources Center found six general allocation methods:

> (1) the prior appropriation doctrine, (2) specific quantities of water measured in terms of beneficial consumptive use, (3) specific diversion rights measured in fixed percentages of available flow, (4) the amount of actual storage permitted in existing or future reservoirs, (5) outflow as a proportion of actual inflow, and (6) combinations of the above.

Id.

[82] *Id.* at 71–73.

[83] Mann, *supra* note 47, at 391–92 & n.5. The Great Lakes Compact includes groundwater. Stack, *supra* note 80, at 504. The Amended Bear River Compact, to which Wyoming is party, includes "ground water tributary to the Bear River." Amended Bear River Compact art. V, WYO. STAT. ANN. § 41-12-101 (2010).

2. *Doctrine of Equitable Apportionment*

If states are unable to reach agreements about how interstate waters should be shared, then the United States Supreme Court may resolve the conflict.[84] The Supreme Court has only equitably apportioned interstate surface waters—and recently declined its first opportunity to equitably apportion an interstate groundwater aquifer in Mississippi and Tennessee.[85] In 1907, the Supreme Court determined it had original jurisdiction over a water dispute between Kansas and Colorado and announced the equitable apportionment doctrine.[86] The first pronouncement of the doctrine was simply that there should be an equitable division of benefits between the states.[87] Since 1907, the doctrine has evolved into an analysis balancing the equities.[88]

The Supreme Court gives state law varying degrees of relevance.[89] First, in a dispute between Wyoming and Colorado regarding the Laramie River, the Supreme Court applied the prior appropriation doctrine because that was the law in both states.[90] Later, in a dispute between Wyoming and Nebraska regarding the North Platte River, the Supreme Court chose not to apply the doctrine of

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[84] Clemons, *supra* note 70, at 118.

[85] Mississippi v. Memphis, 130 S. Ct. 1317, 1317 (2010) (denying Mississippi's Motion for Leave to File a Bill of Complaint); Hood *ex rel.* Mississippi v. Memphis, 570 F.3d 625, 627–28 (5th Cir. 2009); Leshy, *supra* note 4, at 1486–87. The dispute between Mississippi and Memphis involves the Memphis Sands Aquifer existing under Mississippi, Tennessee, and Arkansas. *Hood*, 570 F.3d at 627. The state of Mississippi claims the City of Memphis and Memphis Light, Gas and Water are pumping groundwater belonging to Mississippi. *Id.* Mississippi filed a claim in federal district court but failed to include the state of Tennessee as a party. *Id.* The court dismissed Mississippi's claim because Tennessee was an indispensable party. *Id.* The United States Court of Appeals for the Fifth Circuit upheld the dismissal, stating Mississippi's claim involved the equitable apportionment doctrine. *Id.* at 630. After dismissal, Mississippi filed a Motion for Leave to File Bill of Complaint against the City of Memphis and the State of Tennessee, but the Supreme Court denied the motion. *Mississippi v. Memphis*, 130 S. Ct. at 1317.

[86] Kansas v. Colorado, 206 U.S. 46, 117 (1907). The dispute in this case was over the Arkansas River. *Id.* at 85. Each state presented an extreme argument to the Supreme Court. *Id.* at 98. Colorado argued it had an absolute right to appropriate all waters within its boundaries. *Id.* Kansas argued it was entitled to the natural flow of the river. *Id.* The Supreme Court rejected both arguments. *Id.*

[87] *Id.* at 117–18.

[88] *See, e.g.*, Clemons, *supra* note 70, at 126 (identifying a "cardinal rule" and other principles); A. Dan Tarlock, *The Law of Equitable Apportionment Revisited, Updated, and Restated*, 56 U. COLO. L. REV. 381, 410 (1985) (identifying five basic principles derived from the equitable apportionment cases).

[89] Tarlock, *supra* note 88, at 394.

[90] Wyoming v. Colorado, 259 U.S. 419, 470–71 (1922). As a result, the Court upheld Wyoming's priorities, and Colorado received only a small portion of the Laramie River. *Id.* at 495–96.

prior appropriation, even though both states relied on the doctrine.[91] These cases suggest that when both states follow the prior appropriation doctrine, priority may control in small river basins, such as the Laramie River, but is less likely to control in large river basins, such as the North Platte River.[92]

In the absence of controlling state law, the Supreme Court determines the equities of the case by relying on a number of factors.[93] In the most recent equitable apportionment case, the Supreme Court stated a proper factor is to "weigh the harms and benefits to competing States."[94] The Supreme Court also suggested it would consider whether reasonable conservation measures would offset injuries.[95]

3. Congressional Apportionment

A less common form of interstate water allocation is congressional apportionment.[96] Congress can affect interstate water allocation both directly, by passing laws related to a particular interstate source, or indirectly, by passing general laws that would supersede any compacts or equitable apportionment decrees.[97] This power of Congress was established in *Arizona v. California*.[98] However, Congress has been reluctant to use the power.[99]

III. ANALYSIS

States, especially those in the West, must no longer ignore that groundwater is a limited resource.[100] Groundwater mining is occurring throughout the country

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[91] Nebraska v. Wyoming, 325 U.S. 589, 618 (1945); *see also* Colorado v. New Mexico, 459 U.S. 176, 186 (1982).

[92] Tarlock, *supra* note 88, at 410.

[93] Nebraska v. Wyoming, 325 U.S. at 618. The Court established the following standard:

> Apportionment calls for the existence of an informed judgment on a consideration of many factors. Priority of appropriation is the guiding principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared to the benefits to downstream areas if a limitation is imposed on the former—these are all relevant factors.

Id.

[94] Colorado v. New Mexico, 459 U.S. at 186. The Court went on to recognize that usually the equities will favor established uses rather than proposed uses. *Id.* at 187.

[95] *Id.* at 185–86.

[96] TARLOCK, *supra* note 17, § 10:28; Grant, *supra* note 70, at 993.

[97] Leshy, *supra* note 4, at 1483. Congress can alter a compact because the compact is federal law that Congress can change. *Id.* Similarly, equitable apportionment decrees apply federal common law, and Congress is able to modify the common law. *Id.*

[98] 373 U.S. 546, 564–66 (1963).

[99] Grant, *supra* note 70, at 993.

[100] *See* Leshy, *supra* note 4, at 1477 (describing various limitations on the extraction of groundwater).

and poses a serious problem for future generations.[101] Attention to management of all groundwater resources is needed and cannot adequately be done without considering the interstate aspect of the resource.[102] In the absence of compacts or agreements water users will deplete aquifers—negatively affecting the economy and environment.[103]

The first part of this analysis examines what policy choices states should consider regarding groundwater management.[104] Then it addresses how the Supreme Court would likely apply the doctrine of equitable apportionment to interstate groundwater sources.[105] Next, this section argues it is in the best interests of states, and water users, to avoid equitable apportionment and instead enter into interstate compacts or some other form of agreement.[106] Further, it discusses how compacts allocating interstate groundwater should be negotiated.[107] Finally, this analysis considers how compacts should be administered.[108]

A. Policy

States must determine a proper policy before any interstate groundwater source can be managed or allocated.[109] States must make these policy choices

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[101] NAT'L WATER COMM'N, *supra* note 39, at 238–39; Robert Jerome Glennon, *The Concept of Capture: The Hydrology and Law of Stream/Aquifer Interactions*, 43 ROCKY MTN. MIN. L. INST. 22-1, 22-5 (1997) ("Over the last several decades, the country has used an ever-increasing amount of groundwater, and the impact of pumping on surface flows has gradually become apparent and, in certain areas, critical."); Leshy, *supra* note 4, at 1475.

[102] Baxtresser, *supra* note 51, at 776 (stating most groundwater doctrines were developed more than 100 years ago and were never intended to deal with large-scale water shortages); *see* James L. Huffman, *The Federal Role in Water Resource Management*, 17 N.Y.U. ENVTL. L.J. 669, 670 (2008) (describing the need for state action and calling state roles in water management "crucial"); Albert E. Utton, Sporhase, El Paso*, and the Unilateral Allocation of Water Resources: Some Reflections on International and Interstate Groundwater Law*, 57 U. COLO. L. REV. 549, 549–50 (1986). Huffman identifies five factors that will ensure water fights continue:

> (1) the certainty of growing demand for water; (2) the certainty of recurrent droughts; (3) the reality that many water sources are transboundary (interstate and/or international); (4) the reality that, in the case of rivers and streams, some states have natural geographical advantages; and (5) the rising concern for environmental protection and ecosystem preservation.

Huffman, *supra*, at 670.

[103] *See* Chan, *supra* note 5, at 176 (stating "an unrestrained race to the bottom of the aquifer" could result when states do not know what their rights are).

[104] *See infra* notes 109–22 and accompanying text.

[105] *See infra* notes 123–38 and accompanying text.

[106] *See infra* notes 139–51 and accompanying text.

[107] *See infra* notes 152–67 and accompanying text.

[108] *See infra* notes 168–75 and accompanying text.

[109] Leshy, *supra* note 6, at 144; *see* Ellis, *supra* note 64, at 471 (stating a decision must be made for each aquifer regarding whether it will be maintained or mined, and if mined then what the life span of the aquifer should be).

to determine "the best way to (1) assure that the waters are shared fairly, (2) encourage the prudent planning, management, and utilization of these resources for present and future generations, and (3) protect the delicate balance between the states themselves within the federal union."[110]

In the early 1900s, water policies revolved around large scale development of water, but today the policy concerns are about sustainability of the resource.[111] The goal of sustainable resource management is to ensure future generations have enough of the resource.[112] Almost everyone agrees about the goal; however, few agree about the meaning of sustainability or how to achieve it.[113] Establishing a policy of sustainability is hard enough for individual states to do, and as a consequence, establishing a multi-state policy is no easy task.[114] States will need to gather as much information about the resource as possible in order to establish an effective policy.[115] Armed with this information, states need to establish groundwater regulations to administer and manage the resource.[116] States need to initially determine how much depletion or preservation of the aquifer should occur.[117] States may permit an aquifer to be completely depleted, determine a level of acceptable depletion, or allow no depletion at all.[118]

Another main policy issue is the role of states in relation to the federal government.[119] One source of tension between the states and the federal

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[110] Utton, *supra* note 102, at 549, 554 (concluding the fundamental question should not be what law to apply but what policy to apply).

[111] WATER IN THE WEST, *supra* note 11, at 5-47; Huffman, *supra* note 102, at 680–84. The Reclamation Act of 1902 provided federal funding for construction of reservoirs and dams, leading to the creation of nearly 600 dams by the Bureau of Reclamation. Huffman, *supra* note 102, at 680.

[112] Gary D. Meyers & Simone C. Muller, *The Ethical Implications, Political Ramifications and Practical Limitations of Adopting Sustainable Development as National and International Policy*, 4 BUFF. ENVTL. L.J. 1, 6 (1996).

[113] WATER IN THE WEST, *supra* note 11, at 3-1 to -6; Meyers & Muller, *supra* note 112, at 4, 10 (referring to the definition of "ecologically sustainable development" as "elusive"); John E. Thorson, *Visions of Sustainable Interstate Water Management Agreements*, 43 NAT. RESOURCES J. 347, 354 (2003). The Western Water Policy Review Advisory Commission recognized the states should be primarily responsible for achieving sustainability. WATER IN THE WEST, *supra* note 11, at 3-6.

[114] *See* Leshy, *supra* note 4, at 1492 (noting state boundaries further complicate the already complex problem of groundwater management).

[115] *Id.* at 1497 (noting that as states begin to deal with interstate groundwater issues, there will frequently be situations in which little is known about the aquifer systems).

[116] NAT'L WATER COMM'N, *supra* note 39, at 232 ("Thus, each State will have to design ground water and surface water management schemes to suit its own physical and institutional peculiarities."); Leshy, *supra* note 6, at 147.

[117] NAT'L WATER COMM'N, *supra* note 39, at 234.

[118] *Id.*

[119] WATER IN THE WEST, *supra* note 11, at 3-38 ("The allocation of governance responsibilities in western water resources between the federal and state governments has always been somewhat problematic, frustrating, and fractious.").

government is federal environmental laws that threaten to overtake how states allocate groundwater—such as the Endangered Species Act and the Clean Water Act.[120] These laws will likely add another dimension to any policy established.[121] States overlying each aquifer should be responsible for determining the best policy to manage the groundwater.[122]

B. Equitable Apportionment

Before states can reach an agreement regarding interstate groundwater resources, they should understand how the Supreme Court could equitably apportion the resource.[123] The first issue for any state would be whether it could bring its claim before the Supreme Court.[124] Before a state can seek to enjoin a diversion of water by another state, it must prove the diversion will cause a "real or substantial injury or damage."[125] Proving injury with respect to a groundwater diversion will be difficult because of its physical characteristics.[126] Further, states seeking only to avoid future conflicts regarding groundwater would be unable to bring an equitable apportionment action.[127]

If a state can establish injury, the next issue is how the Supreme Court would equitably apportion interstate groundwater resources—something the

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[120] *Id.* at 3-39; Glennon, *supra* note 101, at 22-4 to -5. Federal environmental laws place additional duties on state water right holders, which can affect the how water is allocated. WATER IN THE WEST, *supra* note 11, at 3-38 to -39.

[121] J.B. Ruhl, *Equitable Apportionment of Ecosystem Services: New Water Law for a New Water Age*, 19 J. LAND USE & ENVTL. L. 47, 49 (2003) ("It is not at all clear how thirty years of environmental awareness and regulation may have affected the Court's demeanor when it comes to interstate water allocation.").

[122] *See* Baxtresser, *supra* note 51, 776 (arguing that state legislatures, not outdated laws, should be responsible for determining the legality of water marketing).

[123] *See* Tarlock, *supra* note 88, at 382–83 (stating how the Supreme Court would apply the equitable apportionment doctrine influences how states would reach agreements).

[124] *See* Fischer, *supra* note 31, at 735–36.

[125] Colorado v. New Mexico, 459 U.S. 176, 188 nn.12–13 (1982).

[126] Fischer, *supra* note 31, at 736. Without explanation, the Supreme Court seemed to recognize this in Mississippi's claim against Tennessee. *See* Mississippi v. City of Memphis, 130 S. Ct. 1317, 1317 (2010). The court cited footnote thirteen in *Colorado v. New Mexico* when denying Mississippi's equitable apportionment claim. *Id.*

[127] *See* Fischer, *supra* note 31, at 735–36. The negotiations between Utah and Nevada over the Snake Valley groundwater basin illustrate this point. *See* John R. Zimmerman, *Nevada-Utah Interstate Groundwater Negotiations*, 24 NAT. RESOURCES & ENV'T 54, 56 (2010). The Snake Valley groundwater basin exists in both Nevada and Utah. *Id.* at 54. The Southern Nevada Water Authority, which supplies water to Las Vegas, seeks to pump water from the basin in Nevada and pipe it to Las Vegas. *Id.* Utah counties oppose the transfer because of the effects it will have in Utah. *Id.* at 54–55. Utah's interest is in controlling Nevada pumping before it begins, and the states have therefore developed a draft agreement apportioning the groundwater. *Id.* In the absence of an agreement, Utah would likely be unable to prove injury until Nevada's pumping actually impacted the Snake Valley groundwater basin. *See id.* at 56.

Court has never done.[128] The last time the Supreme Court decided an equitable apportionment case was 1984.[129] Since that time much has changed, and the Supreme Court could modify the way it equitably apportions water—especially in light of environmental laws and regulations.[130] All equitable apportionment cases are fact intensive, making it difficult to predict the outcome of any case.[131] The main issue the Supreme Court faces when deciding interstate water disputes is what law should apply.[132] This issue would be even more prevalent in groundwater cases because the state law governing groundwater is more inconsistent than that governing surface water.[133] Based on the diverse nature of state groundwater law, it seems likely the Supreme Court would give state law little weight and instead focus more on balancing equities.[134]

The factors used to balance equities include some that only apply to surface water.[135] The Supreme Court would therefore need to develop new factors based on the characteristics of groundwater.[136] These factors could include the extent the aquifer is being depleted, the size of the aquifer, and future uses of groundwater.[137] In the end, the doctrine of equitable apportionment requires sharing the resource and prohibits one state from unilaterally making its own allocation regardless of the state's economic, geographic, or geologic advantages.[138]

C. The Best Solution is for States to Compact

States have three basic alternatives to establishing some form of agreement with regard to interstate groundwater resources: (1) do nothing, (2) seek an equitable apportionment through the Supreme Court, or (3) allow the federal government to step in and allocate or regulate groundwater resources.[139] These alternatives

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[128] Ruhl, *supra* note 121, at 48–49.

[129] *New Mexico II*, 467 U.S. 310 (1984).

[130] Ruhl, *supra* note 121, at 49.

[131] Grant, *supra* note 70, at 981 ("[T]he multiplicity of apportionment criteria, and the paucity of cases applying them in concrete situations, make it virtually impossible to predict the outcome of equitable apportionment litigation."); Tarlock, *supra* note 88, at 392.

[132] *See* Tarlock, *supra* note 88, at 394.

[133] *See supra* notes 51–69 and accompanying text (discussing the five main doctrines applied to groundwater).

[134] *See* Utton, *supra* note 102, at 554–55 (stating equitable apportionment of groundwater would be based on a range of factors).

[135] *See* Nebraska v. Wyoming, 325 U.S. 589, 618 (1945) (referring to factors involving upstream and downstream users).

[136] *See* Utton, *supra* note 102, at 553–54.

[137] *Id.* at 553–54.

[138] *Id.* at 553.

[139] *See id.*

are not in the best interest of the states or individual water users.[140] First, if states elect to do nothing then groundwater resources will be depleted at the expense of future generations.[141] Second, equitable apportionment provides no guarantees and is too undefined for a state to rely on.[142] Third, the federal government is not suited to deal with the unique and complex issues that exist within each aquifer.[143] The best alternative is for states to enter into interstate compacts that allow them to control groundwater depletion and achieve sustainability.[144]

One of the main benefits of compacts is that they consider regional, state, and local interests.[145] Compacts focus on particular regions that require more than state legislation but less than absolute federal action.[146] Another benefit to forming interstate compacts is it forces states to properly manage their water resources.[147]

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[140] *See* Muys et al., *supra* note 78, at 23 (referring to "uncertainties and costs" of equitable apportionment litigation and "vagaries" of congressional apportionment).

[141] Huffman, *supra* note 102, at 693–94 ("Absent controls on access, common pool resources can be exploited without regard for maintaining a sustainable supply, resulting in a 'tragedy of the commons.'").

[142] Clemons, *supra* note 70, at 129 (stating an interstate compact guarantees a state at least some of what it wants, while a state is not guaranteed anything in an equitable apportionment case); Frankfurter & Landis, *supra* note 72, at 701 ("The judicial instrument is too static and too sporadic for adjusting a social-economic issue continuously alive in an area embracing more than a half a dozen States."); O'Day et al., *supra* note 11, at 257 (describing equitable apportionment as "fraught with uncertainty"); Thorson, *supra* note 113, at 366 ("Rarely can a judge or court, looking at a complex water issue for the first time, develop a better solution than the parties after some give and take on all sides.").

[143] Frankfurter & Landis, *supra* note 72, at 708 (stating control by the federal government in regional water problems would be "ill-conceived and intrusive"); *see* NAT'L WATER COMM'N, *supra* note 39, at 227 ("The Commission concludes that a uniform national ground water law is not desirable because of the great variety in aquifer characteristics, in legal regimes allocating the resource, and in the economic and social milieu in which the uses take place.").

[144] *See* Fischer, *supra* note 31, at 740–41 (stating an interstate compact is the most effective way to resolve interstate groundwater disputes because it is flexible and reflects expertise); Frankfurter & Landis, *supra* note 72, at 700–01 ("Agreement among the affected States and the United States, with an administrative agency for continuous study and continuing action, is the legal institution alone adequate and adapted to the task.").

[145] BROUN ET AL., *supra* note 73, at 26–28; WATER IN THE WEST, *supra* note 11, at 5-4 ("States play a central role in water management because they are at the fulcrum between national and local concerns."); Marlissa S. Briggett, Comment, *State Supremacy in the Federal Realm: The Interstate Compact*, 18 B.C. ENVTL. AFF. L. REV. 751, 753 (1991) ("The interstate compact has been recognized as a valuable intermediate level of regulation between intrusive federal control and ineffective state control."). The Supreme Court in an equitable apportionment case is unable to consider or understand the nuances of the case. Thorson, *supra* note 113, at 366.

[146] Frankfurter & Landis, *supra* note 72, at 707–08 (discussing the nature of regional problems requiring regional solutions); Briggett, supra note 145, at 753 ("Because regions are more familiar than Washington with the particular circumstances of a regional problem, they are more sensitive to the type of regulations required.").

[147] *See* Huffman, *supra* note 102, at 671 (noting resource allocation is only resolved after disputes arise). The Platte River Cooperative Agreement forced Nebraska to regulate interconnected

This is often true even if no agreement is ever reached.[148] The biggest disadvantage of a compact is that a state often gives up some of its power to the independent administrative bodies established by the compact.[149] This disadvantage must be balanced against the possibility that without a compact, the federal government could apportion interstate groundwater with little or no state input.[150] In the end, states and individual water users must realize water is a limited resource—making it impossible for every state to achieve all of its goals.[151]

D. Forming Interstate Compacts

There is no particular process required to form a compact.[152] Tradition dictates that states delegate commissioners to negotiate and, once an agreement is reached, each state passes the terms of the agreement legislatively.[153] Forming a compact is politically driven and therefore requires an inclusive process, effective public relations, and a broad network of supporters.[154] The hardest part of forming a compact concerning groundwater is that there is no visible conflict to drive negotiations because states are unable to see the resource.[155]

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groundwater and surface water more proactively. *See* J. David Aiken, *Balancing Endangered Species Protection and Irrigation Water Rights: The Platte River Cooperative Agreement*, 3 GREAT PLAINS NAT. RESOURCES J. 119, 157 (1999) (describing steps Nebraska has taken to regulate groundwater).

[148] *See* Thorson, *supra* note 113, at 368 (recognizing the process of negotiation keeps information flowing and changes the behavior of the parties).

[149] BROUN ET AL., *supra* note 73, at 28.

[150] *See* Arizona v. California, 373 U.S. 546, 564–66 (1963) (determining that Congress apportioned waters of the Colorado River); Leshy, *supra* note 4, at 1498 (arguing the federal government should play a key role in establishing policies relating to interstate groundwater).

[151] WATER IN THE WEST, *supra* note 11, at 6-1 ("[T]here will be fewer truly win-win solutions in the future.").

[152] BROUN ET AL., *supra* note 73, at 72–73 (noting that the process of establishing compacts continues to evolve).

[153] BROUN ET AL., *supra* note 73, at 73–74. Five general steps are identified: (1) authorization from Congress to negotiate a compact, (2) appointment of commissioners from each state, (3) actual negotiation, (4) ratification of agreement by state legislatures, and (5) consent of Congress. Jeff Boyce, Note and Comment, *Wrestling With the Bear: A Compact Approach to Water Allocation*, 19 BYU J. PUB. L. 301, 306 (1996) (citing Douglas L. Grant, *Water Apportionment Compacts Between States*, *in* 4 WATER AND WATER RIGHTS § 46.02 (Robert Beck ed., 1990)).

[154] BROUN ET AL., *supra* note 73, at 88–94 ("[C]ompacts, for all their simplicity, are not ordinary contracts at all but rather creatures of an inherently political exercise."); John J. Entsminger, *The Challenges of Water for the Future of the West: Where Will We Get the Water?*, 51 ROCKY MTN. MIN. L. INST. § 25.05 (2005) ("[C]ompetition for water brings into sharp focus the social, cultural, and political divides that comprise the Western landscape.").

[155] *See* John A. Folk-Williams, *The Use of Negotiated Agreements to Resolve Water Disputes Involving Indian Rights*, 28 NAT. RESOURCES J. 63, 72–74 (1988) (describing the process of negotiation); Huffman, *supra* note 102, at 687 ("[C]onflict rather than foresight is likely to be the motivating factor for discussion of a possible interstate agreement.").

Negotiations could focus on two primary areas: (1) dividing the interstate aquifers among the states, and (2) agreeing on how the interstate aquifer should be managed.[156] Division of aquifers is likely to be a difficult and time consuming process.[157] Negotiations concerning ways in which groundwater can be managed cooperatively are likely to be more productive than negotiations focusing solely on how much water each state gets.[158] If states simply try to divide the interstate aquifer, the agreement is likely to fall apart as time goes by and circumstances change.[159] This is not to say negotiations about management of an aquifer will be easier, because there are very few, if any, compacts that effectively implement regional water management.[160] States could begin with compacts addressing only the management of groundwater.[161] The existence of effective laws and regulations managing groundwater will help increase efficiency and sustainability of the resource.[162]

Reaching an agreement in principle is important, but precision in drafting every word of the compact is equally crucial.[163] The number of disputes between states regarding the meaning of existing compacts illustrates this.[164] A compact should contain certain types of provisions: (1) a preamble, (2) a purpose and intent section, (3) definitions, (4) terms regarding compact administration, (5) a section apportioning water, (6) dispute resolution and enforcement clauses, and

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[156] *See* Utton, *supra* note 102, at 549. While the primary focus of this comment is on allocation of groundwater, an interstate compact could focus on numerous other issues, including water quality, interconnection of groundwater and surface water, and flood control. *See* Muys et al., *supra* note 78, at 27–28.

[157] Muys et al., *supra* note 78, at 27–28.

[158] *See* Olen Paul Matthews & Michael Pease, *The Commerce Clause, Interstate Compacts, and Marketing Water Across State Boundaries*, 46 NAT. RESOURCES J. 601, 602–03 (2006) ("Focusing efforts on improving efficiency, rather than creating winners and losers, is a more productive approach to conflicts."). *But see* Chan, *supra* note 5, at 176, 181 (arguing a state must know how much water it is entitled to before it can effectively manage that water).

[159] *See* Emily Jeffers, Note, *Creating Flexibility in Interstate Compacts*, 36 ECOLOGY L.Q. 209, 235–36 (2009) (comparing the Colorado River Compact with the Delaware River Basin Compact and concluding a compact that manages a river is superior to one that divides a river).

[160] *See* Huffman, *supra* note 102, at 686–87 (stating compacts aimed at water planning rarely force states to "compromise their ambitions and interests").

[161] *See* Davenport, *supra* note 51, at 173 (stating that if management of the resource is accomplished it would produce more results than a compact dividing the resource). *But see* Robert Haskell Abrams, *Interstate Water Allocation: A Contemporary Primer for Eastern States*, 25 U. ARK. LITTLE ROCK L. REV. 155, 155 (2002) (stating allocation is important to states wanting to conserve water for future uses).

[162] Ellis, *supra* note 64, at 451 (stating the legal profession is responsible for ensuring the use of water is more efficient).

[163] BROUN ET AL., *supra* note 73, at 94–95.

[164] *See, e.g.*, Montana v. Wyoming, No. 137 Original (U.S. Jan. 31, 2007); Kansas v. Nebraska, No. 126 Original (U.S. May 19, 2003).

(7) financing provisions.[165] Detailed definitions and a strong purpose and intent section will help prevent ambiguity.[166] Multiple detailed terms are hard for states to agree on, so a "less is more" approach is typically used.[167]

E. Administering Interstate Compacts

Some form of administrative body is required to implement almost every compact—especially a compact involving water.[168] The form of the administrative body can vary widely, but interstate water compacts often create a commission.[169] Implementation of an interstate compact that cooperatively manages groundwater is likely to be the most difficult part of the compact.[170]

A commission should have ultimate authority regarding implementation of the compact.[171] Any disputes that arise should first go to the commission or administrative body.[172] A commission ensures attention is continually devoted to the issues and gives flexibility to the laws adopted.[173] A proper administrative body should be able to continually study and build knowledge of the issues relevant to a particular aquifer system.[174] In the end, a successful compact is one that minimizes controversy.[175]

IV. CONCLUSION

Interstate groundwater resources are depleting, and few states are proactively managing these resources.[176] Management will not be easy, but it will only get harder as time passes.[177] While states can and should increase management and regulations of their groundwater aquifers, this cannot be done in a vacuum.[178] Almost every groundwater resource is a regional problem, requiring a regional

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[165] *See* BROUN ET AL., *supra* note 73, at 98–114; Muys et al., *supra* note 78, *passim*.

[166] BROUN ET AL., *supra* note 73, at 95.

[167] *Id.* at 100. S*ee generally* Davenport, *supra* note 51, *passim*.

[168] Muys et al., *supra* note 78, at 47; ZIMMERMAN & MITCHELL, *supra* note 74, at 53 ("Nevertheless, lack of a special commission to administer the compact is a serious handicap.").

[169] *See* BROUN ET AL., *supra* note 73, at 140–47; Muys et al., *supra* note 78, at 47.

[170] Huffman, *supra* note 102, at 687–88.

[171] Muys et al., *supra* note 78, at 48, 50. The amount of authority given to the commission or administrative body usually dictates the success of the compact. *See* Boyce, *supra* note 153, at 318. In order to have an effective commission, the proper funding is required. *Id.*

[172] Boyce, *supra* note 153, at 318.

[173] ZIMMERMAN & MITCHELL, *supra* note 74, at 53; Jeffers, *supra* note 159, at 211, 230.

[174] *See* Frankfurter & Landis, *supra* note 72, at 708.

[175] Boyce, *supra* note 153, at 322.

[176] *See supra* notes 39–40 and accompanying text.

[177] *See supra* notes 100–03 and accompanying text.

[178] *See supra* notes 103–16 and accompanying text.

solution.[179] The best solution is for states to enter into compacts addressing the management and allocation of groundwater.[180] These compacts can and will take many forms, but without them the existence of groundwater for future generations will be in danger.[181]

[179] *See supra* notes 41–50 and accompanying text.

[180] *See supra* notes 139–51 and accompanying text.

[181] *See supra* notes 152–75 and accompanying text.