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## Lessons from United States Supreme Court Jurisprudence for Resolving Australian Interstate Groundwater Disputes

Jack DeWinter

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**LESSONS FROM UNITED STATES SUPREME COURT  
JURISPRUDENCE FOR RESOLVING AUSTRALIAN  
INTERSTATE GROUNDWATER DISPUTES**

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## INTRODUCTION

Humans have, for a long time, built civilizations in close proximity to rivers for transportation and water consumption.<sup>1</sup> Reliance on surface water can be traced all the way back to the first civilizations, including Ancient Egypt, which grew around the Nile River.<sup>2</sup> However, groundwater has become the preferred source of water for many regions, cities, and countries because of new groundwater pumping technologies.<sup>3</sup> Unlike surface water, groundwater is generally less polluted, does not evaporate, and can be used to service areas isolated from rivers and lakes.<sup>4</sup> However, like surface water, groundwater is finite.<sup>5</sup>

Unfortunately, laws throughout history have not accounted for the limits of groundwater quantity.<sup>6</sup> One primary example is England. English common law developed in a time and geographic region that rarely experienced water scarcity.<sup>7</sup> When there was scarcity and subsequent disputes over groundwater, English courts applied the absolute ownership rule.<sup>8</sup> As suggested by the name, the absolute ownership rule gives the owner of land above groundwater the

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<sup>1</sup> Stefan A., *From Ancient Egypt to Modernity, Why Were Cities Built Near Rivers?*, THIS CITY KNOWS (2020), <https://www.thiscityknows.com/why-were-cities-built-near-rivers/>; see also Yu Fang & James Jawitz, *The Evolution of Human Population Distance to Water in the USA from 1790 to 2010*, 10 NAT. COMM. 430 (2019).

<sup>2</sup> Mustafa Marie, *Egypt, The Gift of the Nile*, EGYPT TODAY (June 28, 2020), <https://www.egypttoday.com/Article/4/89062/Egypt-The-gift-of-the-Nile>. The Nile River has become the subject of an international dispute between Egypt and Ethiopia in which Ethiopia is building a dam that will limit Egypt's share of the Nile. The two nations have even threatened war over control of the Nile. Gary Polakovic, *Water Dispute on the Nile River Could Destabilize the Region*, USC NEWS (July 13, 2021), <https://news.usc.edu/188414/nile-river-water-dispute-filling-dam-egypt-ethiopia-usc-study>.

<sup>3</sup> See Philippe Cullet, *Groundwater Law in India: Towards a Framework Ensuring Equitable Access and Aquifer Protection*, 26 J. ENV'T L. 55, 55 (2014); Erin Thomas, *Breakdown: Why Memphis' Water Supply is so Unique*, ACTION5NEWS (Dec. 5, 2021), <https://www.actionnews5.com/2021/12/05/breakdown-why-memphis-water-supply-is-so-unique/>; Debra Perrone, *Groundwater Overreliance Leaves Farmers and Households High and Dry*, 2 ONE EARTH 214 (2020); Fang & Jawitz, *supra* note 1.

<sup>4</sup> *Do You Know the Difference Between Groundwater and Surface Water?*, SAN JOSE WATER (Feb. 1, 2017), <https://www.sjwater.com/our-company/news-media/water-blogged/do-you-know-difference-between-groundwater-and-surface-water>; *Great Artesian Basin*, AUSTL. GOV'T: DEP'T OF AGRIC., WATER & ENV'T, <https://www.awe.gov.au/water/policy/national/great-artesian-basin> (last updated Dec. 21, 2021).

<sup>5</sup> See Perrone, *supra* note 3, at 214.

<sup>6</sup> Albert E. Utton, *The Development of International Groundwater Law*, 22 NAT. RES. J. 95, 98 (1982).

<sup>7</sup> REBECCA NELSON & PHILIPPE QUEVAUVILLER, INTEGRATED GROUNDWATER MANAGEMENT, 176–77 (2016), [https://www.researchgate.net/publication/305910428\\_Groundwater\\_Law](https://www.researchgate.net/publication/305910428_Groundwater_Law). The average annual precipitation in the United Kingdom is 33.7 inches using data collected from 1981 to 2010. *Average Annual Precipitation in the United Kingdom*, CURRENT RESULTS, <https://www.currentresults.com/Weather/United-Kingdom/average-yearly-precipitation.php> (last visited Feb. 2, 2022).

<sup>8</sup> NELSON & QUEVAUVILLER, *supra* note 7, at 176.

absolute ability to capture the water without regard to the harm it may cause neighbors' ability to also extract the water.<sup>9</sup>

The absolute ownership rule was adopted by England's former colonies, the United States and Australia.<sup>10</sup> Unlike England, the western United States and Australia are both arid climates where water scarcity is prevalent.<sup>11</sup> Thus, the absolute ownership rule did not work, and the people living in these arid climates required new ways to allocate groundwater.<sup>12</sup> The two countries developed different approaches to solve this problem: courts in the United States developed new rules to replace the absolute dominion rule, while Australia opted to allocate groundwater by issuing permits through regulatory agencies.<sup>13</sup>

Complexities arose in Australia and the United States when applying rules and permits to bodies of water that crossed state lines. While Australia and the United States inherited England's common law, they did not adopt the United Kingdom's method of political power distribution.<sup>14</sup> The United Kingdom is composed of four countries: England, Scotland, Wales, and Northern Ireland.<sup>15</sup> The Parliament in England had comprehensive legislative power over the constituent countries, so dispute resolution between the countries was simply a matter of passing legislation in the central government.<sup>16</sup>

Unlike the United Kingdom, the United States and Australia have federalist systems in which the states have constitutionally protected powers.<sup>17</sup> The constitutions in their respective countries give the states a high degree of control

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<sup>9</sup> Joseph W. Dellapenna, *A Primer on Groundwater Law*, 49 IDAHO L. REV. 265, 271 (2013).

<sup>10</sup> NELSON & QUEVAUVILLER, *supra* note 7, at 176.

<sup>11</sup> The average annual precipitation in the western United States from 1901-2000 was 17.41 inches. *Climate at a Glance*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., [https://www.ncdc.noaa.gov/cag/regional/time-series/109/pcp/12/12/1895-2020?base\\_prd=true&begbaseyear=1901&endbaseyear=2000](https://www.ncdc.noaa.gov/cag/regional/time-series/109/pcp/12/12/1895-2020?base_prd=true&begbaseyear=1901&endbaseyear=2000) (last visited Feb. 2, 2022). The average annual precipitation in Australia is 15–20 inches. BART GEERTS & EDWARD LINACRE, *CLIMATES & WEATHER EXPLAINED* (2022).

<sup>12</sup> Douglas E. Fisher, *Water Law and Policy in Australia - An Overview*, 36 ENV'T. L. REP. 10264, 10264–66 (2006).

<sup>13</sup> Dellapenna, *supra* note 9, at 269; NELSON & QUEVAUVILLER, *supra* note 7, at 176.

<sup>14</sup> See Paul T. Babie et al., *Federalism Fails Water: A Tale of Two Nations, Two States, and Two Rivers*, 35 J. ENV'T L. & LITIG. 1, 11–12 (2020); see also Gordon Slynn, *Constitutional Change in the United Kingdom*, 54 MERCER L. REV. 1199, 1201 (2003).

<sup>15</sup> Slynn, *supra* note 14, at 1201.

<sup>16</sup> See *id.*; see also Alexander Andrew Mackay Irvine, *Constitutional Change in the United Kingdom: British Solutions to Universal Problems*, 23 J. SUP. CT. HIST. 26 (1998). This changed during the 20<sup>th</sup> and 21<sup>st</sup> centuries, well after Australia and the United States gained their independence and set up their methods of governance. Wales and Scotland have gained new powers through devolution, in which the Parliament gives up certain executive and legislative functions to the countries. Slynn, *supra* note 14, at 1201.

<sup>17</sup> Babie et al., *supra* note 14, at 11–15.

over the law within their borders, including water law.<sup>18</sup> Because states, as entities, create and enforce their own laws, they are not subject to the same rules as individuals. In relation to water allocation, state self-governance has cross-border implications. In disregard to political boundaries, water's fluid nature connects all users of a common water source whereby one user affects all other users.<sup>19</sup> When users extract a common resource such as water without restriction, a "tragedy of the commons" occurs.<sup>20</sup> In a tragedy of the commons, users, acting in their own self-interest, collectively deplete the shared resource.<sup>21</sup>

To prevent a tragedy of the commons, water extraction by individuals, businesses, and local governments is limited by state law in Australia and the United States through permits and court rules.<sup>22</sup> However, in creating state law, states are incentivized to prioritize their own citizens while neglecting the effects on others.<sup>23</sup> The result is a race to capture shared water sources.<sup>24</sup> This competition over interstate water has led to numerous disputes in Australia and the United States.<sup>25</sup>

Australia has settled interstate disputes through interstate negotiation and federal legislation.<sup>26</sup> For example, a combination of negotiation between the states along the Murray-Darling River Basin<sup>27</sup> and federal legislation, called the *Water Act 2007*, created a comprehensive water management system for Australia's largest river and its connected groundwater.<sup>28</sup> The *Water Act 2007* placed the responsibility of water management of the Basin in the hands of the Murray Darling Basin Authority (Basin Authority).<sup>29</sup> The Basin Authority's job

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<sup>18</sup> See *id.* at 15–26.

<sup>19</sup> See GEORGE A. GOULD & DOUGLAS L. GRANT, CASE AND MATERIALS ON WATER LAW 325–26, 330–31 (6th ed. 2000).

<sup>20</sup> Martin Fronek, *The Tragedy of the Commons: Four Decades Later*, 11 COMMON L. REV. 16, 16–17 (2010). A "tragedy of the commons" is when there is a nonexcludable finite public resource. All parties using the resource will take as much of it as possible before other parties can use it up. *Id.*

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

<sup>22</sup> See GOULD & GRANT, *supra* note 19, at 16–18; Babie et al., *supra* note 14, at 19–20, 25–26.

<sup>23</sup> See generally Ayele Hegena Anabo, *The Myth of Tragedy of the Commons in Sustaining Water Resources*, 7 MIZAN L. REV. 309 (2013).

<sup>24</sup> See generally *id.*

<sup>25</sup> See generally Babie et al., *supra* note 14.

<sup>26</sup> See Dominic Skinner & John Langford, *Legislating for Sustainable Basin Management: The Story of Australia's Water Act (2007)*, 15 WATER POL'Y 871, 875–76 (2013).

<sup>27</sup> The Murray-Darling River Basin is Australia's largest river basin and flows through Queensland, New South Wales, South Australia, and Victoria. *The Murray-Darling Basin and Why It's Important*, MURRAY-DARLING BASIN AUTH., <https://www.mdba.gov.au/importance-murray-darling-basin> (last visited Feb. 15, 2022).

<sup>28</sup> See *Water Act 2007* (Cth) Part VII, section 43 (Austl.).

<sup>29</sup> Skinner & Langford, *supra* note 26, at 882–83.

was to approve extraction limits for each state and enforce those limits.<sup>30</sup> So far, negotiation and legislation have staved off litigation over the Murray-Darling as well as Australia's other interstate water sources.<sup>31</sup> However, brewing discontent over compliance and gaps in legislation<sup>32</sup> may require the High Court of Australia to settle a dispute between multiple states.<sup>33</sup>

On the other hand, in the United States, states settle interstate water disputes through negotiation and litigation.<sup>34</sup> When there is a dispute, states attempt to negotiate compacts to reach a mutual agreement on how to allocate an interstate water resource.<sup>35</sup> However, these negotiations often break down, and litigation ensues as states demand judicial resolution of the dispute.<sup>36</sup> Lawsuits between states come under the original jurisdiction of the Supreme Court.<sup>37</sup> The Court established the doctrine of equitable apportionment to settle interstate water disputes in 1907 in *Kansas v. Colorado*, and the doctrine has continued to develop throughout the 20<sup>th</sup> and 21<sup>st</sup> centuries.<sup>38</sup>

Historically, the Supreme Court has employed equitable apportionment to settle disputes between the states over interstate waters.<sup>39</sup> The doctrine most commonly applies to interstate rivers<sup>40</sup> but has also been used to allocate

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<sup>30</sup> *Id.* Legislation in 2021 switched enforcement powers over to a new Inspector-General of Water Compliance. The Inspector-General got the pre-existing enforcement powers of the MBDA and some additional enforcement powers. *Water Legislation Amendment (Inspector-General of Water Compliance and Other Measures) Act 2021* (Cth) div 3A (Austl.).

<sup>31</sup> Adam Webster, *Sharing Water from Transboundary Rivers in Australia - An Interstate Common Law?*, 39 MELB. U. L. REV. 263, 264 (2015) [hereinafter Webster – *Sharing Water*].

<sup>32</sup> See, e.g., *The Latest Murray-Darling Basin Scandal Explained*, AUSTL. INST. (Jul. 9, 2019), <https://australiainstitute.medium.com/the-latest-murray-darling-basin-scandal-explained-2b414b866849>; Anne Davies, *Plans for the Plains: The Fight over Harvesting Floodwater in NSW is About to Get Real*, THE GUARDIAN (Feb. 5 2021), <https://www.theguardian.com/australia-news/2021/feb/06/plans-for-the-plains-the-fight-over-harvesting-floodwater-in-nsw-is-about-to-get-real> (noting the recent dispute is over the capture of floodwater. Farmers further upstream of the Murray-Darling are capturing floodwater which would otherwise makes its way back in the river to downstream users.).

<sup>33</sup> Webster – *Sharing Water*, *supra* note 31, at 265.

<sup>34</sup> See generally Babie et al., *supra* note 14.

<sup>35</sup> Josh Clemons, *Interstate Disputes: A Road map for States*, 12 SE. ENV'T L.J. (2004), <http://masglp.olemiss.edu/acf.htm>.

<sup>36</sup> See *id.*

<sup>37</sup> U.S. CONST. art. III § 2. Lower courts do not hear cases over which the Supreme Court has original jurisdiction. The Supreme Court acts as the trial court. Jamie Huffman, *Mississippi v. Tennessee: Analysis and Implications*, 28 N.Y.U. ENV'T. L.J. 227, 240 (2020).

<sup>38</sup> *Kansas v. Colorado*, 206 U.S. 46 (1907); Bernadette R. Nelson, *Muddy Water Blues: How the Murky Doctrine of Equitable Apportionment Should Be Refined*, 105 IOWA L. REV. 1827, 1837 (2020).

<sup>39</sup> Clemons, *supra* note 35.

<sup>40</sup> See *id.*

anadromous fish<sup>41</sup> that swim through multiple states.<sup>42</sup> The doctrine was extended further in *Mississippi v. Tennessee* to interstate groundwater.<sup>43</sup> This decision to apply equitable apportionment to interstate groundwater came at a time when climate change and increasing populations were straining surface water resources, pushing people to increase their use of groundwater.<sup>44</sup>

The development of the doctrine of equitable apportionment in the United States could provide some lessons for a potential Australian interstate water dispute. The shared English common law heritage in the United States and Australia makes each country a potential case study for the other.<sup>45</sup> Australia has followed the lead of U.S. courts in other areas of the law, such as contracts and administrative law.<sup>46</sup> After U.S. courts expanded certain defenses and alternative remedies in contract law, including restitution, promissory estoppel, and unconscionability, Australian courts followed suit.<sup>47</sup> Additionally, American legal scholars influenced Australian administrative legal scholars and Australian administrative case law in several areas, including the jurisdictional reach of administrative agencies and the role of courts in reviewing agency action.<sup>48</sup>

Australian adoption of U.S. law should be extended to interstate water dispute resolution.<sup>49</sup> Litigation between two Australian states over an interstate water source has never happened but remains a looming possibility.<sup>50</sup> Significantly, the High Court does not have any guiding precedent if such a case did arise.<sup>51</sup> Increased use of groundwater such as in aquifers in the Great Artesian Basin and aquifers in the Murray-Darling Basin could extend these

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<sup>41</sup> Idaho ex rel. Evans v. Oregon, 462 U.S. 1017, 1018–19, 1024 (1983). Anadromous fish live most of their lives in the sea but swim up rivers to mate and spawn eggs. *What Does Anadromous Mean?*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., <https://www.fisheries.noaa.gov/>.

<sup>42</sup> Idaho ex rel. Evans, 462 U.S. at 1018–19, 1024.

<sup>43</sup> *Mississippi v. Tennessee*, 142 S. Ct. 31 (2021).

<sup>44</sup> See Noah D. Hall, *Interstate Water Compacts and Climate Change Adaptation*, 5 ENV'T. & ENERGY L. & POL'Y J. 237, 240–47 (2010); *Adaptation Strategies Guide for Water Utilities*, EPA, <https://www.epa.gov/arc-x/adaptation-actions-water-utilities#modifywater>.

<sup>45</sup> See Paul Babie, Paul Leadbeter & Kyriaco Nikias, *Property, Unbundled Water Entitlements, and Anticommons Tragedies: A Cautionary Tale from Australia*, 9 MICH. J. ENV'T. & ADMIN. L. 107, 108–11 (2019).

<sup>46</sup> Ralph James Mooney, *Hands Across the Water: The Continuing Convergence of American and Australian Contract Law*, 23 U.N.S.W. L.J. 1 (2000); Stephen Gageler, *Whitmore and the Americans: Some American Influences on the Development of Australian Administration Law*, 38 U.N.S.W.L.J. 1316 (2015).

<sup>47</sup> Mooney, *supra* note 46, at 37.

<sup>48</sup> Gageler, *supra* note 46, at 1321, 1328, 1330–31.

<sup>49</sup> Webster – *Sharing Water*, *supra* note 31, at 264.

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

<sup>51</sup> *Id.*

disputes and litigation to groundwater.<sup>52</sup> The recent *Mississippi v. Tennessee* decision and other Supreme Court decisions could direct the Australian High Court in such a dispute.<sup>53</sup>

This Comment will explore the exchange of legal ideas between the United States and Australia over interstate groundwater dispute resolution. Part I is a brief introduction to interstate litigation in the United States and the role of groundwater within it. Part II looks at interstate disputes in Australia and the role groundwater may have in the future. Part III looks at how the Australian High Court has adopted ideas from other countries and the constitutional basis under which it can adopt U.S. Supreme Court jurisprudence in interstate water disputes. The remainder of this Comment provides a starting point for the Australian High Court by describing a lessons the United States Supreme Court has learned along the way in settling interstate water disputes. The first lesson, in Part IV, looks at the issue of proof and the importance of facts in interstate groundwater litigation. The second lesson, in Part V, looks at the role of state law in interstate groundwater disputes.

## I. INTERSTATE WATER LITIGATION IN THE UNITED STATES

States in the United States have three mechanisms for settling interstate water disputes: interstate compacts, equitable apportionment, and congressional apportionment.<sup>54</sup> Interstate compacts and equitable apportionment are relatively common, while congressional apportionment has only been used twice.<sup>55</sup> Interstate water compacts are agreements between states over the allocation of interstate waters made with congressional approval.<sup>56</sup> If negotiations over interstate waters do not result in an agreement, the states have another option: equitable apportionment by the Supreme Court.<sup>57</sup> The doctrine of equitable apportionment was formulated by the Supreme Court in the early 20<sup>th</sup> century in

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<sup>52</sup> DEP'T OF WATER, NORTHERN PERTH BASIN: GEOLOGY, HYDROGEOLOGY, AND GROUNDWATER RESOURCES 285 (2017); MURRAY-DARLING BASIN COMM'N, SUMMARY OF ESTIMATED IMPACT OF GROUNDWATER USE ON STREAMFLOW IN THE MURRAY-DARLING BASIN 2–3 (2005), [https://www.mdba.gov.au/sites/default/files/archived/mbdc-GW-reports/2152\\_Exec\\_Summary\\_and\\_about\\_Overview\\_Report.pdf](https://www.mdba.gov.au/sites/default/files/archived/mbdc-GW-reports/2152_Exec_Summary_and_about_Overview_Report.pdf).

<sup>53</sup> See Webster – *Sharing Water*, *supra* note 31.

<sup>54</sup> Huffman, *supra* note 37, at 231.

<sup>55</sup> *Id.*

<sup>56</sup> Hall, *supra* note 44, at 237.

<sup>57</sup> Huffman, *supra* note 37.



*Kansas v. Colorado*.<sup>58</sup> Under equitable apportionment, the Supreme Court allocates the water of an interstate source between the litigating states.<sup>59</sup>

Equitable apportionment and interstate compacts are two separate routes in settling a dispute; however, they do not occur in separate bubbles. The relationship between equitable apportionment and interstate compacts can be seen in the way equitable apportionment helps promote interstate agreements.<sup>60</sup> The Supreme Court has said many times it prefers states to resolve their disputes through compacts rather than litigation.<sup>61</sup> In 2015, the Supreme Court emphasized the role of equitable apportionment in the formation of interstate compacts:

States bargained for those rights [under interstate compacts] in the shadow of our equitable apportionment power—that is, our capacity to prevent one State from taking advantage of another. Each State’s ‘right to invoke the jurisdiction of this Court [is] an important part of the context’ in which any compact is made.<sup>62</sup>

Because equitable apportionment provides a base level of water to which a state is entitled, disputing states can negotiate with the knowledge they are entitled to a certain amount of water under equitable apportionment.<sup>63</sup> States do not know exactly how much water they are entitled to, but the century-old equitable apportionment jurisprudence of the Supreme Court provides some level of predictability as to what portion a state has a right to.<sup>64</sup>

This section of the comment will highlight the pros and cons of interstate litigation involving interstate compacts and equitable apportionment, then a brief history of interstate litigation involving groundwater, and the most recent development in interstate groundwater litigation: the *Mississippi v. Tennessee* Supreme Court decision.

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<sup>58</sup> Burke W. Griggs, *Interstate Water Litigation in the West: A Fifty-Year Retrospective*, 20 U. DENV. WATER L. REV. 153, 166–68 (2017).

<sup>59</sup> Huffman, *supra* note 37.

<sup>60</sup> Ryke Longest, *Opinion Analysis: Bargaining in the Shadow of Equitable Apportionment*, SCOTUS BLOG (Mar. 3, 2015), <https://www.scotusblog.com/2015/03/opinion-analysis-bargaining-in-the-shadow-of-equitable-apportionment/>.

<sup>61</sup> Huffman, *supra* note 37.

<sup>62</sup> *Kansas v. Nebraska*, 574 U.S. 445, 455 (2015).

<sup>63</sup> See Webster – *Sharing Water*, *supra* note 31.

<sup>64</sup> See Huffman, *supra* note 37.

### A. *Pros and Cons to Interstate Litigation*

Litigation over interstate waters is an attractive method of conflict resolution to many states because it provides finality to a dispute.<sup>65</sup> The finality is especially compelling to states that are having a difficult time negotiating and coming to a mutual agreement with the opposing party.<sup>66</sup> What may not be immediately apparent to states engaging in interstate litigation is the amount of time and money it takes to obtain a Supreme Court ruling. These cases often last many years and cost millions of dollars. For example, in recent litigation between Texas and New Mexico, the two states spent over \$30 million in combined legal fees for a case that lasted about six years.<sup>67</sup> Another example of this is the litigation between Florida and Georgia beginning in 2013 when Florida asked for equitable apportionment of the Apalachicola-Chattahoochee-Flint River Basin by the Supreme Court.<sup>68</sup> Only in April 2021 did the Supreme Court make its final determination that Florida was not entitled to equitable apportionment.<sup>69</sup> The legal fees for Florida and Georgia were even higher than that of Texas and New Mexico, with Georgia spending \$49 million and Florida spending more than \$54 million.<sup>70</sup>

Another downside to litigating interstate water disputes is that apportionment by the Supreme Court has not always prevented subsequent litigation. The Supreme Court's ruling over a specific problem is final, but two states may afterward develop another problem over the same water source. For example, Arizona has sued California many times for taking more than its share of the

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<sup>65</sup> See Samuel Hardiman, *How a Supreme Court Decision Could Change the Future of Memphis' and the South's Drinking Water*, MEMPHIS COM. APPEAL (Nov. 29, 2021), <https://www.commercialappeal.com/story/news/2021/11/30/supreme-court-decision-could-change-future-memphis-sand-aquifer/6344790001/>.

<sup>66</sup> See *id.*

<sup>67</sup> Danielle Prokop, *States Spend Big Money in Texas v. New Mexico Supreme Court Fight*, LAS CRUCES SUN NEWS (Dec. 2, 2021), <https://www.lcsun-news.com/story/news/2021/12/02/states-spend-big-money-texas-v-new-mexico-supreme-court-fight-rio-grande-water/8838121002/>.

<sup>68</sup> Tamar Hallerman, *Your Guide to the Florida-Georgia Supreme Court Water Case*, ATLANTA JOURNAL-CONSTITUTION (Apr. 1, 2021), <https://www.ajc.com/news/business/your-guide-to-the-florida-georgia-supreme-court-water-case/7GJK5JCAOZF65JR7G35BJRHDXDI/>.

<sup>69</sup> See *Florida v. Georgia*, 141 S. Ct. 1175 (2021).

<sup>70</sup> Hallerman, *supra* note 68; Mary Ellen Klas, *Secretary Resigned After \$98 Million in Legal Fees in Florida Water Wars*, TAMPA BAY TIMES (Jan. 23, 2017), <https://www.tampabay.com/news/secretary-resigned-after-98-million-in-legal-fees-in-florida-water-wars/2310572/>. Similar litigation in Australia likely would not cost as much because Australian lawyers are not paid as much, but legal fees are a significant factor that Australian states should consider before bringing a case before the High Court. See Christopher Niesche, *US Law Firms Use Huge Salaries to Lure Australian Associates to the States*, LAW.COM (June 21, 2021), <https://www.law.com/international-edition/2021/06/21/u-s-law-firms-lure-australian-associates-to-the-u-s-with-huge-salaries/?sreturn=20220716174607>.

water from the Colorado River under the Colorado River Compact.<sup>71</sup> The ongoing dispute between Arizona and California over the river has produced twelve Supreme Court decisions.<sup>72</sup> Each decision addresses the specific allocation problem before the Court, but none delivered a long-term solution.<sup>73</sup>

Any alternative that avoids the time and cost of interstate litigation may seem preferable, but there are some positive aspects to interstate litigation and the doctrine of equitable apportionment. For one, the doctrine articulates the respective rights each state has to interstate waters.<sup>74</sup> Downstream states like Florida, Arizona, and Kansas understand that if negotiations with upstream states break down, they have an avenue of redress that does not require the consent of the upstream state.<sup>75</sup> On the other hand, in Australia, South Australia has always had to rely on negotiations to ensure Victoria and New South Wales (NSW) do not divert all the water in the Murray-Darling River Basin.<sup>76</sup> Enforceable rights like those under equitable apportionment provide a bargaining chip for an otherwise powerless state and provide a back-up plan if negotiations fall apart.<sup>77</sup>

#### B. *A Brief History of Groundwater in Interstate Disputes*

The United States Supreme Court's experience with groundwater can be traced back to the creation of the equitable apportionment doctrine in 1907.<sup>78</sup> In *Kansas v. Colorado*, the primary dispute was over the Arkansas River, but a secondary issue was the groundwater connected to the river.<sup>79</sup> Kansas contended that "beneath the surface there is, as it were, a second river, with the same course as that on the surface, but with a distinct and continuous flow as of a separate stream."<sup>80</sup> The Supreme Court was not convinced that the groundwater was a separate stream, finding, "[i]t is rather to be regarded as merely the accumulation

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<sup>71</sup> Lawrence J. MacDonnell, *Arizona v. California Revisited*, 52 NAT. RES. J. 363, 369 (2012).

<sup>72</sup> *Arizona v. California*, 283 U.S. 423 (1931); 292 U.S. 341 (1934); 298 U.S. 558 (1936); 373 U.S. 546 (1963); 376 U.S. 340 (1964); 383 U.S. 268 (1966); 439 U.S. 419 (1979); 460 U.S. 605 (1983); 466 U.S. 144 (1984); 531 U.S. 1 (2000); 547 U.S. 150 (2006); 589 U.S. \_\_\_, 140 S. Ct. 684 (2020).

<sup>73</sup> MacDonnell, *supra* note 71, at 369.

<sup>74</sup> See Webster – *Sharing Water*, *supra* note 31, at 264–66.

<sup>75</sup> See ADAM WEBSTER, *DEFINING RIGHTS, POWERS AND LIMITS IN TRANSBOUNDARY RIVER DISPUTES: A LEGAL ANALYSIS OF THE RIVER MURRAY 202–03* (2014) [hereinafter WEBSTER – *DEFINING RIGHTS*].

<sup>76</sup> Adam Webster, *Colonial History of the River Murray Dispute*, 38 ADEL. L. REV. 13, 24–26 (2017) [hereinafter Webster – *Colonial History*].

<sup>77</sup> *Kansas v. Nebraska*, 574 U.S. at 455.

<sup>78</sup> Webster – *Sharing Water*, *supra* note 31.

<sup>79</sup> *Kansas v. Colorado*, 206 U.S. at 46.

<sup>80</sup> *Id.* at 114.

of water which will always be found beneath the bed of any stream whose bottom is not solid rock.”<sup>81</sup>

Groundwater did not have a significant effect on the outcome of the case, as it “[bore] only upon the question of the diminution of the flow from Colorado into Kansas caused by the appropriation in the former state of the waters for the purposes of irrigation.”<sup>82</sup> The relatively little consideration the Court gave to groundwater was in part due to the inability of technology in the early 1900s to extract large amounts of groundwater.<sup>83</sup> A similar story can be seen in the 1936 decision of *Washington v. Oregon*. The main dispute between Washington and Oregon involved the allocation of the Walla Walla River.<sup>84</sup> Secondary to the consideration of surface water in the Walla Walla River were wells dug in Oregon that diverted water Washington asserted would have otherwise made it to Washington.<sup>85</sup> Ultimately, the Supreme Court disagreed and found that the wells took groundwater that would have stayed in Oregon.<sup>86</sup> Thus, Oregon’s groundwater use did not affect Washington.<sup>87</sup>

Prior to the mid-20<sup>th</sup> century, farmers, like those in Washington, were unable to extract groundwater in significant quantities due to a lack of technology.<sup>88</sup> Legal developments reflected this reality as equitable apportionment decisions and the implementation of interstate water compacts primarily addressed surface water allocation.<sup>89</sup> The focus of interstate litigation on surface water changed when new technologies enabled people to extract large amounts of water from aquifers.<sup>90</sup> Consequently, utilization of groundwater rapidly increased in most, if not all, states because groundwater was not subject to the more strict extraction limits imposed on surface water.<sup>91</sup>

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

<sup>82</sup> *Id.* at 115.

<sup>83</sup> See Griggs, *supra* note 58, at 166–68.

<sup>84</sup> *Washington v. Oregon*, 297 U.S. 517, 518–20 (1936).

<sup>85</sup> *Id.* at 524–25.

<sup>86</sup> *Id.* at 525.

<sup>87</sup> *Id.*

<sup>88</sup> Griggs, *supra* note 58, at 166–68.

<sup>89</sup> *Id.* at 168.

<sup>90</sup> *Id.* at 166–68. “An aquifer is a body of porous rock or sediment saturated with groundwater. Groundwater enters an aquifer as precipitation seeps through the soil. It can move through the aquifer and resurface through springs and wells.” *Aquifers*, NAT’L GEOGRAPHIC, <https://www.nationalgeographic.org/encyclopedia/aquifers/> (last visited Feb. 16, 2022).

<sup>91</sup> Griggs, *supra* note 58, at 168–69.

The pumping of groundwater in the 20<sup>th</sup> century exemplified the concept of the tragedy of the commons.<sup>92</sup> At the individual level, the lack of regulation allowed farmers to maximize their groundwater intake, with little regard for others' needs.<sup>93</sup> At the state level, political considerations incentivized states to allow their citizens to continue to extract groundwater at unsustainable levels without regard to other states.<sup>94</sup> The result at both the individual and state levels was a race to extract groundwater before others.<sup>95</sup>

Problems arose when groundwater pumping for irrigation began to significantly affect the flow of interstate rivers resulting in multiple lawsuits between states.<sup>96</sup> Texas sued New Mexico over groundwater extraction that took from groundwater that contributed to the Rio Grande River.<sup>97</sup> Kansas sued Nebraska over groundwater extraction in the Republican River Basin.<sup>98</sup> Montana sued Wyoming over groundwater pumping that decreased surface water flow in two tributaries of the Yellowstone River: the Tongue River and the Powder River.<sup>99</sup> Groundwater extraction may have been the root cause of these disputes, but they were still subject to the upstream-downstream dynamic in which the upstream user had the upper hand over the downstream user.

### C. *Mississippi v. Tennessee*

In *Mississippi v. Tennessee*, the dispute was solely over groundwater. Traditionally, water disputes have involved a downstream party fighting to limit the amount of water that an upstream party is using. In these cases, the upstream party has the geographic upper hand, so the downstream state may have a difficult time finding the leverage necessary to limit the upstream state's water use. However, disputes over aquifers change the upstream-downstream dynamic. Neither party has the geographic upper hand in disputes over aquifers because the extraction of groundwater affects all parties involved. The mutual effect of groundwater extraction gives each party influence over the other. In

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<sup>92</sup> See *supra* notes 20–24 and accompanying text.

<sup>93</sup> *Id.*; Dellapenna, *supra* note 9, at 269.

<sup>94</sup> See Griggs, *supra* note 58, at 166–68.

<sup>95</sup> See *id.*

<sup>96</sup> *Id.* at 168.

<sup>97</sup> *Id.* at 176.

<sup>98</sup> *Id.* at 172.

<sup>99</sup> *Id.* at 174.

this sense, the relationship between parties overlying an aquifer can be likened to that of parties on the coast of a lake.<sup>100</sup>

The dispute between Mississippi and Tennessee was over the Middle Claiborne Aquifer. Memphis, Tennessee, relies only on the Middle Claiborne Aquifer for its water supply and pumps over 100 million gallons from the aquifer every year.<sup>101</sup> During litigation before the Supreme Court, Mississippi alleged Memphis's pumping created a "cone of depression" that lowered water levels of the portions of the aquifer in Mississippi.<sup>102</sup> The Supreme Court addressed two questions: (1) whether the aquifer was an interstate resource, and if so, (2) whether the aquifer was subject to equitable apportionment.<sup>103</sup>

The first question is factual. The Middle Claiborne Aquifer has different sections.<sup>104</sup> One of the sections, the Sparta-Sands Aquifer, is completely under Mississippi, and thus, Mississippi argues the Sparta-Sands Aquifer is its own hydrological unit.<sup>105</sup> Another section of the Middle Claiborne Aquifer, the Memphis-Sands Aquifer, is under Tennessee and is the portion of the Middle Claiborne Aquifer being pumped by Memphis.<sup>106</sup> The Special Master<sup>107</sup> recommended, and the Supreme Court ultimately agreed, that Middle Claiborne Aquifer is a single hydrological unit because water flows between the different sections.<sup>108</sup>

The second question is a legal question. There are a few differentiating factors between groundwater and surface water that may have led the Supreme Court to reach a different decision and opt out of equitable apportionment for groundwater.<sup>109</sup> The main factor is that the flow of groundwater is much slower

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<sup>100</sup> For purposes of simplification, analogizing groundwater to a lake is helpful for showing how one person's extraction affects all others. However, an aquifer is not an "underground lake," and water instead flows slowly through pores in rocks underground. Water Science School, *Aquifers and Groundwater*, U.S. GEOLOGICAL SURV. (Oct. 16, 2019), <https://www.usgs.gov/special-topics/water-science-school/science/aquifers-and-groundwater>.

<sup>101</sup> Tom Charlier, *The Memphis Sand Aquifer: A Buried Treasure*, COM. APPEAL (Dec. 19, 2016), <https://www.commercialappeal.com/story/news/environment/2016/12/16/memphis-sand-aquifer-buried-treasure/93814278/>.

<sup>102</sup> Report of the Special Master at 5, *Mississippi v. Tennessee*, 142 S. Ct. 31 (2021) (No. 143), 2020 WL 11629023, at \*5.

<sup>103</sup> *See id.* at 2.

<sup>104</sup> *Id.* at 15.

<sup>105</sup> *Id.* at 17.

<sup>106</sup> *Id.* at 15–18.

<sup>107</sup> For more information on what a Special Master is see *infra* Fact-Finding and the Special Master.

<sup>108</sup> Report of the Special Master, *supra* note 102, at 17; *Mississippi v. Tennessee*, 142 S. Ct. at 40.

<sup>109</sup> *See Mississippi v. Tennessee*, 142 S. Ct. at 40–41.

than surface water—it percolates rather than flows freely through the ground.<sup>110</sup> For example, the Middle Claiborne Aquifer can flow as little as “one or two inches per day.”<sup>111</sup> The Supreme Court acknowledged the difference but ultimately dismissed it because the one or two inches “amounts to over 35 million gallons of water per day.”<sup>112</sup> Additionally, the Supreme Court cited to previous cases in which it had applied equitable apportionment to surface water that dried sometimes and therefore did not have any flow.<sup>113</sup> The Court further explained that the actions of Tennessee and the effects these actions had on Mississippi are exactly the type of situation equitable apportionment was designed for: one state taking water from a source that negatively affects the ability of another state to access that water.<sup>114</sup> Ultimately, the Supreme Court chose to extend equitable apportionment to groundwater.<sup>115</sup>

## II. INTERSTATE WATER DISPUTES IN AUSTRALIA

Australia’s political negotiations over the allocation of interstate water sources have been successful so far in preventing litigation between Australian states.<sup>116</sup> Both the ability of Australian politicians to compromise and the will of the federal government to participate in interstate water allocation are admirable and could provide lessons for U.S. politicians. However, the path to efficient water resource management in Australia has been anything but easy. Politicians from states in the Murray-Darling River Basin have engaged in bitter fights concerning the allocation of water in the basin.<sup>117</sup> The states, most notably South Australia, have gone as far as to threaten to sue other states for attempting to take more than their share of interstate water.<sup>118</sup> These threats have never come

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<sup>110</sup> *Id.* at 40.

<sup>111</sup> *Id.*

<sup>112</sup> *Id.* at 40–41.

<sup>113</sup> *Id.* at 40 (citing *Kansas v. Colorado*, 206 U.S. 46, 115 (1907)).

<sup>114</sup> *Id.*

<sup>115</sup> *Id.*

<sup>116</sup> WEBSTER – DEFINING RIGHTS, *supra* note 75, at 195.

<sup>117</sup> See SA MP Reined in After ‘F\*\*\* You All’ Comments over Murray-Darling Basin Plan, ABC NEWS (Nov. 18, 2016), <https://www.abc.net.au/news/2016-11-19/sa-minister-reined-in-over-expetive-laden-outburst/8039798>. On one occasion at a dinner, a South Australian minister hurled expletives at politicians and officials from states upstream for trying to limit how much water they had to let flow downstream to South Australia. *Id.*

<sup>118</sup> See Lucille Keen, SA Mulls Legal Redress on Murray-Darling Basin Plan, AUSTL. FIN. REV. (May 28, 2012), <https://www.afr.com/policy/energy-and-climate/sa-mulls-legal-redress-on-murray-darling-plan-20120528-j2plk>. The South Australian Premier threatened legal action against the upstream states in the Murray-Darling Basin for trying to allocate too much water for themselves in the Basin Plan, which determines how much water each state is entitled to. *Id.*

to fruition, but interstate litigation before the Australian High Court could emerge in the coming years with increased pressures on water supplies resulting from climate change.<sup>119</sup> Because the High Court has never decided a case between two states, uncertainty exists as to what principles the High Court would follow and what the outcome would be in such a case.<sup>120</sup>

Australia, like the United States, has a long history of interstate water disputes tracing back to before Australia's independence from England.<sup>121</sup> Water disputes continued after independence in part because the Australian Constitution gave water allocation power to the states rather than the Commonwealth and failed to articulate the rights each state had with respect to interstate waters. The decision by the drafters of the Australian Constitution would haunt the country to the present day with fights over the allocation of interstate waters.<sup>122</sup>

#### A. *Murray River Dispute*

The most prominent interstate dispute in Australia is over the Murray and Darling Rivers. Animosity between the Murray-Darling Basin states began when they were colonies of Great Britain.<sup>123</sup> In 1886, South Australia was snubbed by Victoria and NSW in discussions regarding the allocation of the Murray River.<sup>124</sup> During these discussions, the two upstream colonies, Victoria and NSW, formulated an agreement that concentrated power over the Murray River into a trust that was controlled by them without consulting South Australia.<sup>125</sup> As a downstream state, South Australia became concerned about its bargaining position; however, it still had some leverage over Victoria and NSW, which needed the river for steamboats to transport goods to South Australia's ports.<sup>126</sup>

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<sup>119</sup> See Webster – *Sharing Water*, *supra* note 31; WILL STEFFEN ET AL., DELUGE AND DROUGHT: AUSTRALIA'S WATER SECURITY IN A CHANGING CLIMATE 21 (2018).

<sup>120</sup> Webster – *Sharing Water*, *supra* note 31; Adam Webster, *Reflecting on the Waters: Past and Future Challenges for the Regulation of the Murray-Darling Basin*, 40 ADEL. L. REV. 249, 249 (2019) [hereinafter Webster – *Reflecting on the Waters*].

<sup>121</sup> Webster – *Reflecting on the Waters*, *supra* note 120, at 249.

<sup>122</sup> *Australian Constitution* s 100; WEBSTER – DEFINING RIGHTS, *supra* note 75, at 195.

<sup>123</sup> Webster – *Colonial History*, *supra* note 76, at 24–26.

<sup>124</sup> *Id.*

<sup>125</sup> *Id.* at 13, 24 n.48. The agreement to create the trust was never enacted by the legislatures of Victoria and New South Wales and never came into existence. *Id.*

<sup>126</sup> *Id.* at 24–26.



Further animosity arose when Victoria contracted with irrigation planners and engineers to develop an irrigation scheme using water from the Murray River that would significantly reduce the flow of the river to South Australia.<sup>127</sup> Worse, Victoria engaged in this agreement while the three colonies were planning a joint conference “for the purpose of setting all intercolonial rights involved in the apportionment of the waters of the River Murray.”<sup>128</sup> South Australia protested Victoria entering the irrigation agreement until after the conference, but its attempts were unsuccessful.<sup>129</sup>

Because the two states had the geographic upper hand and the primary use of the Murray River was changing from transportation to irrigation,<sup>130</sup> South Australia had a difficult time enticing Victoria and NSW to the bargaining table.<sup>131</sup> The influence of South Australia’s ports to ship goods to London was dwindling because railroads to other parts of the country were quickly replacing the steamboats to the south.<sup>132</sup> As long as Victoria and NSW did not sign an agreement with South Australia, there was little legal basis for South Australia to assert any rights to the river.<sup>133</sup> As such, the two upstream colonies could divert water from the Murray River at their discretion.<sup>134</sup>

Politicians and officials in South Australia argued that their colony had rights to the river, but these arguments were never put to the test.<sup>135</sup> South Australia had two options available to assert its rights to the river: the British Parliament or the British Judicial Committee.<sup>136</sup> However, both of these options required the opposing parties’ consent.<sup>137</sup> Because Victoria and NSW were satisfied with their dominant position as upstream users, they did not want a third party getting involved that would potentially require them to recognize South Australia’s rights to the river.<sup>138</sup>

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

<sup>128</sup> *Id.* at 30.

<sup>129</sup> *Id.*

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

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

<sup>133</sup> *See Webster – Colonial History, supra note 76, at 24–26.*

<sup>134</sup> *See id.* at 30.

<sup>135</sup> *Id.* at 30–40.

<sup>136</sup> *Id.* at 44–46.

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

<sup>138</sup> *See id.* at 35–40.

Uncertainty continued after independence from Britain because the constitution created during the Federation of Australian colonies in 1901<sup>139</sup> failed to articulate the rights of South Australia (or other Australian states) to interstate waters.<sup>140</sup> However, the constitution did create a forum in which states could test their rights without the consent of the opposing state: the Australian High Court.<sup>141</sup> The High Court was given original jurisdiction over disputes between states.<sup>142</sup> Despite this new avenue for potential resolution, South Australia did not sue Victoria and NSW.<sup>143</sup> The hesitation in suing Victoria and NSW may have stemmed from the uncertainty in the legal principles that would apply to litigation before the High Court.<sup>144</sup> South Australia could not be sure the Australian High Court would rule in its favor given the lack of clarity of interstate water rights in the constitution.<sup>145</sup> Fortunately, the three states signed the first of many agreements governing the Murray River in 1914, and the dispute was briefly put on hold.<sup>146</sup>

Despite the lack of interstate water litigation, Australia does not suffer from a lack of litigation in its courts. In fact, Australia is arguably second only to the United States in its litigious nature.<sup>147</sup> There could be several reasons that Australia's litigious nature has not extended to interstate water disputes. These reasons include the lack of legal certainty makes litigation a risky endeavor and the high level of involvement the Australian Commonwealth has in water quantity management. The Commonwealth government's involvement can often solve cross-border issues before they make their way to court and further complicate any potential litigation making it even more uncertain as to what the outcome of litigation would be.<sup>148</sup>

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<sup>139</sup> *The Federation of Australia*, NAT'L ARCHIVES AUSTR., <https://www.naa.gov.au/learn/learning-resources/learning-resource-themes/government-and-democracy/federation/federation-australia> (last visited Feb. 8, 2022).

<sup>140</sup> Webster – *Colonial History*, *supra* note 76, at 45.

<sup>141</sup> *Australian Constitution* s 71.

<sup>142</sup> *Id.* s 75(iv).

<sup>143</sup> Webster – *Colonial History*, *supra* note 76, at 30–31. However, South Australia sued Victoria over a border dispute, and the High Court ruled in favor of Victoria. *South Australia v. Victoria* (1911) 12 CLR 667 (Austl.).

<sup>144</sup> Webster – *Colonial History*, *supra* note 76, at 30–31, 45.

<sup>145</sup> *Id.* at 195.

<sup>146</sup> *River Murray Waters Act 1915* (NSW) (Austl.); Webster – *Colonial History*, *supra* note 76, at 45 n.147 (2017).

<sup>147</sup> *Did you know? Australia is the World's Second Most Litigious Country*, GERMAN-AUSTRALIAN CHAMBER INDUS. & COM., <https://australien.ahk.de/en/media/news-details/did-you-know-australia-is-the-worlds-second-most-litigious-country>.

<sup>148</sup> See Paul Kildea & George Williams, *The Constitution and the Management of Water in Australia's Rivers*, 32 SYDNEY L. REV. 595, 598–99, 603 (2010).

The rest of the 20<sup>th</sup> century and the 21<sup>st</sup> century would bring subsequent disputes and agreements between the three Murray states but never any lawsuits.<sup>149</sup> The most recent agreements are the National Water Initiative (NWI) and the Water Act 2007. The NWI was passed in 2004 to reform water management in areas such as water accounting, metering, water markets, and infrastructure.<sup>150</sup> All seven Australian states signed it as a promise to improve in these areas.<sup>151</sup>

The other agreement, the Water Act 2007, coupled with its 2008 amendments, is an agreement between the states in the Murray-Darling River Basin and the Commonwealth government.<sup>152</sup> Under the Water Act 2007, the states are required to contribute to the creation of the Basin Plan which defines the portion of flow of the Murray-Darling Basin each state is entitled.<sup>153</sup> The Basin Plan was created by a process in which the respective states submitted their diversion limits in water resource plans to the Murray-Darling Basin Authority (MDBA).<sup>154</sup> The MDBA then approves the limits, adds them to the Basin Plan, and enforces them against the states.<sup>155</sup>

The Water Act 2007 and the subsequent Basin Plan are big steps forward in improving water allocation and bringing water usage to sustainable levels. Four out of the five governments in the Murray-Darling Basin have successfully submitted their water resource plans and are now subject to enforcement action if they exceed their limits.<sup>156</sup> However, New South Wales exceeded its deadline for submitting its water resource plans.<sup>157</sup> Until NSW submits its water resource

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<sup>149</sup> *Id.*

<sup>150</sup> Douglas E. Fisher, *Markets, Water Rights, and Sustainable Development*, 36 ENV'T. L. REP. NEWS & ANALYSIS 10310 (2006); Vicki Wayne & Christina Son, *Regulating the Australian Water Market*, 22 J. ENV'T. L. 431 (2010).

<sup>151</sup> *Intergovernmental Agreement on a National Water Initiative 2004* (Cth) 4, 13 (Austl.), <https://www.pc.gov.au/inquiries/completed/water-reform/national-water-initiative-agreement-2004.pdf>.

<sup>152</sup> Webster – *Colonial History*, *supra* note 76, at 45 n.147 (2017).

<sup>153</sup> *Water Act 2007* (Cth) (Austl.); NELSON & QUEVAUVILLER, *supra* note 7, at 178.

<sup>154</sup> Skinner & Langford, *supra* note 26, at 872. The MDBA is the organization responsible for implementing water management in the Murray-Darling River Basin, which includes ensuring the states in the Basin do not take water over their allotted limits. *Id.*

<sup>155</sup> *Id.* Australia gave more enforcement power to the federal government in 2021 legislation by creating an Inspector-General of Water Compliance. The legislation reallocated enforcement power from the Murray-Darling Basin Authority to the Inspector-General and created additional enforcement tools. *Water Legislation Amendment (Inspector-General of Water Compliance and Other Measures) Act 2021* (Cth) div 3A (Austl.).

<sup>156</sup> *State Water Resource Plans*, MURRAY-DARLING BASIN AUTH., <https://www.mdba.gov.au/basin-plan/water-resource-plans/state-water-resource-plans> (last updated Sept. 27, 2022).

<sup>157</sup> Anne Davies, *New South Wales Told to Go Back and Try Again on Murray-Darling Basin Plan Submissions*, THE GUARDIAN (May 6, 2021), <https://www.theguardian.com/australia-news/2021/may/07/new-south-wales-told-to-go-back-and-try-again-on-murray-darling-basin-plan-submissions>.

plans, there are no limits to be enforced against it.<sup>158</sup> Because NSW has failed to submit an adequate plan, there have been calls for the federal government to get involved and create limits to enforce against the MDBA<sup>159</sup> and lawsuits from private parties against NSW for its water allocation plans.<sup>160</sup> If the NSW fails to create water resource plans, the last resort for downstream states could be a lawsuit.

### B. Disputes Extending to Groundwater

Groundwater use in Australia can be traced back tens of thousands of years to the Aboriginal people.<sup>161</sup> The groundwater flowing up through springs provided a habitat for wildlife and humans alike.<sup>162</sup> The Aboriginals were able to live in inland Australia because of the groundwater springs flowing from the Great Artesian Basin.<sup>163</sup>

In the 19<sup>th</sup> and 20<sup>th</sup> centuries, Australians accessed more water from the Great Artesian Basin by drilling holes through the impermeable layer of rock that kept the water in the ground.<sup>164</sup> Once the layer of rock was breached, the pressurized water would flow by itself up to the surface.<sup>165</sup> Thousands of these bores were drilled through the ground and into the aquifers of the Great Artesian Basin.<sup>166</sup> Because of the numerous bores, the pressure in the aquifers began to fall,

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<sup>158</sup> See *Water Resource Plans*, MURRAY-DARLING BASIN AUTH., <https://www.mdba.gov.au/basin-plan/water-resource-plans> (last updated Dec. 22, 2021). As of August 12, 2022, NSW has still not had its plans accredited by the MDBA. *Id.*

<sup>159</sup> *NSW Must Deliver Robust, Climate-Ready Water Resource Plans as a Matter of Urgency*, NATURE CONSERVATION COUNCIL (June 3, 2022).

<sup>160</sup> *Legal First Climate Case Filed Against NSW Water Sharing Plan*, ENV'T DEFENDERS OFF. (Oct. 6, 2021), <https://www.edo.org.au/2021/10/06/legal-first-climate-case-filed-against-nsw-water-sharing-plan/>.

<sup>161</sup> R.J. Fairfax & R.J. Fensham, *In the Footsteps of J. Alfred Griffiths: A Cataclysmic History of Great Artesian Basin Springs in Queensland*, 40 AUSTRALIAN GEOGRAPHICAL STUD. 210, 210 (2002).

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

<sup>163</sup> *Id.*; *Great Artesian Basin*, AUSTRALIAN GOV'T: DEP'T AGRIC., WATER & ENV'T, <https://www.awe.gov.au/water/policy/national/great-artesian-basin> (last visited Feb. 4, 2022).

<sup>164</sup> M.A. Habermehl, *Review: The Evolving Understanding of the Great Artesian Basin (Australia)*, 28 HYDROGEOLOGY J. 13–36 (2020). Groundwater in an artesian basin is trapped underground by a layer of impermeable rock. When the rock is breached, the groundwater can flow to the surface. GOULD & GRANT, *supra* note 19, at 325–31.

<sup>165</sup> Water Science School, *Artesian Water and Artesian Wells*, U.S. GEOLOGICAL SURV. (June 6, 2018), <https://www.usgs.gov/special-topics/water-science-school/science/artesian-water-and-artesian-wells>.

<sup>166</sup> Habermehl, *supra* note 164, at 15–16.

resulting in springs drying and groundwater becoming more difficult to access.<sup>167</sup>

The Australian government implemented a plan to plug the bores so water would only flow from the aquifers when it was needed.<sup>168</sup> Although a significant portion of the bores have been plugged,<sup>169</sup> it is not enough to keep up with increasing groundwater use.<sup>170</sup> Increased utilization of groundwater is not limited to the Great Artesian Basin and extends to those aquifers in the Murray-Darling Basin and Western Australia.<sup>171</sup> High reliance on groundwater is a result of climate change which has an amplified impact on Australia and its rivers compared to other countries.<sup>172</sup> Surface water has become a less dependable resource as a result of increased temperatures and less rainfall from climate change, which forces people to extract groundwater to make up the difference.<sup>173</sup> According to one Australian farmer talking about groundwater, “[i]t’s been becoming, rather than a water resource you use some of the time, a water resource you might use most of the time.”<sup>174</sup>

With water scarcity comes disputes. Australian groundwater disputes in recent years have included fights between towns and corporations bottling groundwater,<sup>175</sup> conflicts between cities and coal and gas companies that mine

<sup>167</sup> *Id.*; see also Anna Salleh, *Water Resilience: Is a Backyard Bore a Sustainable Way to Safeguard Against Drought?*, ABC SCI (Nov. 7, 2020), <https://www.abc.net.au/news/science/2020-11-08/should-i-get-a-backyard-bore-water-resilience-drought/11894072>.

<sup>168</sup> Habermehl, *supra* note 164, at 31.

<sup>169</sup> *Id.* at 31–32.

<sup>170</sup> Paul Martin & Neil Gunningham, *Improving Governance Arrangements for Sustainable Agriculture: Groundwater as an Illustration*, 1 AUSTL. J. ENV’T L. 5, 8 (2014); ANDREW L. HERCZEG & ANDREW J. LOVE, REVIEW OF RECHARGE MECHANISMS FOR THE GREAT ARTESIAN BASIN 10, 44–45 (2007).

<sup>171</sup> DEP’T OF WATER, NORTHERN PERTH BASIN: GEOLOGY, HYDROGEOLOGY, AND GROUNDWATER RESOURCES 285–86 (2017); MURRAY-DARLING BASIN COMM’N, SUMMARY OF ESTIMATED IMPACT OF GROUNDWATER USE ON STREAMFLOW IN THE MURRAY-DARLING BASIN 2–3 (2005), [https://www.mdba.gov.au/sites/default/files/archived/mdbc-GW-reports/2152\\_Exec\\_Summary\\_and\\_about\\_Overview\\_Report.pdf](https://www.mdba.gov.au/sites/default/files/archived/mdbc-GW-reports/2152_Exec_Summary_and_about_Overview_Report.pdf); Nick Harrington & Peter Cook, *Groundwater in Australia*, NAT’L CTR. GROUNDWATER RSCH. & TRAINING, 6–11 (2014).

<sup>172</sup> Harrington & Cook, *supra* note 171, at 20; Glen R. Walker et al., *Groundwater Impacts and Management Under a Drying Climate in Southern Australia*, WATER (Dec. 14, 2021).

<sup>173</sup> See Harrington & Cook, *supra* note 171, at 2–3, 20.

<sup>174</sup> Olivia Calver, *Groundwater’s Value Rises as Irrigators Realise, There is More Value to be Found Underground*, ABC RURAL (Oct. 23, 2021), <https://www.abc.net.au/news/2021-10-24/groundwater-prices-drought-surface-water/100556256>.

<sup>175</sup> Companies bottling water in Tamborine Mountain, Queensland, and Springbrook, Queensland, are facing pushback from local residents who allege that bottling water from groundwater is drying up the aquifers beneath the towns. A similar phenomenon can be seen across Australia. Jess Davis, *Residents in Regional Communities Fighting the Bottled Water Industry for Groundwater*, ABC NEWS (Nov. 2, 2019), <https://www.abc.net.au/news/rural/2019-11-03/bottled-water-wars-in-rural-australia/11666438>.

using groundwater,<sup>176</sup> and corporations cornering the groundwater market because of its rapidly rising value from surface water shortages.<sup>177</sup> These groundwater disputes will likely become more prevalent because of increasing use today and because of increased use in preceding decades.

Effects of groundwater use lack temporal proximity.<sup>178</sup> Groundwater flow can range from hundreds of feet per year to only a couple inches per year, depending on the porosity of the substance it flows through.<sup>179</sup> Thus the effects of increased use of groundwater years ago may be felt today or even years in the future.<sup>180</sup> A drought coupled with delayed effects from past groundwater use could exacerbate scarcity.<sup>181</sup>

The delayed effects of groundwater extraction also present a problem for fact-finding during dispute resolution. Gathering information in groundwater disputes is a difficult process that requires a court to determine how water is flowing underground and how the litigating parties affect that flow.<sup>182</sup> Determining causes and effects of groundwater flow is easier said than done, and the methods used to determine groundwater flow have been the subject of dispute in cases in the United States.<sup>183</sup> Further complicating groundwater disputes, many of the aquifers in Australia, including those in the Great Artesian Basin and the Murray-Darling Basin, cross state lines.<sup>184</sup> If these interstate aquifers experience drops in water levels, whether from irrigation or mining, states could fight over the allocation of the remaining water.<sup>185</sup> And although

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<sup>176</sup> Kim de Rijke et al., *The Great Artesian Basin: A Contested Resource Environment of Subterranean Water and Coal Seam Gas in Australia*, SOC'Y & NAT. RES. 696–710 (2016), <https://www.tandfonline.com/doi/abs/10.1080/08941920.2015.1122133>. Communities in the Great Artesian Basin are wary of coal and gas extraction. Mining operations will take a small percentage of the total water in the Basin but in doing so could divert water away from farmers and communities that consume the water. *Id.*

<sup>177</sup> Jess Davis & Andy Burns, *As Rivers and Dams Dry Up, Groundwater Emerges as New Battleground in Fight for Water*, ABC RURAL (Oct. 12, 2019), <https://www.abc.net.au/news/2019-10-13/groundwater-the-new-frontier-for-corporations/11593610>. An agricultural investment company called “goFarm” is buying land in northern Victoria overlying the Katunga Deep Lead Aquifer. The company plans to use water from the aquifer for water-intensive crops like tree nuts and fruit which will take up more water than the dairy farmers that goFarm is buying the land from. *Id.*

<sup>178</sup> GOULD & GRANT, *supra* note 19, at 325–31.

<sup>179</sup> *Mississippi v. Tennessee*, 142 S. Ct. at 40; GOULD & GRANT, *supra* note 19, at 325–31.

<sup>180</sup> *See* GOULD & GRANT, *supra* note 19, at 325–31.

<sup>181</sup> *See generally id.*

<sup>182</sup> *See* Griggs, *supra* note 58, at 181.

<sup>183</sup> *See id.*

<sup>184</sup> HERCZEG & LOVE, *supra* note 170, at 8; *see also* MURRAY-DARLING BASIN COMM'N, MURRAY-DARLING BASIN GROUNDWATER – A RESOURCE FOR THE FUTURE 5 (2000).

<sup>185</sup> *See supra* notes 168–174 and accompanying text.

negotiation may yet again save Australia from interstate litigation, the Australian High Court should be prepared to resolve such a dispute.

### III. VIABILITY OF U.S. SUPREME COURT JURISPRUDENCE IN AUSTRALIA

The United States Supreme Court has spent over a century refining the doctrine of equitable apportionment. In the 1907 case *Kansas v. Colorado*, The Supreme Court had to consider that Kansas and Colorado followed two different rules for water allocation.<sup>186</sup> Kansas maintained the riparian rights doctrine imported from England, while Colorado employed the prior appropriation doctrine developed in the western United States.<sup>187</sup> The contrast in law between the opposing parties required the Supreme Court to create a new doctrine that would be flexible enough to apply to disputes between two states, no matter their respective state laws.<sup>188</sup>

The Supreme Court formulated the doctrine of equitable apportionment under the idea that all states are equal and therefore have an equal right to interstate water.<sup>189</sup> In coming to this conclusion, the Supreme Court equated the individual states in the United States to sovereign states, declaring that relations between states “depend in any respect upon principles of international law.”<sup>190</sup> Further, “one cardinal rule underlying all the relations of the states to each other is that of equality of right. Each state stands on the same level with all the rest.”<sup>191</sup> Thus, the Supreme Court held the equality of states gives each state the right to an equitable portion of interstate waters.<sup>192</sup>

Australia has a federalist system like the United States, in which the states have their own respective laws. The Australian High Court could benefit from the experience of the United States Supreme Court in balancing the interests of states with different laws.<sup>193</sup> However, the Australian High Court is not bound by decisions in the United States and functions under a different constitution.<sup>194</sup> This Part will examine how the Australian High Court (A) has used the precedence of foreign courts in the past and (B) how the lessons from the United

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<sup>186</sup> *Kansas v. Colorado*, 206 U.S. at 48.

<sup>187</sup> *Id.* at 48–49.

<sup>188</sup> *See id.* at 47–49.

<sup>189</sup> *Id.* at 95–99; Webster – *Sharing Water*, *supra* note 31.

<sup>190</sup> *Kansas v. Colorado*, 206 U.S. at 96.

<sup>191</sup> *Id.* at 97.

<sup>192</sup> *Id.* at 95–99.

<sup>193</sup> *See Webster – Sharing Water*, *supra* note 31.

<sup>194</sup> *See generally* Babie et al., *supra* note 14, at 11–15.

States Supreme Court in interstate disputes can be constitutionally incorporated into Australian jurisprudence.

A. *Australian High Court Using Other Courts as Guidance*

Unlike the United States, Australia's split from England was gradual and relatively peaceful. The Australian colonies federated in 1901 with the permission of the British Parliament.<sup>195</sup> Dissimilar from the Revolutionary War, which broke ties between the United States and the United Kingdom, this did not break Australia's relationship with the U.K.<sup>196</sup> Australia's early judiciary exemplified the preservation of these ties as Australian courts often cited to English courts, especially when there was a gap in Australian jurisprudence.<sup>197</sup>

The Australian High Court's dependence on English Courts for precedence normalized the use of foreign case law, including employing U.S. court decisions as persuasive precedence.<sup>198</sup> Citations to U.S. cases, especially for constitutional interpretation, were prevalent during the first decade of Australia's independence but experienced a lag during the middle of the 20<sup>th</sup> century.<sup>199</sup> The lag was due in part to the High Court determining that English precedence was more appropriate than U.S. precedence in constitutional interpretation.<sup>200</sup> However, citations to U.S. court decisions rebounded in the 1970s and 80s.<sup>201</sup> The resurgence occurred when appeals to the British Privy Council were eliminated by the Australian Parliament, and the High Court began exercising more discretion in its decisions.<sup>202</sup> The trend of using U.S. court decisions, including Supreme Court jurisprudence, continued into the 21<sup>st</sup> century but further expanded to areas of the law beyond constitutional law.<sup>203</sup> In addition to looking at the Supreme Court's constitutional interpretation, the Australian High Court now also looks at U.S. courts in other areas of the law,

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<sup>195</sup> *The Federation of Australia*, *supra* note 139.

<sup>196</sup> Paul E von Nessen, *The Use of American Precedents by the High Court of Australia, 1901-1987*, 14 ADEL. L. REV. 181, 182 n.4 (1992).

<sup>197</sup> *Id.*

<sup>198</sup> *See id.*

<sup>199</sup> *Id.* at 188–200.

<sup>200</sup> *Id.*

<sup>201</sup> *Id.*

<sup>202</sup> *Id.* 216–17.

<sup>203</sup> Paul von Nessen, *Is There Anything to Fear in Transnationalist Development of Law - The Australian Experience*, 33 PEPP. L. REV. 883, 895–910 (2006). The expansion of using United States jurisprudence came from the elimination of appeals to the Privy Council in the United Kingdom. Without appeals to the Privy Council, the Australian High Court was less constrained and required other legal sources to look to in developing the law. *Id.* at 892.



such as torts and contracts.<sup>204</sup> The extensive experience the Supreme Court has in settling interstate water disputes could be attractive for the Australian High Court to extend its consideration of United States' jurisprudence to interstate water law.<sup>205</sup>

*B. The Constitutional Basis of the Australian High Court Using U.S. Supreme Court Principles to Solve an Interstate Water Dispute*

Before the High Court can resolve a dispute between multiple states, it must first determine whether it has jurisdiction over the dispute.<sup>206</sup> As stated above, the Australian Constitution gives the High Court original jurisdiction over “all matters... between States.”<sup>207</sup> However, the dispute must be a matter capable of a judicial resolution rather than a political one.<sup>208</sup> A matter is capable of judicial resolution if the High Court finds “that there are recognised principles of law governing such a dispute.”<sup>209</sup> In the case of interstate water disputes, the disputing states must have rights that can be enforced against each other.<sup>210</sup>

In formulating the doctrine of equitable apportionment in *Kansas v. Colorado*, the United States Supreme Court did not specifically point to any provision in the U.S. Constitution.<sup>211</sup> Instead, the Supreme Court determined that the underlying framework of the U.S. Constitution created equality between all the states of America.<sup>212</sup> In the 1970s, Ian Renard, an Australian legal scholar, took a similar approach but with the Australian Constitution. Renard argued the Australian High Court could apply a doctrine similar to equitable apportionment, called “reasonable use,” by using the underlying foundation of the Australian Federation to determine that states have equal rights against each other.<sup>213</sup> However, given the High Court's pivot towards textualism, Adam Webster, a more recent Australian legal scholar who has written extensively on Australian interstate water disputes, determined that the High Court would not imply an

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<sup>204</sup> *Id.*; see generally Rebecca Lefler, *A Comparison of Comparison: Use of Foreign Case Law as Persuasive Authority by the United States Supreme Court, the Supreme Court of Canada, and the High Court of Australia*, 11 S. CAL. INTERDISC. L.J. 165 (2001).

<sup>205</sup> See Webster – *Sharing Water*, *supra* note 31, at 265–66.

<sup>206</sup> WEBSTER – DEFINING RIGHTS, *supra* note 75, at 195.

<sup>207</sup> *Australian Constitution* s 75(iv).

<sup>208</sup> WEBSTER – DEFINING RIGHTS, *supra* note 75, at 195.

<sup>209</sup> *Id.*

<sup>210</sup> *Id.*

<sup>211</sup> *Id.*; see *Kansas v. Colorado*, 206 U.S. at 46.

<sup>212</sup> See *id.* at 95–100.

<sup>213</sup> Ian Renard, *Australian Inter-State Common Law*, 4 FED. L. REV. 87, 97–98. (1970).

equality of states merely from the foundation of the Australian Federation.<sup>214</sup> Rather, the High Court would have to point to specific provisions in the Australian Constitution in settling interstate water disputes.<sup>215</sup>

There are a few provisions in the Australian Constitution that suggest an equality of rights between the states.<sup>216</sup> For example, Section 7 requires all states have equal representation in the Senate.<sup>217</sup> Section 92 requires all trade between states be on equal grounds and that states cannot impose duties on other states.<sup>218</sup> Sections 99 and 102 prevent the Commonwealth from giving preference to any state in passing laws regarding trade and commerce.<sup>219</sup> Webster postulates that the provisions, when read together, could imply a basis for the High Court to resolve an interstate dispute under the idea that all states are equal.<sup>220</sup> South Australia has often asserted an equality of states when it accuses upstream states of taking more than their fair portion of the Murray River.<sup>221</sup> However, Webster argues that instead of implying an equality of rights between states, an extension of Australia's implied intergovernmental immunities doctrine provides a sounder basis for the High Court to resolve an interstate dispute.

The implied intergovernmental immunities doctrine in Australia protects the states from the Commonwealth government overreaching its delineated powers.<sup>222</sup> The doctrine finds its roots in Chapter V of the Australian Constitution which preserved state constitutions after federation.<sup>223</sup> Subsequent High Court cases have clarified that Chapter V extends to protect certain functions of state governments from interference by the Commonwealth government.<sup>224</sup>

Webster's argument requires the High Court to extend the implied intergovernmental immunities doctrine in two respects. First, the argument requires the High Court to extend the doctrine to apply against state actions that interfere with other states, not just Commonwealth actions that interfere with the

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<sup>214</sup> WEBSTER – DEFINING RIGHTS, *supra* note 75, at 195.

<sup>215</sup> Webster – *Sharing Water*, *supra* note 31.

<sup>216</sup> *Id.*

<sup>217</sup> *Australian Constitution* s 7.

<sup>218</sup> *Id.* s 92.

<sup>219</sup> *Id.* ss 99, 102.

<sup>220</sup> WEBSTER – DEFINING RIGHTS, *supra* note 75, at 252–58.

<sup>221</sup> *Id.* at 247.

<sup>222</sup> *Id.* at 260.

<sup>223</sup> *Id.*

<sup>224</sup> *Id.* at 260–63.

states.<sup>225</sup> To extend the doctrine to state actions, Webster argues Chapter V of the constitution requires the intergovernmental immunities doctrine to apply to interstate activity:

If the basis for the immunities doctrine is to ensure the co-existence and continued existence of the States, there would be no bar to the same principle supporting the application of the immunities doctrine *between* States. The purpose of the immunities doctrine is to prohibit the Commonwealth interfering with the essential working of the States. The co-existence is not just the Commonwealth with the States but must also be the States with each other. If the legislative and executive power of the Commonwealth must be limited so as not to interfere with the continued existence of the States, then the legislative and executive power of each State must equally be limited to maintain the continued existence of the other States, and one State must not interfere with the essential workings of another state.<sup>226</sup>

Essentially, Webster's argument says that, if a state is protected from intrusions by the Commonwealth, it should also be protected from intrusions by other states.<sup>227</sup>

Second, the argument requires the High Court to broaden the protections provided by the implied intergovernmental immunities doctrine.<sup>228</sup> In its current form, the doctrine protects essential functions of government, such as the state's legislature. Webster argues the doctrine could be extended to protect the people of one state because without people to vote, that state's legislature could not exist.<sup>229</sup> A legislature requires voting, which requires people, and people require water. Thus, overuse of a given interstate water supply by another state would violate this extended version of the immunities doctrine because water is a necessity for people to live. and people are necessary for the legislature.<sup>230</sup>

The drawback of this approach is that it does not recognize the equality of states, just the "continued existence" of the states, which requires a higher threshold of harm before the High Court can grant relief.<sup>231</sup> Therefore, a state

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<sup>225</sup> *Id.* at 264.

<sup>226</sup> *Id.* at 266.

<sup>227</sup> *Id.*

<sup>228</sup> *Id.* at 264.

<sup>229</sup> *Id.* at 269. Webster argues that the doctrine could protect other things that are essential to the existence of a government such as trade. *Id.*

<sup>230</sup> *Id.* at 267.

<sup>231</sup> *Id.* at 273.

seeking relief may not be entitled to a “reasonable share” or an equitable portion.<sup>232</sup> It may only be entitled to enough water to continue its existence.<sup>233</sup>

Whether the High Court agrees with Ian Renard and the equality of states or Adam Webster and the extended implied intergovernmental immunities doctrine remains to be seen. Either way, there is a possible route of relief for Australian states experiencing negative effects of water overuse in other states.<sup>234</sup> Notably, throughout the history of Australia both, during its time as a colony and after independence, South Australia has had difficulty asserting its rights to the Murray-Darling River Basin.<sup>235</sup> The lack of clarity of South Australia’s rights has resulted in longstanding disputes over the waters of the Murray-Darling.<sup>236</sup> If these interstate disputes extend to an interstate groundwater resource such as the Murray-Darling’s alluvial aquifers or the Great Artesian Basin, the High Court must be prepared to provide relief to ensure the well-being of the states and its citizens. U.S. Supreme Court jurisprudence can help in this endeavor.

#### IV. ISSUES OF PROOF AND FACT-FINDING IN INTERSTATE WATER LITIGATION

Litigating water disputes is a fact-intensive endeavor requiring expert analysis, studies, and information gathering.<sup>237</sup> In litigating over surface water, courts often must determine how much water flows through a river which requires extensive metering and information gathering infrastructure.<sup>238</sup> Flow analysis of groundwater is even more difficult.<sup>239</sup> The Texas Supreme Court described groundwater as “mysterious, secret, and occult.”<sup>240</sup> In an interstate water dispute over groundwater, the burden of proof the Australian High Court sets and how facts are gathered could make or break a case.<sup>241</sup>

##### A. *Burden of Proof*

In the United States, the Supreme Court requires that a state asking for equitable apportionment prove with “clear and convincing evidence” that the

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<sup>232</sup> *Id.*

<sup>233</sup> *Id.*

<sup>234</sup> See *supra* notes 208–225 and accompanying text.

<sup>235</sup> Webster – *Colonial History*, *supra* note 76, at 25–40.

<sup>236</sup> *Id.*

<sup>237</sup> Griggs, *supra* note 58, at 181.

<sup>238</sup> *Id.* at 175–80.

<sup>239</sup> *Id.* at 181.

<sup>240</sup> *Houston & T.C. Ry. Co. v. East*, 98 Tex. 146, 149 (1904).

<sup>241</sup> See, e.g., *Florida v. Georgia*, 141 S. Ct. at 1175.

defendant state is threatening “an invasion of rights... of serious magnitude.”<sup>242</sup> The plaintiff state is required to “place in the ultimate factfinder [the Supreme Court] an abiding conviction that the truth of its factual contentions are ‘highly probable.’”<sup>243</sup> The high burden of proof has precluded many cases from equitable apportionment.<sup>244</sup>

In one example, Florida was precluded from equitable apportionment in a recent case in which it asked the Supreme Court for equitable apportionment against Georgia.<sup>245</sup> The case stemmed from an increase in salinity in the waters where oyster beds are located, which caused Florida’s oyster population to decline.<sup>246</sup> Increased water salinity can come from decreased river flow because, with less river flow, the salt in the water is more concentrated.<sup>247</sup> Florida alleged that water diverted by Atlanta and other parts of Georgia reduced the flow in the Apalachicola-Chattahoochee-Flint Basin, thus causing the salinity in the downstream oyster beds to increase and the oysters to die.<sup>248</sup> However, the Supreme Court held, “Florida has not shown that it is ‘highly probable’ that Georgia’s alleged overconsumption played more than a trivial role in the collapse of Florida’s oyster fisheries.”<sup>249</sup> There were many other intervening factors that potentially affected the salinity of the oyster beds, such as the diversion of water by the Army Corps of Engineers and Florida’s own overfishing.<sup>250</sup>

The same fate befell Washington in 1936.<sup>251</sup> Washington did not present clear and convincing evidence that the water extracted by Oregon residents would have otherwise made its way to streams in Washington.<sup>252</sup> Modern knowledge of the inner workings of groundwater may have benefited Washington’s case, but even with today’s technology, a causal relationship between the wells in Oregon and rivers in Washington would have been difficult to establish under the heightened burden of proof.<sup>253</sup>

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<sup>242</sup> *Id.*

<sup>243</sup> *Id.* (citing *Colorado v. New Mexico*, 467 U.S. 310, 316 (1984)).

<sup>244</sup> *See id.*

<sup>245</sup> *Id.*

<sup>246</sup> *Id.*

<sup>247</sup> *See id.*

<sup>248</sup> *Id.*

<sup>249</sup> *Id.* at 7.

<sup>250</sup> *Id.* at 2, 5–6.

<sup>251</sup> *See supra* notes 67–72 and accompanying text.

<sup>252</sup> *Washington v. Oregon*, 297 U.S. at 525–26.

<sup>253</sup> *See Griggs, supra* note 58, at 181.

The high burden of proof required by the Supreme Court is attributable to the identity of the litigants.<sup>254</sup> The ramifications of a ruling between two states have the potential to affect millions of people.<sup>255</sup> If the Supreme Court does not make the right decision, it risks harming the people that depend on the water source in question.<sup>256</sup> The stakes are even higher in cases that involve water sources running through many states and crossing international borders. For example, the Colorado River, which has been the subject of multiple Supreme Court cases, provides water to forty million people, industries such as California's agricultural industry, and northern Mexico.<sup>257</sup>

Groundwater use has been replacing that of surface water, making the stakes of groundwater disputes just as high.<sup>258</sup> Exemplifying this phenomenon are the disputes between Florida and Georgia and between Mississippi and Tennessee. Florida's and Georgia's litigation is largely a result of irrigators in Southwest Georgia extracting groundwater from aquifers that contribute to the Apalachicola River flowing to Florida.<sup>259</sup> Agriculture in Georgia is a multi-billion dollar industry and helps feed millions of people.<sup>260</sup> In the Mississippi-Tennessee dispute, the water supply of the City of Memphis depends on groundwater from the Middle Claiborne Aquifer.<sup>261</sup> Reallocation of groundwater in Georgia and Memphis would affect the lives of millions of people and entire economies. The Supreme Court rightly requires a high burden of proof to prevent disrupting people's lives and the economy without being supported by sufficient evidence.

Like the United States Supreme Court, the Australian High Court should also employ a high burden of proof in potential Australian interstate litigation because of the importance of water supplies in Australia. Similar to the Colorado

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<sup>254</sup> E. Tate Crymes, *Who Gets the Drought: The Standard of Causation Necessary in Cases of Equitable Apportionment*, 73 MERCER L. REV. 423, 425–26 (2021).

<sup>255</sup> *See id.*

<sup>256</sup> *See id.*

<sup>257</sup> Abraham Lustgarten, *40 Million People Rely on the Colorado River. It's Drying Up Fast*, PROPUBLICA (Aug. 27, 2021), <https://www.propublica.org/article/40-million-people-rely-on-the-colorado-river-its-drying-up-fast>.

<sup>258</sup> Griggs, *supra* note 58, at 158.

<sup>259</sup> *Florida v. Georgia*, 141 S. Ct. at 1178; Tamar Hallerman, *Your Guide to the Florida-Georgia Supreme Court Water Case*, ATLANTA JOURNAL-CONSTITUTION (Apr. 1, 2021), <https://www.ajc.com/news/business/your-guide-to-the-florida-georgia-supreme-court-water-case/7GJK5JCAOZF65JR7G35BJRHXD1/>.

<sup>260</sup> William Flatt, *Agriculture in Georgia*, NEW GA. ENCYC. (2022), <https://www.georgiaencyclopedia.org/articles/business-economy/agriculture-in-georgia-overview/>.

<sup>261</sup> *See Charlier, supra* note 101.

River, Australia's water sources provide resources to people and infrastructure throughout the country. For example, the Murray-Darling River Basin provides water for about 3.6 million people in Australia.<sup>262</sup> In addition, groundwater in the Great Artesian Basin provides water for livestock and mining, and is the only reliable source of water for many Australians.<sup>263</sup> Before the Australian High Court disrupts the current regimes of allocating these resources, it must be certain the state asking for relief provides extensive evidence of a causal relationship between the actions of the defendant and the injury.

### B. *Fact-Finding and the Special Master*

Because water is an essential resource that affects people and industries across Australia, proper fact-finding methods are essential to interstate water litigation.<sup>264</sup> In the United States, the Supreme Court acts as the trial court when it exercises its original jurisdiction.<sup>265</sup> Although the Supreme Court has original jurisdiction, the Justices do not have the expertise or time to gather all the facts necessary to decide a case over an interstate water resource.<sup>266</sup> Instead, the Supreme Court appoints a Special Master to gather facts and make initial determinations regarding a dispute.<sup>267</sup> The appointee of the position is often a federal judge or a lawyer with experience in the area of law in question.<sup>268</sup>

The Special Master's role is essential for the Justices of the Supreme Court to receive the relevant information required to accurately assess the situation between litigant states.<sup>269</sup> The duty of the Special Master is perhaps even more important when groundwater is involved because determining how much water is in an aquifer requires the highly technical process of groundwater modeling.<sup>270</sup> "Groundwater modeling has proven to be the most difficult and contentious

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<sup>262</sup> 2020 Basin Plan Evaluation, MURRAY-DARLING BASIN AUTH. <https://www.mdba.gov.au/2020-basin-plan-evaluation> (last visited Feb. 16, 2022).

<sup>263</sup> Australian Dep't of Agriculture, *Water and the Environment, Great Artesian Basin*, <https://www.awe.gov.au/water/policy/national/great-artesian-basin> (last updated Dec. 21, 2021).

<sup>264</sup> See *supra* notes 245–247 and accompanying text.

<sup>265</sup> Anne-Marie Carstens, *Lurking in the Shadow of Judicial Process: Special Masters in the Supreme Court's Original Jurisdiction Cases*, 86 MINN. L. REV. 625, 625–30 (2002).

<sup>266</sup> *Id.* at 627.

<sup>267</sup> *Id.*

<sup>268</sup> *Id.* at 644. In the recent *Mississippi v. Tennessee* case, the Special Master was Eugene Siler Jr., a judge on the Court of Appeals on the Sixth Circuit. Report of the Special Master, *supra* note 102, at 15.

<sup>269</sup> See Carstens, *supra* note 265, at 625–27.

<sup>270</sup> See *Metering and Measurement*, GOV. W. AUSTL. <https://www.water.wa.gov.au/licensing/metering-and-measurement> (last visited Feb. 16, 2022). Unlike groundwater, surface water can be metered to show how much water is flowing in a river. Metering requires extensive infrastructure but is more straightforward than groundwater modeling. See *id.*

component of an interstate water case.”<sup>271</sup> Often a battle between expert witnesses occurs when states disagree over what type of groundwater modeling method should be employed in litigation.<sup>272</sup> Having a Special Master in place can ensure the states are able to come to an agreement. For example, in *Texas v. New Mexico*, when the two litigating states could not agree over groundwater modeling, the Special Master persuaded the litigants to agree on a modeling approach by threatening to use his own model.<sup>273</sup>

Like the United States, the Australian High Court has original jurisdiction over a dispute between states and thus will be the court of first instance<sup>274</sup> and will likely require the equivalent of a Special Master to facilitate fact-finding. The High Court Justices, like the U.S. Supreme Court Justices, do not have the expertise or time to learn everything about a given interstate water dispute, so outsourcing the responsibility to a capable party is essential. Additionally, an interstate groundwater dispute in Australia would inevitably lead to disagreements over which groundwater modeling method would be employed. Choosing a capable Special Master is a step toward ensuring the Australian High Court has the right facts and can make the right decision.

### C. *Interconnectivity of Groundwater and Surface Water*

Recognizing the interconnectivity of groundwater and surface water is critical in disputes where the extraction of one type of water affects the flow of another type of water. For example, groundwater extraction often affects the flow of surface water. Likewise, the diversion of surface water can affect the flow of groundwater. Lack of recognition could potentially result in an injured party not being able to obtain relief.<sup>275</sup>

The groundwater-surface water connection is essential in U.S. Supreme Court jurisprudence. One case, *Kansas v. Nebraska*, involved an interstate compact.<sup>276</sup> The interstate compact was enacted in 1943 as an agreement between Kansas, Nebraska, and Colorado over the allocation of the Republican River.<sup>277</sup> The language of the compact did not specify whether its terms applied

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<sup>271</sup> Griggs, *supra* note 58, at 181.

<sup>272</sup> *Id.* at 181–84.

<sup>273</sup> *Id.*

<sup>274</sup> *Australian Constitution* s 75(iv).

<sup>275</sup> *See id.*

<sup>276</sup> *Kansas v. Nebraska*, 574 U.S. at 445.

<sup>277</sup> *Id.*



to groundwater.<sup>278</sup> Kansas argued the compact covered groundwater because of the effect the groundwater had on the river, while Nebraska argued to the contrary.<sup>279</sup> The Supreme Court ultimately determined that the Republican River Compact extended to groundwater, thus recognizing groundwater-surface water interconnectivity.<sup>280</sup> Similar cases can be found throughout the 20<sup>th</sup> century as groundwater extraction replaced surface water as the main source for irrigation.<sup>281</sup> The Supreme Court, in many of these cases, ensured that downstream users were not precluded from relief just because upstream users obtained the water from the ground rather than the surface.<sup>282</sup>

In Australia, a prominent example of groundwater-surface water interconnectivity is in the Murray River, which is connected to alluvial aquifers.<sup>283</sup> Upstream farmers in NSW could extract groundwater from the alluvial aquifers that later affect downstream users in South Australia.<sup>284</sup> If the High Court does not recognize a connection between the alluvial aquifers and the Murray River, the causal chain from water diversions by upstream irrigators to South Australians would not be established.<sup>285</sup> Consequently, South Australians would be out of luck in obtaining relief from overuse by upstream users.

Luckily, recognizing the interconnectivity of groundwater and surface water has not been an area in which Australia is lacking and is arguably ahead of the United States.<sup>286</sup> For example, groundwater and surface water in the Murray-Darling River Basin are both managed by the same regulations and subject to similar rules under the *Water Act 2007* and the Basin Plan.<sup>287</sup> If Australia's regulatory scheme is any indication, the High Court will recognize the connection.

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<sup>278</sup> *Id.*

<sup>279</sup> *Id.*

<sup>280</sup> *See id.*

<sup>281</sup> *See* Griggs, *supra* note 58, at 166–68.

<sup>282</sup> *See id.*

<sup>283</sup> *See* *Groundwater – Alluvial Areas Map*, MURRAY-DARLING BASIN AUTH. <https://www.mdba.gov.au/publications/products/groundwater-alluvial-areas-map> (last visited Feb. 15, 2022).

<sup>284</sup> *See id.*

<sup>285</sup> *See id.*

<sup>286</sup> *See* National Water Initiative (2004) (Cth) (Austl.).

<sup>287</sup> *Water Act 2007* (Cth) (Austl.); Basin Plan 2016 (Cth) (Austl.).

## V. INTRASTATE WATER ALLOCATION IN INTERSTATE DISPUTES

Many interstate disputes stem from Australia's intrastate water administration. This phenomenon is exemplified in the Murray-Darling River Basin, where the lack of enforcement of water allocation limits by upstream states, such as Queensland, NSW, and Victoria led to diminished flows into South Australia.<sup>288</sup> A similar situation could be occurring in Australia's aquifers such as those in the Great Artesian Basin.<sup>289</sup> Thus, the United States Supreme Court's consideration of intrastate water allocation should be adopted by the Australian High Court to incentivize the enforcement of water allocation limits.

### A. *Intrastate Water Allocation in the Development of Interstate Disputes*

Each state in the United States has its own groundwater allocation regime.<sup>290</sup> Some states rely on judicial rules, while other states created regulatory regimes that supplement or significantly replace judicial allocation.<sup>291</sup> The effectiveness, or lack thereof, of a state's groundwater allocation regime can lead to overuse or misallocation.<sup>292</sup> Not only does overuse have ramifications on other users within the state, but it can also affect the water supply of users in other states.<sup>293</sup> If the overuse is large enough, it could lead to interstate litigation.<sup>294</sup>

For example, in the Washington-Oregon dispute in the 1930s,<sup>295</sup> Washington and Oregon both followed the rule of prior appropriation.<sup>296</sup> The rule determines the priority of a water use based on when the use began.<sup>297</sup> Part of the issue in *Washington v. Oregon* was that Oregon had not recognized the priority that the Washington Supreme Court had assigned to some water users in Washington.<sup>298</sup> The Oregon court's lack of recognition of Washington's users led to interstate litigation.<sup>299</sup>

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<sup>288</sup> *See id.*

<sup>289</sup> *See supra* notes 168–176 and accompanying text.

<sup>290</sup> Dellapenna, *supra* note 9, at 71.

<sup>291</sup> *Id.*

<sup>292</sup> *Id.*

<sup>293</sup> *See supra* Section IV.C.

<sup>294</sup> *See, e.g., Mississippi v. Tennessee*, 142 S. Ct. at 40.

<sup>295</sup> *Supra* notes 67–72 and accompanying text.

<sup>296</sup> *Id.*

<sup>297</sup> *Washington v. Oregon*, 297 U.S. at 521.

<sup>298</sup> *Id.*

<sup>299</sup> *See id.*

Additionally, in a brewing dispute between Texas and New Mexico, Texas's loose groundwater allocation rules are leading to groundwater depletion in New Mexico.<sup>300</sup> In 2020, the Supreme Court decided a case between Texas and New Mexico regarding allocation of the Rio Grande River, but the two states are gearing up to litigate again over groundwater in the Pecos Valley Aquifer.<sup>301</sup> The dispute stems from groundwater use in hydraulic fracturing (fracking) operations by oil companies in New Mexico.<sup>302</sup> Because New Mexico has stricter groundwater regulations than Texas, the oil companies can extract more groundwater at a lower price in Texas.<sup>303</sup> The oil companies have been going south into Texas, extracting the groundwater from the portion of the Pecos Valley Aquifer, and then shipping the water back north into New Mexico for their fracking operations.<sup>304</sup> The amount of water the oil companies extract in Texas is starting to deplete the groundwater in the Pecos Valley Aquifer in New Mexico.<sup>305</sup>

Texas follows the rule of capture (also known as the absolute dominion rule), which allows a landowner to extract groundwater under his property regardless of the effect it has on the landowner's neighbors.<sup>306</sup> Texas limits the rule of capture to reasonable use, but a landowner can "reasonably use" all of the groundwater in an aquifer.<sup>307</sup> Later cases in Texas have not done much, if anything, to reign in a landowner's ability to extract an excessive amount of water from an aquifer.<sup>308</sup> Texas supplemented the rule of capture with regulatory permits, but the permits only cover some groundwater in Texas and failed to prevent oil companies from extracting the groundwater in the Pecos Valley Aquifer.<sup>309</sup> Consequently, a dispute caused by intrastate groundwater allocation in Texas could result in further interstate litigation between Texas and New Mexico.<sup>310</sup>

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<sup>300</sup> Kameron B. Smith, *Subsurface Tension: The Conflicting Laws of Texas and New Mexico over Shared Groundwater and New Mexico's Desire for Regulation*, 7 TEX. A&M L. REV. 453, 455 (2020).

<sup>301</sup> *Id.*

<sup>302</sup> *Id.*

<sup>303</sup> *Id.*

<sup>304</sup> *Id.*

<sup>305</sup> *Id.*

<sup>306</sup> *Id.* at 457; Dellapenna, *supra* note 9, at 271.

<sup>307</sup> Smith, *supra* note 300, at 458 (citing *Houston & T.C. Ry. Co. v. East*, 81 S.W. 279, 280 (Tex. 1904)).

<sup>308</sup> *Id.*; see also *Edwards Aquifer Authority v. Day*, 369 S.W.3d 814, 831 (Tex. 2012) (the Texas Supreme Court treated ownership of groundwater as analogous to ownership of oil and gas in the ground).

<sup>309</sup> Smith, *supra* note 300, at 454.

<sup>310</sup> See *id.* at 455.

Unlike the United States, Australia made great efforts in bringing uniformity to intrastate water allocation rules and interstate diversion limits.<sup>311</sup> Unfortunately, Australia has an issue with the enforcement of water allocation rules and diversion limits in the Murray-Darling River Basin.<sup>312</sup> The Commonwealth made inroads to improve the enforcement of diversion limits by creating the position of Inspector-General of Water Compliance and adding additional penalties for unauthorized diversions.<sup>313</sup> It remains to be seen whether these additions will improve enforcement in the Basin, as the position was created in June 2021. If the Inspector-General cannot reign in the Basin states (namely NSW), there could be interstate lawsuits, and the High Court may find itself judging intrastate enforcement practices. This is a challenge but also provides an opportunity to incentivize prudent water management.

### *B. Incentivizing Prudent Water Administration*

Because the High Court may find an opportunity to incentivize prudent intrastate water administration in Australia (such as enforcement of diversion limits), it is informative to examine how the Supreme Court incentivizes prudent water administration. One step the Supreme Court sometimes takes is determining whether the water use by the respective states is wasteful or beneficial.<sup>314</sup> If a state's use is wasteful, it may prevent the state from obtaining an equitable apportionment judgment or decrease the amount of water to which it is entitled.<sup>315</sup>

There is a fine line between wasteful use and beneficial use.<sup>316</sup> Examples of beneficial uses include irrigation and hydroelectric power plants.<sup>317</sup> However, within these uses, there could be waste.<sup>318</sup> For example, a type of irrigation called flood irrigation uses trenches between rows of crops on the surface of the

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<sup>311</sup> Babie et al., *supra* note 14, at 41.

<sup>312</sup> *Basin-Wide Compliance and Enforcement*, MURRAY-DARLING BASIN AUTH. <https://www.mdba.gov.au/basin-plan/basin-wide-compliance-enforcement> (last visited Feb. 16, 2022).

<sup>313</sup> *Water Legislation Amendment (Inspector-General of Water Compliance and Other Measures) Act 2021* (Cth) div 3A (Austl.).

<sup>314</sup> See Bernadette R. Nelson, *Muddy Water Blues: How the Murky Doctrine of Equitable Apportionment Should Be Refined*, 105 IOWA L. REV. 1827, 1847 (2020).

<sup>315</sup> See *id.*

<sup>316</sup> See *id.*

<sup>317</sup> See *id.* Another type of beneficial use is urban consumption which could play a role in a potential *Mississippi v. Tennessee* equitable apportionment. Tennessee uses the Middle Claiborne Aquifer for urban consumption, which generally has priority over the agricultural uses in Mississippi. *Id.*

<sup>318</sup> See *id.*

ground.<sup>319</sup> Because the water is on the surface, it is subject to evaporation which could be considered wasteful despite the fact it is used to water crops.<sup>320</sup> Another example is hydroelectric power plants that use water from a river or stream to generate electricity.<sup>321</sup> Water in hydroelectric power plants heats up as it flows through the power plant, and some power plants cool the water before sending it back into the stream.<sup>322</sup> To cool the water, the power plants evaporate the water in cooling towers which could change an otherwise beneficial use into one more likely to be considered wasteful.<sup>323</sup>

The Supreme Court incentivizes states to improve their water use efficiency by denying relief to states that engage in wasteful or inefficient uses.<sup>324</sup> For example, in *Colorado v. New Mexico*, at issue was whether New Mexico took adequate steps to improve its water use efficiencies.<sup>325</sup> The Special Master and the Supreme Court found that New Mexico did not have an efficient administration of water supplies when compared to other states.<sup>326</sup> However, the Supreme Court precluded relief to Colorado because the evidence did not show that “Colorado ha[d] undertaken reasonable steps to minimize the amount of the diversion that w[as] required.”<sup>327</sup> *Colorado v. New Mexico* signaled to future potential litigants they must take steps to improve their own water use to improve their chances of recovery before the Supreme Court.<sup>328</sup>

The Australian High Court could apply similar tactics to improve enforcement practices. If two states litigate over an interstate water source, State A may argue that State B should be entitled to less water because of its lack of enforcement practices. The High Court could reward State A with more water if it found it had adequate enforcement practices. However, it could deny relief to State A if the High Court found it did not enforce diversion limits. If the

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<sup>319</sup> Water Science School, *Irrigation Methods: Furrow or Flood Irrigation*, U.S. GEOLOGICAL SURV. (June 13, 2018), <https://www.usgs.gov/special-topics/water-science-school/science/irrigation-methods-furrow-or-flood-irrigation>.

<sup>320</sup> See Nelson, *supra* note 314, at 1847.

<sup>321</sup> *Over Half the Cooling Systems at U.S. Electric Power Plants Reuse Water*, U.S. ENERGY INFO. ADMIN. (Nov. 17, 2011) [hereinafter *Cooling Systems*], <https://www.eia.gov/todayinenergy/detail.php>.

<sup>322</sup> *Id.* Power plants could be required to cool water under the Clean Water Act, which defines “heat” as a pollutant under Section 502 of the CWA. *Id.*

<sup>323</sup> *Cooling Systems*, *supra* note 321.

<sup>324</sup> See Heather Elliott, *The Failings of Alabama Water Law*, 68 ALA. L. REV. 759, 783 (2017).

<sup>325</sup> *Colorado v. New Mexico et al.*, 467 U.S. 310, 320 (1984).

<sup>326</sup> *Id.*

<sup>327</sup> *Id.*

<sup>328</sup> See Elliott, *supra* note 324, at 783. Florida and Georgia accused each other of inefficient use when they were litigating over the Chattahoochee. *Id.*

Australian High Court rewarded states with better enforcement practices with more water, states would be more likely to improve their enforcement practices.

#### CONCLUSION

Interstate litigation over Australia's water resources has loomed over Australian states since the enactment of the Australian Constitution and the creation of the High Court.<sup>329</sup> States like South Australia have threatened litigation and have often asserted that they have rights over interstate waters, but these threats and assertions have never been put to the test.<sup>330</sup> The possibility of litigation grows as droughts and growing populations put a strain on Australia's rivers, forcing many Australians to rely on groundwater for consumption and irrigation.<sup>331</sup> Much of this groundwater comes from aquifers that cross state lines or aquifers that are connected to rivers that cross state lines.<sup>332</sup> Thus, disputes over groundwater have flowed from its increased use.<sup>333</sup> If these disputes spill over state lines like those over the Murray River, the Australian High Court should be prepared to rule on a case between two states. Because the High Court has never encountered interstate water litigation, it could look to the jurisprudence of other countries as a guide.<sup>334</sup> The United States Supreme Court has a long history of ruling on interstate water disputes, including those involving groundwater.<sup>335</sup> Therefore, the Supreme Court's jurisprudence could serve as an example for the Australian High Court.

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<sup>329</sup> Webster – *Colonial History*, *supra* note 76.

<sup>330</sup> *Id.*

<sup>331</sup> Perrone, *supra* note 3.

<sup>332</sup> See, e.g., *Great Artesian Basin*, AUSTL. GOV'T, <https://www.awe.gov.au/water/policy/national/great-artesian-basin> (last visited Feb. 4, 2022).

<sup>333</sup> Perrone, *supra* note 3.

<sup>334</sup> See *supra* notes 170–174 and accompanying text.

<sup>335</sup> See *supra* notes 53–60 and accompanying text.