

# IMPORTING SOLUTIONS: HOW CHINESE WATER LAW PRINCIPLES CAN PLUG THE HOLES IN U.S. INTERSTATE WATER CONFLICT RESOLUTION MECHANISMS

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## I. INTRODUCTION

Water is a precious natural resource. It is the spring of life, the blood of industry, and the lifeline of agriculture. Without water, men cannot live or engage in productive activities. Water resources are not inexhaustible. With the growth of industry, agriculture, and the cities, the country's water consumption has increased rapidly. Water shortages are now being felt in areas once abundant in water.<sup>1</sup>

While this quote describes changing conditions in China, it equally describes changing conditions in the United States.<sup>2</sup> Since water covers two thirds of the Earth's surface,<sup>3</sup> it seems an odd assertion that water scarcity presents an increasing challenge. However, most of Earth's water is not usable fresh water.<sup>4</sup> In fact, 97% of Earth's water is ocean salt water.<sup>5</sup> Of the 3% that is fresh water, only 1% is easily accessible as surface fresh water.<sup>6</sup> This leaves only 0.03% of Earth's water for daily uses including human consumption, industrial and agricultural production, irrigation, waste removal, recreation, hydroelectric power generation, and transportation.<sup>7</sup>

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1. Wen Boping, *On the Water Pollution Prevention and Control Law*, 19 CHINESE L. AND GOV'T 50 (1986)(China), reprinted in LESTER ROSS & MITCHELL A. SILK, ENVIRONMENTAL LAW AND POLICY IN THE PEOPLE'S REPUBLIC OF CHINA 122 (1987).

2. See Burke W. Griggs et al., *Comparative Water Law and Management: the Yellow River Basin in Western China and the State of Kansas in the Western United States*, 18 KAN. J.L. & PUB. POL'Y 428, 428-29 (2009)(discussing the similarities between Chinese and U.S. water allocation issues).

3. J.S. Wallace et al., *The Sharing of Water Between Society and Ecosystems: from Conflict to Catchment-based Co-Management*, 358 PHIL. TRANSACTIONS: BIOL. SCI. 2011, 2011 (Nov. 17, 2003) (U.K.), available at <http://rstb.royalsocietypublishing.org/content/358/1440/2011.full.pdf+html>.

4. Gwyn Prins, *Water, Water, Everywhere . . .*, 56 THE WORLD TODAY 4, 5 (2000) (U.K.).

5. *Id.*

6. See *id.* (noting that Earth's fresh water is 79% frozen water and 20% ground water); see also Robert B. Jackson et al., *Water in a Changing World*, 11 ECOL. APPL. 1027, 1028-29 (2001)(estimating that Earth's water is only 3% fresh water and that less than 0.01% of the total water is found in fresh water lakes and rivers).

7. Jackson, *supra* note 6, at 1028.

As a result of surface fresh water's geography, over 1.1 billion people throughout the world do not have access to safe drinking water.<sup>8</sup> By comparison, the United States is relatively water abundant and has done an exceptional job of providing reliably safe drinking water to nearly 100% of the population.<sup>9</sup> The United States spends approximately \$36 billion every year on public drinking water<sup>10</sup> and an additional \$4 billion every year on bottled water.<sup>11</sup> In spite of these staggering expenditures, fresh water is a finite resource and the water supply throughout the country is becoming increasingly strained, especially on a regional basis.<sup>12</sup>

Many scholars have written about global climate change and the negative impact on global water supplies.<sup>13</sup> However, many other factors will likely impact water supplies even more than any change in the global climate. The growth in U.S. population and the extension of public drinking water to nearly the entire country has taken a toll. In 2001, after completing a survey of public water utilities' infrastructures, the Environmental Protection Agency concluded that public utilities needed to increase investments by \$151 billion to maintain existing infrastructures.<sup>14</sup> Degrading infrastructure alone is responsible for losses of up to 25% of the drinking water through leaks during delivery to the final customer.<sup>15</sup>

Once it reaches the public, American consumption of water per capita greatly exceeds that of other developed countries.<sup>16</sup> Large population shifts to arid areas also puts additional stress on the system, especially the regional systems where the water supply cannot naturally support the population size.<sup>17</sup> Other factors, which vary by region throughout the country, contribute to increasing water scarcity, including artificially-suppressed water pricing, revenue disposition, and inefficient industry ownership structures.<sup>18</sup>

Regardless of water scarcity's specific cause in any particular region, as water

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8. *Id.*

9. Ronnie B. Levin et al., *U.S. Drinking Water Challenges in the Twenty-First Century*, 110 ENVTL. HEALTH PERSP. 43, 43 (2002).

10. *Id.*

11. *Bottled Water: Pure Drink or Pure Hype?* - Executive Summary, NATURAL RES. DEF. COUNCIL, <http://www.nrdc.org/water/drinking/bw/exesum.asp> (last visited Feb. 28, 2013).

12. Levin, *supra* note 9, at 43.

13. See generally Peter H. Gleick, *The Effects of Future Climatic Changes on International Water Resources: the Colorado River, the United States, and Mexico*, 21 POL'Y SCI. 23, 30-37 (1988)(Neth.); Jackson, *supra* note 6, at 1036-38; Levin, *supra* note 9, at 45-46; Prins, *supra* note 4, at 5-6.

14. Levin, *supra* note 9, at 43 (citing U.S. ENVTL. PROTECTION AGENCY, DRINKING WATER INFRASTRUCTURE NEEDS SURVEY, EPA-816-R-01-004 (2001), [http://www.epa.gov/ogwdw/needssurvey/pdfs/2001/report\\_needssurvey\\_2001.pdf](http://www.epa.gov/ogwdw/needssurvey/pdfs/2001/report_needssurvey_2001.pdf) (last visited Jan. 22, 2012)).

15. *Id.* at 44.

16. Americans use an estimated 382 liters of water per person each day compared with only 129 liters in Germany, 153 liters in the United Kingdom, and 156 liters in France. *Id.* at 44.

17. *Id.* at 47-48.

18. For a more detailed analysis of water utilities in the United States and the issues leading to current and future water scarcity, see *id.* at 43-50.

supplies decrease, states that depend on shared water sources are destined to find an increase in water conflicts. All forty-eight continental U.S. states share at least one water source with at least one other state.<sup>19</sup> When two or more states share a water source, they need to coordinate efforts to determine the amount of water each state will draw from the shared water source. When coordination efforts break down, states have three mechanisms to resolve interstate water conflicts: litigating in the U.S. Supreme Court, negotiating interstate compacts, and seeking enactment of federal legislation.<sup>20</sup>

The three mechanisms for resolving interstate water conflicts have major drawbacks that will continue to erode the effectiveness of each one as water sources become increasingly scarce. All three mechanisms lack effective means of enforcement, ultimately failing to resolve interstate water conflicts with any degree of certainty.<sup>21</sup> Supreme Court litigation leading to equitable apportionment decisions, which can take years to reach,<sup>22</sup> relies on the upstream state's compliance with the terms. If the upstream state fails to comply, then the downstream state must, once again, resort back to litigation to enforce compliance. Furthermore, equitable apportionment decisions can be altered by either an interstate compact or federal legislation.<sup>23</sup> Interstate compacts, even after negotiation and ratification, are frequently litigated in the Supreme Court due to non-compliance.<sup>24</sup> Federal legislation regarding shared water sources is also often litigated and can be altered by a subsequent interstate compact.<sup>25</sup> Whichever mechanism states choose to resolve their interstate conflicts, a disgruntled state can always challenge the initial resolution or simply fall out of compliance with the resolution. No mechanisms allow for immediate enforcement, only subsequent litigation seeking damages and compliance with whichever mechanism was initially used to resolve the interstate water conflict.

In addition to problems with enforceability, each mechanism has other weaknesses, both in general and in terms of future applicability to interstate water conflicts as water scarcity increases. For a variety of reasons, the mechanisms are already strained in their ability to resolve interstate water conflicts because of the pressure resulting from increasing tensions over water source depletion. The increase in interstate water conflicts in recent history, and the foreseeable continued increase, makes it likely that the tensions will only further strain the

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19. George William Sherk, *The Management of Interstate Water Conflicts in the Twenty-First Century: Is it Time to Call Uncle?*, 12 N.Y.U. ENVTL. L.J. 764, 765 (2005).

20. *Id.*

21. See Sherk, *supra* note 19, at 765 n.2 (analogizing interstate water conflicts to volcanoes: "Sometimes they are active, sometimes they are dormant, but they are *always* volcanoes.").

22. See Griggs, *supra* note 2, at 446 (discussing Kansas's suit against Colorado which resulted in an award for damages after twenty years of litigation).

23. In fact, the Court will only apply equitable apportionment in the absence of any applicable federal legislation. *Arizona v. California*, 373 U.S. 546 (1963).

24. Griggs, *supra* note 2, at 446.

25. Once approved by the states which are parties to the compact, Congress must ratify the compact. U.S. CONST. art. I, § 10, cl. 3. After approval, the compact becomes federal legislation.

effectiveness of the mechanisms. As a result, all three mechanisms will likely fail to effectively resolve future interstate conflicts.

In order to provide a mechanism for effectively resolving future interstate water conflicts, the United States will need to seriously reexamine and fundamentally alter the existing mechanisms. In particular, by first adopting mechanisms used by China for managing water resources, allocating usage, and resolving disputes, and then adapting those mechanisms to fit within the structure of the U.S. system, the United States will resolve the shortcomings of the current mechanisms and establish more effective, long-term water management practices.

Part II of this Article provides background information on interstate water conflicts. Part III will discuss the three mechanisms currently available to states for resolving interstate water conflicts. The discussion will examine the legal basis of each mechanism; the historical development and prior successes and failures of each mechanism; and the weaknesses of each mechanism that will ultimately lead to its failure to adequately resolve future interstate water conflicts. Part IV will discuss the history and legal basis for mechanisms of water management, usage allocation, and dispute resolution in China; the potential applicability of each mechanism to interstate water conflict resolution in the United States; and the method of adaptability to assist the United States in dealing with future water scarcity and interstate conflict resolution.

## II. BACKGROUND ON INTERSTATE WATER CONFLICTS

States have the right to control the use of water sources located entirely within their own borders in any manner they see fit.<sup>26</sup> Water has a wide range of public uses such as consumption and recreation, as well as commercial uses, such as various industrial and agricultural applications.<sup>27</sup> As discussed in Part I, the pressure on water supplies throughout the United States and the world as a whole is increasing as industrial and agricultural uses expand and development continues. In turn, each state needs more water to satisfy the growing needs of its various water users.

The growing challenge is that water is not an inexhaustible resource and parts of the world—and more recently the United States—are discovering that there may not be enough water to satisfy the needs of all potential users.<sup>28</sup> As cities develop and expand, they need more drinking water. In order to attain greater access to water, a state needs to divert more fresh water from rivers and lakes into its cities. When more water is diverted, less water travels downstream. The upstream diversion creates a tension with downstream water users who also tend to have an increasing thirst for water supplies.

When the clash is between cities within the same state, it is the responsibility

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26. *See Kansas v. Colorado*, 206 U.S. 46, 93 (1907) (“[E]ach state has full jurisdiction over the lands within its borders, including the beds of streams and other waters.”).

27. Michael D. Tauer, *Evolution of the Doctrine of Equitable Apportionment—Mississippi v. Memphis*, 41 U. MEM. L. REV. 897, 898 (2011).

28. Boping, *supra* note 1, at 50.

of the state to handle the conflict resolution,<sup>29</sup> which in itself can be challenging due to the highly political nature of such decisions and the numerous, important competing interests at stake. However, when the clash is over a water source that is located across several states, the conflicts become increasingly difficult to resolve.<sup>30</sup> Some examples in the United States have included conflicts between upstream New York City and downstream New Jersey, Pennsylvania, and Delaware; between upstream Memphis and downstream Mississippi; and between upstream Atlanta and downstream Florida and Alabama.<sup>31</sup>

When one state uses, or plans to use, a water source that is shared with another state, the state downstream currently has several options for addressing its concerns regarding the upstream use of the shared resource. The state can bring suit against the other state in the Supreme Court. The Court is given original jurisdiction in the Constitution over cases where a state is a party,<sup>32</sup> and the Court has regularly exercised this grant of original jurisdiction in conflicts involving shared water resources. A second option is to seek the enactment of legislation in Congress that allocates the shared water resource between the states.<sup>33</sup> The third and final option currently available to a concerned state is to negotiate with the upstream state and sign a contract, known as a compact, which allocates the shared water resource between the states.<sup>34</sup>

Historically, all three options have been pursued by states looking to challenge or prevent the use of a shared water resource by a neighboring state.<sup>35</sup> In some cases, both the litigation and negotiation options have been used to resolve the same conflict before one of the options finally settles the conflict. For example, a state may file suit to enjoin an upstream state from a planned water use.<sup>36</sup> Based on the strength of each state's position, the states will negotiate privately in attempt to settle the conflict before the Court steps in and makes a decision.<sup>37</sup> In other

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29. *Kansas v. Colorado*, 206 U.S. at 93.

30. "State political leaders . . . are often tempted to disobey their compact obligations to other states, rather than face the political consequences of making the unpopular decision to reduce their constituents' water use." Griggs, *supra* note 2, at 446.

31. Atlanta's water system is made up of five different water sources, four of which are shared with neighboring states. Every time Atlanta makes changes to its water management system, disputes inevitably arise between Georgia, Florida, and Alabama. Joseph W. Dellapenna, *Interstate Struggles over Rivers: The Southeastern States and the Struggle over the 'Hooch*, 12 N.Y.U. ENVTL. L.J. 828, 829–30 (2005).

32. U.S. CONST. art. III, § 2, cl. 1.

33. Sherk, *supra* note 19, at 765.

34. *Id.*

35. *Id.*

36. *See, e.g.*, *South Carolina v. North Carolina*, 130 S. Ct. 854, 858–59 (2010) (discussing South Carolina's efforts to enjoin North Carolina's use of the Catawba River in an equitable apportionment action).

37. *See, e.g.*, *North and South Carolina End Water Dispute*, CHARLESTON REG'L BUS. J., Dec. 22, 2010, <http://www.charlestonbusiness.com/news/37392-north-and-south-carolina-end-water-dispute?rss=0> (reporting settlement between South Carolina and North Carolina in equitable apportionment case prior to Court's decision).

cases, the states have sought to negotiate first, only resorting to litigation later when the negotiations break down or one party fails to follow the terms of the negotiated compact.<sup>38</sup>

### III. MECHANISMS FOR INTERSTATE WATER CONFLICT RESOLUTION

#### A. *Equitable Apportionment*

The U.S. Constitution grants the Supreme Court original jurisdiction over cases involving a conflict between two or more states.<sup>39</sup> In addition, the Court also has original jurisdiction over all cases in which the United States is a party.<sup>40</sup> In interstate water conflicts, the typical suit occurs when one state sues another over the right to use a shared water source and the United States joins as an interested party.<sup>41</sup> As far back as 1901, the Court has been involved in settling interstate conflicts over shared water resources.<sup>42</sup>

The first interstate water conflict case in the Supreme Court was *Kansas v. Colorado*, 206 U.S. 46 (1907). Colorado diverted water from the Arkansas River to provide an additional water supply for land that had become arid.<sup>43</sup> Colorado asserted that it had the right to determine the extent of its use of the Arkansas River within its own borders and also claimed the additional diversion was not substantially diminishing the flow of the river as it left the state.<sup>44</sup> Kansas, located downstream from Colorado on the Arkansas River, was concerned about the additional water being diverted and sought to prevent Colorado from diverting the river by asserting “a right to the continuous flow of the waters of the Arkansas River, as that flow existed before any human interference therewith.”<sup>45</sup> The U.S. government, admittedly unable to assert authority under the Commerce Clause in regards to the specific portion of the Arkansas River in question,<sup>46</sup> instead asserted

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38. For example, Georgia, Alabama, and Florida negotiated unsuccessfully for six years before resorting to litigation over the Apalachicola-Chattahoochee-Flint River. Dellapenna, *supra* note 31, at 830–31.

39. U.S. CONST. art. III, § 2, cl. 1 (“The judicial Power shall extend . . . to Controversies between two or more states”).

40. *Id.* (“The judicial Power shall extend . . . to Controversies to which the United States shall be a Party”).

41. In one early example, Kansas sued Colorado and several Colorado corporations over the diversion of the Arkansas River, and the United States joined the suit to assert its claim to authority pursuant to legislation related to projects for reclamation of arid land. *Kansas v. Colorado*, 206 U.S. 46, 85–87.

42. *See id.* at 47–50 (discussing Kansas’s initial suit in May 1901 against Colorado).

43. *Id.*

44. *Id.* at 85.

45. *Id.*

46. Congress has the power to regulate interstate waterways which are navigable, stemming from the Constitution’s grant of power to regulate commerce “among the several States.” U.S. CONST. art. I, § 8, cl. 3. *See, e.g.*, *U.S. v. Rio Grande Dam & Irrigation Co.*, 174 U.S. 690 (1899) (affirming congressional authority to regulate navigable streams under the interstate commerce clause). However, this portion of the Arkansas River was never navigable. *Kansas v. Colorado*, 206 U.S. at 86.

authority under a “duty for legislating for the reclamation of arid lands.”<sup>47</sup> The Court recognized a cause of action stemming from a common law trespass action for the right to the flow of a stream.<sup>48</sup>

In *Kansas v. Colorado*, the Court resolved a water dispute by creating equitable apportionment as the conflict resolution mechanism to be used by federal courts in litigation between states regarding a shared water source.<sup>49</sup> The Court acknowledged that states have absolute power over water sources located entirely within their borders and some power over shared water sources, as long as they do not substantially diminish the neighboring state’s ability to use the shared source.<sup>50</sup> At that point, because any action by one state affects another state, the power to control the water source is no longer absolute.<sup>51</sup>

The rights of one state are equal to the rights of any other state.<sup>52</sup> Therefore, any one state cannot impose its will on another,<sup>53</sup> or claim a stronger right or authority over another state in an interstate transaction.<sup>54</sup> In the realm of interstate water conflicts, this means that one state’s actions cannot have an adverse impact on another state without considering and balancing that impact on the other state. It is not simply a matter of allowing the upstream state to exercise control of the shared water source merely as a result of its advantageous geographical location.

As a result of the equality of rights between states, the Court determined that water in a shared source must be allocated equitably.<sup>55</sup> This did not mean the water would be shared equally by the states or that neither state would be free from injury as a result of the other state’s use of the shared source.<sup>56</sup> Equitable apportionment of the shared water source between the states meant that that the water would be allocated in a way that takes each state’s desired uses into consideration equally.<sup>57</sup> Ultimately, in *Kansas v. Colorado*, the Court found the

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47. *Kansas v. Colorado*, 206 U.S. at 86–89 (rejecting the federal government’s claim of authority over the entire river; limiting it, instead, to authority over the portions of the river specifically affecting the land owned by the government).

48. *Id.* at 85.

49. *Id.* at 117–18.

50. *Id.* at 85 (if the flow of the stream was not substantially diminished, then no cause of action would exist).

51. *Id.* at 95.

52. This principle was established by the Full Faith and Credit Clause of the U.S. Constitution. U.S. CONST. art. IV, § 1.

53. *Kansas v. Colorado*, 206 U.S. at 95 (“Neither state can legislate for, or impose its own policy upon the other.”).

54. *Id.* at 97 (“One cardinal rule, underlying all the relations of the States to each other, is that of equality of right.”).

55. *Id.* at 117–18.

56. *See id.* at 117 (affirming that both states were entitled to the use of the Arkansas).

57. *See id.* (holding that the interests of both states shall be weighed equally when allocating water use between them); *see also* George William Sherk, *Equitable Apportionment After Vermejo: the Demise of a Doctrine*, 29 NAT. RESOURCES J. 565, 567–68 (1989)(discussing how the equitable apportionment, as established in *Kansas v. Colorado*, balances the interest of the competing states in equity when the competing states’ laws and polices conflict).

benefits that Colorado received from the additional diversion of the Arkansas River outweighed the injury to parts of Kansas along the shared border with Colorado.<sup>58</sup> The Court established the basic equitable apportionment mechanism in this case<sup>59</sup> and continued to develop and refine the precise analysis and considerations over time.

In the second interstate water conflict case, the Court determined the precise allocation of water allowed to be taken by the upstream state, with the balance going to the downstream state.<sup>60</sup> In addition, the Court imposed a duty on each state to make reasonable use of the shared water source in such a way as to conserve the source as much as possible,<sup>61</sup> presumably to minimize future impact on the downstream state when the balance of the shared source is lower.<sup>62</sup> In equitable apportionment cases, the Court can determine the precise allocation of water to each state;<sup>63</sup> approve the allocation already taken by the upstream state;<sup>64</sup> or appoint a Special Master to collect evidence and recommend to the Court the most appropriate allocation.<sup>65</sup>

The Court has also established factors to be considered in equitable apportionment cases,<sup>66</sup> including priority of appropriation; physical and climatic conditions; consumptive use of the water source; availability of storage water; effect of upstream wasteful use on downstream states; and relative damages and benefits to upstream areas as compared to downstream areas.<sup>67</sup> The factors established by the Court are a mix of geographical, practical, efficiency, and public policy concerns. In order to prevail in a conflict before the Court, each state must provide extensive scientific and historical data about the use of the shared water source in its state; data on current and future uses that the state seeks to make of the shared source; evidence of efficiencies of its own uses and inefficiencies of the other state's uses; and evidence on how to maximize the benefits to its state and

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58. *Kansas v. Colorado*, 206 U.S. at 117.

59. Sherk, *supra* note 57, at 567.

60. *Wyoming v. Colorado*, 259 U.S. 419, 495–96 (1922)(holding that the downstream state may not allocate more than the available supply minus the upstream state's previous legitimate allocations).

61. *Id.* at 484.

62. Sherk, *supra* note 57, at 567–68.

63. See *Wyoming v. Colorado*, 259 U.S. at 494–95 (using evidence presented to allocate an annual quantity of water to the upstream state); *Nebraska v. Wyoming*, 325 U.S. 46, 117–18 (1907)(using evidence presented to allocate a percentage of total annual flow to the competing states).

64. By denying the claim of a downstream state, the Court is effectively affirming the allocation the upstream state has already taken. See *Kansas v. Colorado*, 206 U.S. 46, 117–18 (1907)(calculating the downstream state's limited water allocation after first finding that the upstream state's allocation was legitimate).

65. Tauer, *supra* note 27, at 910. For examples of using a special master, see *Texas v. New Mexico*, 462 U.S. 554 (1983); *Colorado v. New Mexico*, 459 U.S. 176 (1982); and *New Jersey v. New York*, 283 U.S. 336 (1931).

66. For the Court's discussion of the factors, see *Nebraska v. Wyoming*, 325 U.S. 589, 618–20 (1945).

67. Sherk, *supra* note 57, at 570–71.

minimize the damages to the other state.<sup>68</sup>

For a state to file a claim seeking equitable apportionment of a shared water source, the state must be able to show that the water use by another state caused real or substantial injury or damage to its own territory.<sup>69</sup> The Court requires more than a mere threat or potential for future injury or damage,<sup>70</sup> but rather requires an injury of a serious magnitude that can be established by clear and convincing evidence.<sup>71</sup> In many cases where states have attempted to bring suits against upstream states to prevent current or proposed uses, the Court has found the state has not proven a sufficient injury or damage from the defendant state's uses to even warrant consideration.<sup>72</sup>

This threshold burden on the plaintiff state serves as a deterrent for states to pursue litigation as a means of resolving conflicts because the state has to wait until it actually suffers a real or substantial injury.<sup>73</sup> While it is unclear whether the Court meant to deter states from bringing action, as a practical matter, it is prudent for states to consider negotiating privately in the early stages of a conflict over shared water sources before the situation gets to the point where the injury or damage begins to take its toll.<sup>74</sup> It would not be wise nor in the state's best interests to allow the conflict to ripen to the point of substantial injury and risk allowing that allocation to be upheld in an equitable apportionment action.<sup>75</sup>

The Court went even further and explicitly stated that the preferred mechanism for resolving interstate water conflicts should be the negotiation of interstate compacts.<sup>76</sup> The Supreme Court has stated that interstate water conflicts are "more likely to be wisely solved by cooperative study and by conference and mutual concession on the part of . . . the States . . . than by proceedings in any court."<sup>77</sup> When viewed in conjunction with the increased threshold for getting litigation into the Court, it becomes clear that the Court is directing states towards the interstate compact process when attempting to resolve an interstate water conflict.<sup>78</sup>

After the Court determines that the state bringing the suit has established the

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68. See *Colorado v. Kansas*, 320 U.S. 383, 389–93 (1943)(discussing the factors that influence the apportionment decision).

69. *Sherk*, *supra* note 57, at 565–66.

70. See *Kansas v. Colorado*, 206 U.S. 46, 109 (1907)(stating legal harm alone is not sufficient grounds for relief without a demonstrated significant harm or significant potential benefit to the downstream state).

71. *Connecticut v. Massachusetts*, 282 U.S. 660, 669 (1931).

72. For a discussion of cases dismissed by the Supreme Court for lack of established injury, see *Tauer*, *supra* note 27, at 909–12.

73. *Sherk*, *supra* note 57, at 577.

74. *Id.* at 578.

75. *Id.*

76. *Tauer*, *supra* note 27, at 901 ("The Supreme Court has repeatedly expressed a clear preference for states to resolve these disputes among themselves.")

77. *New York v. New Jersey*, 256 U.S. 296, 313 (1921).

78. *Sherk*, *supra* note 19, at 766–67.

existence of an injury or damage from an upstream use, the Court will then weigh the competing uses of the shared water source. There are many factors the Court examines during the weighing process. States have attempted to argue for consideration of individual state water laws for establishing property rights over water within their state.<sup>79</sup> However, the Court has repeatedly rejected the claims that property right assignment methods used by individual states should control how the Court establishes property rights over interstate water sources.<sup>80</sup> Instead, the Court created the interstate common law to supplant each state's laws governing internal conflicts once the clash moves beyond its own borders.<sup>81</sup>

Equitable apportionment litigation is costly and time-intensive because of the nature of the evidence needed to prevail. Due to the relatively low number of interstate conflicts actually resolved by the Court and the high variability of facts surrounding interstate water conflicts in different parts of the country, litigation before the Court is highly unpredictable.<sup>82</sup> These issues serve as additional deterrents to states considering pursuing litigation as a means to resolve interstate water conflicts.

States still choose to pursue equitable apportionment, in spite of the drawbacks, for several reasons. One reason is that it is the only mechanism of the three which has a guaranteed resolution at the end of the process. If Congress is unwilling to take action to resolve the conflict over a specific shared resource—which is highly likely based on the rarity of congressional action in the past—then the states at least know the decision of the Court will create a clear, distinct, and functional allocation of the water in the shared source with respect to each competing use. Similarly, the third mechanism, private state negotiation, provides no guarantee of an ultimate resolution. Because the negotiating process is highly politicized and each state is looking out for its interests only, when there are insufficient supplies to satisfy all of the potential uses, it is unlikely any state would subordinate its own wellbeing to that of its neighbors. Therefore, even though compacts may be preferable, they may not always be practically achievable.

A second reason states will still pursue Supreme Court litigation is that the compact process may have failed to resolve the conflict adequately.<sup>83</sup> As

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79. For example, Kansas followed the common law riparian rights doctrine for water property rights determination, and Colorado followed the prior appropriation doctrine, both of which were rejected by the Court as controlling the conflict resolution in the case. *Kansas v. Colorado*, 206 U.S. 46, 95–104 (1907).

80. Tauer, *supra* note 27, at 902–06.

81. *Id.*

82. *See id.* at 905–06 (discussing the evidentiary record in *Kansas v. Colorado*, which contained the testimony of 347 witnesses, 122 exhibits, over 8,500 pages, and a great deal of conflict and confusion about the facts).

83. One example is the ongoing dispute between Georgia, Florida, and Alabama over the waters in the Apalachicola-Chattahoochee-Flint River Basin. After an initial onslaught of lawsuits by Alabama and Florida to prevent Georgia from diverting more water into Atlanta, the states agreed to negotiate. After more than six years of negotiations failed to produce a finalized agreement, the states again resorted to litigation. Dellapenna, *supra* note 31, at 830–31.

mentioned above, the practicality of reaching an agreement may not always exist. However, even when an agreement has been reached, one or both of the parties to the compact may nevertheless violate the terms of the agreement due to changed circumstances. In order to get enforcement and damages, the non-breaching state must pursue litigation in the Court.<sup>84</sup> Assuming the compact was properly executed and approved by Congress, the Court's role is to interpret the compact and apply the language of the compact, not to determine how the water source should have been allocated. In this situation, the state's desires are implemented by the Court rather than independently evaluated.

A third reason states will pursue equitable apportionment is to strengthen their bargaining position in the negotiations with their neighboring state. If one state secures a victory in equitable apportionment, then it certainly gives that state the upper hand should the states decide to pursue a compact to change the precise result the Court handed down. Sometimes the threat of litigation before the Court can be enough to get a stubborn state to negotiate more readily with a downstream state that is potentially going to bring a suit against it.

While there are both reasons to pursue and to avoid litigation before the Court seeking equitable apportionment, litigation is unlikely to be useful in resolving future interstate water conflicts for several reasons. First, the Court seems to be deterring states from pursuing litigation and has stated its preference for compact-based resolutions. Second, the decisions of the Supreme Court are less likely to be permanently binding, as both congressional action and interstate compacts approved by Congress take higher legal priority. Third, and perhaps most important, equitable apportionment requires states to suffer too great an injury before bringing litigation and takes too long to resolve the conflict.

As water sources are continually stressed, supplies will become increasingly insufficient to satisfy even the most crucial uses, such as human consumption of drinking water. Litigation's protracted time frame is not ideal to respond to a situation with such important consequences. In addition, the Court expressed that it would be difficult to allocate a shared water source knowing that, no matter how it is apportioned, people in a state or multiple states will be left with an insufficient water supply.<sup>85</sup>

### ***B. Interstate Compacts***

States are free to enter into contracts with one another, subject to approval by Congress.<sup>86</sup> After the states reach an agreement through the negotiation process

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84. See *Kansas v. Colorado*, 206 U.S. at 117–18 (holding that a downstream state may return to litigation to enforce the terms of equitable water allocation).

85. See *Idaho v. Oregon*, 462 U.S. 1017, 1024 (1983) (dismissing Idaho's claim rather than adjudicating it based partially on the fact that the Court did not think it would be possible to allocate the resource in a fair manner).

86. The U.S. Constitution grants the specifically enumerated right to enter into agreement or compact with another state, subject to congressional approval. U.S. CONST. art. I, § 10, cl. 3 ("No State shall, without the Consent of Congress . . . enter into any Agreement or

and sign the resulting compact, it is submitted to Congress for approval.<sup>87</sup> Once these compacts are approved by Congress, they become federal law and are binding on all parties.<sup>88</sup> If the compacts are not approved by Congress, then they are generally interpreted by courts using traditional contract law rather than statutory interpretation methods.<sup>89</sup> Historically, many compacts have been created to resolve interstate water conflicts involving shared sources.<sup>90</sup> Conflicts were most common in the western states, where most of the early compacts were developed.<sup>91</sup> Eastern states also created several significant compacts, including the Great Lakes Compact and the Delaware River Basin Compact.<sup>92</sup>

The recent trend, however, has been away from compacts and toward litigation. Most compacts in the United States related to interstate water conflicts were developed prior to the 1980s.<sup>93</sup> Frequently, compact interpretation and enforcement leads to litigation as well.<sup>94</sup> Although compacts seem to be the most preferable mechanism for resolving interstate conflicts involving shared water sources, the preferences have not translated into increased resolution through compacts.<sup>95</sup>

Compacts are preferable because they allow states to allocate the water in shared sources according to their own desires and needs.<sup>96</sup> Unlike equitable apportionment—where the Court has its own priorities that are used to create the allocation—compacts are driven solely by the states' priorities. While each state must compromise to reach an agreement, compacts are not required to incorporate outside factors or public concerns. The process for forming compacts and the substance of the compact itself are not regulated by federal law.

Compacts are, at least in theory, less costly than litigation and can be accomplished in a much shorter time frame. In addition, compacts provide a much more predictable mechanism for resolving the conflict for all states involved. During the negotiation process, the states discuss possible solutions and proposals before settling on an agreed-upon allocation of the shared water source. This is in stark contrast to litigation, where the states proffer arguments and evidence in support of their position, but the Court has the sole ultimate authority to allocate

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Compact with another State.”).

87. Dellapenna, *supra* note 31, at 832–33.

88. *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92, 104 (1938).

89. Dellapenna, *supra* note 31, at 833.

90. *Id.* at 831.

91. *Id.* at 836.

92. *See id.* at 840–55 (discussing the two compacts in detail).

93. *See id.* at 836 (noting that twenty-two compacts in western states were created between 1925 and 1980 and many of the compacts in western states were enacted prior to 1972).

94. *See, e.g.,* *Virginia v. Maryland*, 540 U.S. 56 (2003); *Texas v. New Mexico*, 482 U.S. 124 (1987); *Texas v. New Mexico*, 462 U.S. 554 (1983); *Arizona v. California*, 373 U.S. 546 (1963); *Hinderlider v. La Plata River & Cherry Creek Ditch Co.*, 304 U.S. 92 (1938).

95. In fact, many of the compacts that were formed are becoming less relevant because they were enacted before groundwater pumping became a serious consideration. *Griggs*, *supra* note 2, at 445–46.

96. Dellapenna, *supra* note 31, at 833–35.

the water however it determines is most equitable. The Court-fashioned solution can often be undesirable for all parties involved.

One major benefit of the compact is that it can supersede any decisions by the Supreme Court in equitable apportionment litigation. Once the compact is agreed upon, it must be approved by Congress to have the force of law.<sup>97</sup> Once approved by Congress, any conflict between states over a shared water source which is governed by a compact is resolved by looking to the language of the compact. The Court evaluates the compact in the same manner as it evaluates other federal statutes—by interpreting and applying the language itself, not by rewriting the language as it sees fit. The Court does not do an independent evaluation of the shared water source allocation as it would in an equitable apportionment case and would not rewrite the compact even if the Court made a contradictory equitable apportionment ruling prior to the formation of the compact.<sup>98</sup>

Ultimately, the compact is preferred by the states because it gives them the most control over their own destiny and the use of the shared water sources.<sup>99</sup> However, the compact is unlikely to be helpful in future interstate water conflicts. The assumption behind the use of the compact is that both states, if they negotiate diligently and with enough political will power, can reach a mutually agreeable solution. If there were simply not enough water to meet the minimum demands of each state, then it is difficult to imagine that one state would willingly surrender and accept an allocation below the minimum required needs of its citizens.<sup>100</sup> Ultimately, the upstream state would have very little incentive to enter into a compact without serious threat of immediate enforcement of federal legislation or equitable apportionment. The only enforcement mechanism for compacts is litigation, which does not resolve disputes quickly.<sup>101</sup>

This problem has already been manifested in the near absence of new compacts over the past forty years. As water supplies have continued to decline, states are becoming more obstinate in their stances and have become more aggressive in their desire to acquire more rights to shared water sources. As water supplies continue to decline in the future, states will only be less willing and less able to find a mutually agreeable solution. While compacts seem to be the most preferred mechanism of resolving conflicts in the future, they seem to be increasingly more difficult to develop because of the increasing tensions surrounding shared water sources.

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97. *Id.* at 833.

98. *See Texas v. New Mexico*, 462 U.S. at 564 (explaining that congressional consent transforms an interstate compact into federal law).

99. *See Dellapenna, supra* note 31, at 832–37 (noting that states prefer compacts because they keep the federal government from managing their water sources and allow them the greatest autonomy in decision making, implementation, and enforcement).

100. *See Griggs, supra* note 2, at 446 (stating that mounting internal political pressure is likely to prevent any state political figures from taking a position detrimental to their own constituents).

101. *Dellapenna, supra* note 31, at 837–38.

### C. Federal Legislation

Federal legislation directed towards allocation of shared water sources or resolution of interstate water conflicts has been quite rare.<sup>102</sup> Congress has not been willing to step in and apportion water from a shared interstate water source. However, many areas of federal legislation have had an indirect impact on how shared water sources can be used. In addition, many federal agencies have responsibility for controlling various aspects of shared water sources.

For example, some scholars have written that the Missouri River may as well be considered some sort of federal river.<sup>103</sup> More than nine different federal agencies have responsibility for different aspects of managing the Missouri River, including the Corps of Engineers, the Bureau of Reclamation, the Western Area Power Administration, the Fish and Wildlife Service, the Environmental Protection Agency, the Bureau of Land Management, the Department of the Interior, the Bureau of Indian Affairs, and the Department of Justice.<sup>104</sup> In attempting to navigate around these agencies with federal authority, state actors must try to resolve significant conflicts with their neighbors without interrupting or usurping federal authority, which is an extremely difficult task.

In some cases, federal legislation in areas related to water sources, like the Clean Water Act and Reclamation Act, have influenced interstate water conflicts, even though the legislation was not specifically directed towards resolving any particular interstate water conflict.<sup>105</sup> States will sometimes pursue litigation seeking enforcement against their neighbors or citing violations by their neighbors under these acts when they cannot provide enough evidence of a real or substantial injury or damage to their own state as a result of state action.<sup>106</sup> While this can be beneficial to states in originating litigation, the same issue of navigating around these federal legislation packages comes into play, thus hampering conflict resolution efforts.

One example of federal legislation complicating interstate water conflict resolution can be found in a conflict between Georgia, Florida, and Alabama over the use of shared water in the Apalachicola-Chattahoochee-Flint River Basin.<sup>107</sup> In this river basin, the field of federal legislation and regulation pertaining to the water usage includes the Rivers and Harbors Acts of 1945 and 1946; the Flood Control Act of 1962; the Federal Power Act; the Clean Water Act; the Endangered Species Act; the Migratory Bird Treaty Act; the Bald and Golden Eagle Protection

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102. See Griggs, *supra* note 2, at 445 (noting that Congress has allocated water through direct legislation in, at most, only two shared water source situations—the Colorado River and the Missouri River).

103. Sherk, *supra* note 19, at 769 (citing JOHN E. THORSON, RIVER OF PROMISE, RIVER OF PERIL: THE POLITICS OF MANAGING THE MISSOURI RIVER, 113–14 (1994)).

104. *Id.*

105. See *id.* at 788–91 (explaining the intentions and requirements of the Clean Water Act).

106. See *Background on Clean Water Cases Before the Supreme Court*, EARTHJUSTICE, <http://earthjustice.org/features/background-on-clean-water-cases-before-the-supreme-court> (last visited March 5, 2013)(describing litigation under the Clean Air Act before the Supreme Court).

107. Sherk, *supra* note 19, at 778–79.

Act; the Marine Mammal Protection Act; the Fish and Wildlife Coordination Act; the Coastal Zone Management Act; and the water requirements of the Chattahoochee River National Recreation Area.<sup>108</sup> With all of this legislation, it becomes almost impossible for states to reach an agreement through an interstate compact because the federal legislation preempts the terms of the compact that contradict tangentially applicable federal legislation.<sup>109</sup>

Overall, this mechanism has not frequently been employed and is unlikely to help in the future. The process for obtaining federal legislation can be just as long as the litigation process and just as unpredictable. While states can influence the outcome through lobbying efforts, it seems equally difficult for Congress to arrive at an equitable allocation solution when there is a shortage of water supplies. In the future, it will become increasingly important and necessary to the resolution of interstate conflicts to have disinterested parties involved in the allocation. Due to the highly politicized atmosphere of Congress and the unwillingness to legislate in this area in the past, it is unlikely to become prevalent in the future.

#### IV. MECHANISMS USED IN CHINA FOR WATER ALLOCATION AND MANAGEMENT

China provides an interesting comparison to the United States in terms of water management. While the two countries are quite different politically and ideologically, the two have a great deal in common when it comes to water scarcity issues.<sup>110</sup> Both countries face water scarcity problems due to extensive irrigation for agriculture; excessive development for consumptive and municipal uses, especially in arid areas; and infrastructure inefficiencies leading to serious waste.<sup>111</sup> In spite of fundamental differences in governmental structures, the United States could benefit by adopting some of the Chinese mechanisms for water allocation and adapting those mechanisms to work within the United States. The Chinese mechanism for water management features two main components: strong, centralized control and an emphasis on conservation and efficiency.<sup>112</sup>

##### A. *Centralized Governmental Control*

###### 1. Chinese system

Dating back as early as the third century B.C., the Chinese government has maintained complete control over water management and resource allocation.<sup>113</sup> China has been able to accomplish incredible internal projects as a result of

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108. *Id.* at 779.

109. *Id.* at 778–81.

110. Griggs, *supra* note 2, at 428–34.

111. *Id.*

112. *Id.* at 430–31; Patricia Wouters et al., *The New Development of Water Law in China*, 7 U. DENV. WATER L. REV. 243, 274–86 (2004).

113. Griggs, *supra* note 2, at 430.

exerting control over the country's water resources.<sup>114</sup> One project, still in use to some extent today, was the construction of the Grand Canal, a series of canals connecting the north and south both socially and economically, and stretching over 1,000 miles in length.<sup>115</sup> Another project required the work of 100 million people for three months and resulted in the irrigation of almost 81,000 square miles of land.<sup>116</sup> A final example is China's Three Gorges Dam, the world's largest dam.<sup>117</sup> Three Gorges Dam, with a reservoir over 400 miles long<sup>118</sup> and a completion cost over \$24 billion,<sup>119</sup> can generate eight times the amount of power of the Hoover Dam<sup>120</sup> and caused the displacement of more than one million Chinese farmers.<sup>121</sup> China continues to fuel extensive infrastructure projects, including some projects equaling the scale of Three Gorges Dam.<sup>122</sup> Although the government has been criticized for various aspects of these projects,<sup>123</sup> there is no disagreement about a centralized government's ability to be decisive and take swift, effective action.<sup>124</sup>

In the most recent manifestation, the 2002 China Water Law, centralized management was reaffirmed and further strengthened.<sup>125</sup> Pursuant to the law, the Ministry of Water Resources is responsible for creating water development strategies for the entire country; developing water-related policies and legislation to implement the strategies; and administering and monitoring the policies and regulations once enacted.<sup>126</sup> Although some regional and local agencies are responsible for water management in their respective areas,<sup>127</sup> China's nationwide water management program is controlled in a single, unified agency with sole ultimate authority and accountability.<sup>128</sup>

The authority to mediate and resolve all inter-sector and trans-provincial

114. *Id.* at 429–32; Wouters, *supra* note 112, at 246–47.

115. Griggs, *supra* note 2, at 429–30.

116. *Id.* at 430; Wouters, *supra* note 112, at 247.

117. Mara Hvistendahl, *China's Three Gorges Dam: An Environmental Catastrophe?*, SCIENTIFIC AMERICAN, Mar. 25, 2008, <http://www.scientificamerican.com/article.cfm?id=chinas-three-gorges-dam-disaster>.

118. Griggs, *supra* note 2, at 430.

119. Hvistendahl, *supra* note 117.

120. *Id.*

121. Griggs, *supra* note 2, at 430.

122. Wouters, *supra* note 112, at 247.

123. *See, e.g.*, Hvistendahl, *supra* note 117.

124. This becomes especially apparent when the Chinese accomplishments are compared to private industry struggles in the United States to find the capital and leverage necessary to transform arid areas into usable property. The U.S. government did finance projects early in American history, including the Hoover Dam and several other massive irrigation and water development projects in the West. However, the federal government's efforts eventually receded to return power to state governments. Griggs, *supra* note 2, at 432–34.

125. *Id.* at 440; *see also* Wouters, *supra* note 112, at 289 (stating that although an agency was created to handle centralized water management under the 1988 China Water Law, the 2002 China Water Law significantly strengthened and expanded the agency's powers).

126. Wouters, *supra* note 112, at 289.

127. Griggs, *supra* note 2, at 440–41.

128. Wouters, *supra* note 112, at 289.

water disputes also falls within the powers of the Ministry of Water Resources.<sup>129</sup> This process of trans-boundary water dispute resolution shares many characteristics with the interstate water conflict resolution mechanisms in the United States, with Chinese regional agencies serving the same function as state governments in the United States.<sup>130</sup> The first step in dispute resolution requires the competing agencies to attempt to resolve the issue through negotiation of a mutually satisfactory agreement.<sup>131</sup> This process mirrors interstate compact negotiation. Agencies, like states, are on equal footing and cannot dictate terms of the agreement to any other agency.<sup>132</sup> Instead, they rely on the ability to reach an agreement solely based on finding a mutually satisfactory allocation of shared water sources.<sup>133</sup>

If the two competing agencies cannot reach an agreement, then the dispute becomes subject to mediation by the next highest regional agency that has jurisdiction over both lower agencies.<sup>134</sup> The Ministry of Water Resources is the final arbiter of any regional agency water dispute.<sup>135</sup> Unlike any of the three U.S. mechanisms, the Chinese system can resolve disputes in as quickly as three months.<sup>136</sup> The arbitration process in China is similar to the first stage in equitable apportionment litigation before the Supreme Court. In the first stage, the Supreme Court appoints a Special Master to attempt to mediate an agreement with the states involved in the water conflict.<sup>137</sup> It is if this Special Master's recommendation does not satisfy the Supreme Court that it ultimately must resolve the conflict through equitable apportionment.<sup>138</sup>

One major departure in the Chinese system from the U.S. system is the use of administrative punishments that include expulsion or even criminal prosecution of non-compliant leaders.<sup>139</sup> In the United States, no enforcement mechanisms exist to hold states accountable. Instead, states that fail to adhere to interstate compacts

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129. *Id.*

130. *See* Griggs, *supra* note 2, at 440 (noting that, like states, Chinese regional and provincial governments can develop their own policies and water management schemes, with the difference being that they are subject to national principles); Wouters, *supra* note 112, at 283–84 (stating that plans are developed at the local level and submitted to the national agency for review and consent).

131. Griggs, *supra* note 2, at 444.

132. *See* Wouters, *supra* note 112, at 279–81 (stating that, although the Chinese national government has formal ownership of all water resources, local agencies have de facto ownership over the actual use of the water as long as the local agency does not act without regard for its neighbors).

133. *Id.*

134. Griggs, *supra* note 2, at 440.

135. Wouters, *supra* note 112, at 289.

136. *Id.* at 270.

137. *See* Tauer, *supra* note 27, at 910 (explaining that the Court turned to a special master for a recommendation on how to rule in a dispute between Connecticut and Massachusetts).

138. *See id.* at 910–11 (discussing the direction the Court took after rejecting the special master's recommendation).

139. Griggs, *supra* note 2, at 444–45.

or that disagree with neighboring states regarding the interpretation of compact provisions are merely subject to further litigation, which is frequently lengthy and often futile for the downstream state.<sup>140</sup> Even though the stakes seem much higher in China for regional leaders, this aspect of Chinese water policy has been criticized due to the government's failure to actually follow through with enforcement of allocation agreements when quotas are routinely exceeded.<sup>141</sup>

Overall, the 2002 China Water Law has been effective at implementing a massive coordination plan.<sup>142</sup> China has 1,359 different local governments.<sup>143</sup> The Ministry of Water Resources has already helped streamline coordination efforts between urban and rural governments, between surface and groundwater users, and between local governments and other national agencies involved in water quality and pollution control that now report up to the Ministry of Water Resources as well.<sup>144</sup>

## 2. Recommended adaptation in the United States

The United States could benefit from borrowing some of the principles of China's strong, centralized management of water allocation. By creating a single federal agency in charge of all water-related policy issues, the United States would benefit from having a unified voice in representing national issues before the states; a power structure designed to facilitate state negotiations rather than imposing federal decisions on states; and a means of immediate enforcement of compact breaches or equitable apportionment violations.

The current fragmented approach to water source management has not been successful in resolving conflicts; instead, it has created a perpetual cycle of negotiation and litigation. Federal legislation, as a conflict resolution mechanism, has rarely been employed.<sup>145</sup> Congress is also unlikely to increase the use of legislation as a means to resolve conflicts outright, for reasons discussed in Part III.C. As an alternative to direct legislation, Congress should create a new federal agency or elevate an existing agency to a position of ultimate authority, to oversee all water-related issues for the federal government. Using the Missouri River as an example, more than nine different federal agencies have authority over different

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140. For example, Kansas sued Colorado alleging a violation of a previously negotiated interstate compact regarding allocation of the Arkansas River. After twenty years of litigation, the Supreme Court finally granted relief in the form of monetary damages. Kansas also sued Nebraska alleging a violation of an interstate compact regarding allocation of the Republican River. While the two states settled after mediation with the Special Master, Nebraska immediately failed to comply with the terms of the settlement, ultimately leading Kansas to initiate litigation yet again. *Id.* at 446.

141. *Id.* at 444–45.

142. See Wouters, *supra* note 112, at 285–86 (stating that discussing implementation of strict quotas and strong accountability measures worked to motivate local agencies to work together on efforts to allocate and manage shared water resources).

143. Griggs, *supra* note 2, at 441.

144. *Id.* at 442.

145. See *id.* at 445 (stating that congressional allocation has been utilized in only two cases, with the Colorado River and the Missouri River).

aspects of water management or areas that impact water management.<sup>146</sup> There are many more when looking at the United States as a whole.

While the newly-elevated or newly-created agency would lack the power to enact legislation that China's Ministry of Water Resources enjoys,<sup>147</sup> the agency would provide a unified and clarified front representing all water-related federal policies. One of the major stumbling blocks to compact negotiations is the consideration for federal legislation the states must make when structuring their allocation decisions.<sup>148</sup> Any finalized state compact must not infringe terms of federal laws governing endangered species; recreation areas; coastal and wetland management areas; pollution control systems; and any other federal legislation that affects water management.

Rather than infringing upon the sphere of state power, having a single agency responsible for all water-related issues would mean the federal government could work more easily with state governments when negotiating interstate compacts.<sup>149</sup> Due to the nature of the complex federal regulatory system in place currently, it is very difficult for states to negotiate an interstate compact that does not interfere with some aspect of legitimate federal legislation.<sup>150</sup> By providing one point of contact for states to turn to for resolution of issues related to federal legislation, the agency will empower states to negotiate compacts without the fear that the final product will be preempted. Although it is counterintuitive to suggest that strengthening the federal government makes the states more powerful, simplifying the federal structure will ultimately remove one of the major stumbling blocks states face in interstate compact negotiations.

The proposed agency would provide a management strategy that is nationally-focused, while still accounting for local needs and desires.<sup>151</sup> Federal authority over non-navigable water is limited, with much of the authority belonging to the states.<sup>152</sup> Although the Chinese Ministry of Water Resources has ultimate final authority, the power to make water allocation and management decisions typically falls to regional authorities, unless local and regional agencies cannot resolve

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146. Sherk, *supra* note 19, at 769.

147. Wouters, *supra* note 112, at 278.

148. *See supra* Part III.C.

149. The state is still an important player in the control of water resources. The unified agency sets policies and guidelines, and regions are tasked with creating plan specifics and implementation procedures. *See* Wouters, *supra* note 112, at 295–99 (discussing the important role that local and regional governments play in determining details of administration and implementation of management plans in China).

150. *See id.* (discussing the complexity of China's system at every level of government).

151. *See id.* at 261 (discussing process whereby China's centralized agency seeks advice and guidance from local governments before finalizing water management schemes).

152. The U.S. Constitution limits the federal government's powers to water-related issues that also affect interstate commerce, federally-owned property, treaties, and national defense. *See* Griggs, *supra* note 2, at 444 (noting that states have the most power because water rights are property rights in the United States, which is an area of traditional state power).

conflicts.<sup>153</sup> Regional compacts that have been effective in the United States, such as the Delaware River Basin Compact and the Great Lakes legal system, have not been effectively duplicated.<sup>154</sup> They also lack important legislative, administrative, and enforcement functions that oversight by a federal agency could provide.<sup>155</sup> The federal agency could facilitate the creation of more regional commissions that have shown promise in the eastern states throughout the rest of the country. Current commissions have focused more on pollution control because the eastern states have not had the same allocation and scarcity problem that is common in the west.<sup>156</sup>

Representatives of each state in the region could be placed on the management team of the regional groups, along with representatives of the federal agency. Representation and influence by each state as well as one or more neutral federal representatives will help ensure the regional commission accomplishes its tasks and adheres to agreements. Since compacts become federal law once approved by Congress, the federal representatives have the power to operate effectively as members of these commissions. Also, like the regional commissions in place now,<sup>157</sup> the new organizations' representatives from the federal government should not be political appointees to avoid stalemates and undue influence. As a replacement for the highly adversarial nature of the current compact-creation process, regional groups should have members from other states, including states where the water source is not shared, and disinterested federal representatives. With such a composition, the compact process is likely to proceed more smoothly, efficiently, and fairly.

Under the current system, in times of water scarcity, state political leaders must choose between disregarding or honoring their obligations under an interstate compact. If they choose to abandon the compact's obligations, then the leaders satisfy their constituents while immediately subjecting their state to the risk of litigation and a penalty in the distant future—when they will likely be out of office.<sup>158</sup> If they honor the compact, then they anger their constituency and must explain why they have chosen to put the needs of another state above the needs of their own people.<sup>159</sup> In times of crisis, it is difficult to imagine even the most honorable politician choosing the latter.<sup>160</sup>

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153. *Id.*

154. The Delaware River Basin Compact has many of the features recommended here, including establishing a regional, integrated agency with widespread authority over all water-related management in the region and representation by both state and federal actors. Dellapenna, *supra* note 31, at 831.

155. *See id.* at 840–64 (discussing the success of the two compacts and the shortfalls of the regional commissions that the compacts created).

156. *Id.* at 837–38.

157. *Id.*

158. Griggs, *supra* note 2, at 446.

159. *Id.*

160. The 2002 China Water Law, on the other hand, requires local agencies to coordinate planning efforts before disasters and crises strike. *See* Wouters, *supra* note 112, at 283 (discussing delegation of crisis planning to local agencies rather than national government).

In addition to the power to oversee the water management-related functions of all other agencies, the proposed federal agency should also have the power to enforce equitable apportionment allocations handed down by the Supreme Court and interstate compacts approved by Congress. By creating this enforcement mechanism, the endless cycle of litigation that characterizes many interstate water conflicts will be cut down and equitable allocation of shared water sources can be effectuated. Immediate enforcement will also make monetary damages more prevalent and therefore increase the deterrence factor.<sup>161</sup> Granting the federal agency the power to enforce immediately upon breach will make the penalties more realistic and effective. Unlike the Chinese system,<sup>162</sup> the U.S. system would be unlikely to impose criminal penalties upon individual leaders for non-compliance with compacts or equitable allocations, although enforcement is more realistically achievable because of the U.S. legal system's relative strength.<sup>163</sup> However, in times of national crisis and true water scarcity—where citizens of the downstream state are not getting even the minimum amount of necessary water—injunctions followed by more severe penalties may be the only option. The fact remains that upstream states will always have a natural advantage over downstream states.<sup>164</sup>

Changing water consumption patterns and improving efficiencies, which are discussed in Part IV.B.2, are effective solutions but will take a long time to develop. The current dispute resolution mechanisms in the United States also take a long time to develop allocation solutions, whether by lengthy litigation or endless negotiations. Having one agency with responsibility for water allocation management in times of crisis will allow adjustments to be made in times of shortages and emergencies.<sup>165</sup> The agency should have allocation plans for times of shortages to provide water to areas that need it and avoid competition for resources that can be quite chaotic and frenzied.<sup>166</sup> The balance of power can be more effectively maintained between the federal and state governments through a single agency whose purpose is to assist states in entering into compacts and enforcing

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161. *See, e.g.*, Griggs, *supra* note 2, at 446 (discussing Kansas's award of \$34 million for damages as a result of Colorado's breach of the compact, which came after waiting and suffering further injury through twenty years of litigation).

162. *See id.* at 444–45 (noting that regional and local leaders in China who fail to comply with allocations are subject to criminal penalties and prosecution).

163. *Id.* at 445.

164. *See id.* at 447 (stating an old maxim: “it is better to be upstream with a shovel than downstream with a decree”).

165. *See id.* at 457–58 (noting China's central agency has monitoring systems with alarms set for low-level warning and daily level control in times of water supply deficiencies that allow the government to stay ahead of shortages as much as possible); *see generally* Wouters, *supra* note 112, at 284–85.

166. *See* Thomas K. Rudel, *Social Responses to Commodity Shortages: The 1973–1974 Gasoline Crisis*, 8 HUMAN ECOLOGY 193, 193–212 (1980) (describing sudden shortages in gasoline where the government lacked pre-developed plans and trans-boundary coordination which led to poorly conceived rationing plans that sometimes led to violent confrontations over scarce resources).

compacts once created. States would maintain the autonomy that they treasure, and the federal government's power will be used to increase effectiveness and efficiencies in creating the regional compact-based commissions.

## ***B. Water Conservation as a Fundamental Principle***

### **1. Chinese system**

Conservation of environmental resources has long been a part of China's cultural and legal landscape.<sup>167</sup> Traditionally, it was believed that the legitimacy of government leaders was indicated by a lack of environmental disasters, and conversely, that the leaders could be challenged when environmental issues occurred.<sup>168</sup> As a result, sensitivity to the environment formed the basis of many of China's laws throughout the history of the country.<sup>169</sup> However, as China approached the modern era and economic growth became an increasingly important focus, concern for environmental issues became less important.<sup>170</sup> In fact, some considered water pollution a positive sign of industrial growth and success in the country.<sup>171</sup>

After the initial prominence of economic concerns emerged, concerns for the environment re-emerged as an important consideration that could not be overlooked solely to promote the economy; thus, preservation and conservation became vital again in legislation and regulation.<sup>172</sup> The 1988 China Water Law established the basic framework for water management policies in China that are still fundamentally present today.<sup>173</sup> The law incorporated provisions for establishing essential mechanisms for water use management, quality protection, pollution prevention, and a permit system for withdrawals.<sup>174</sup> Any future use of water sources became subject to regulatory approval and required extensive consideration for long-term planning of water usage and water source quality protection.<sup>175</sup> The government clearly required water management considerations to be at the forefront of any water source development plans.

One reason for the emphasis on conservation is that China suffers from a severe water shortage, with each person receiving 75% less water per person than the world average.<sup>176</sup> A second reason for the need for conservation is that, like the United States, China's infrastructure suffers from major inefficiency problems.

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167. Boping, *supra* note 1, at 1.

168. *Id.*

169. *Id.*

170. *See id.* at 1–4 (discussing the trend away from environmental priorities through the generations of leaders as economic growth became more desirable).

171. *Id.*

172. *Id.* at 4–6.

173. Wouters, *supra* note 112, at 259–61.

174. *Id.*

175. *Id.* at 260–62.

176. *See id.* at 250 (discussing China's water crisis and declaring China as one of the most water-deficient countries in the world).

While the United States loses up to 25% of its water through infrastructure leaks,<sup>177</sup> China is estimated to lose up to a staggering 60% of its water during delivery to customers due to system inefficiencies.<sup>178</sup>

The amendment to the 1988 China Water Law—the 2002 China Water Law—further emphasizes water conservation and efficient usage as an essential principle in any management and development of water sources.<sup>179</sup> The stated purposes of the law prominently include “rationally developing, utilizing, conserving, and protecting water resources,” and “bringing about sustainable utilization of water resources.”<sup>180</sup> The law emphasizes efficiency, overall long-term planning, and acknowledgement of other users of water sources, and special attention must be paid to constructing infrastructure for the conservation of water sources.<sup>181</sup> The law makes clear that any development of water sources for economic and social uses must be done with water conservation as a guiding principle.<sup>182</sup>

The law imposes a duty on all individuals to save water<sup>183</sup> and declares: “[t]he State encourages strict economy on the use of water, greatly promotes water-conserving measures, spreads the use of new technologies and techniques for water-conserving, develops water-conserving industries, agriculture and services, and builds a water-conserving community.”<sup>184</sup> Any developer or user of water sources throughout the country is obligated to provide for the protection and conservation of those sources.<sup>185</sup>

In addition to emphasizing the need for conservation, China has implemented specific policies to drive conservation efforts. One policy requires that any new development proposal submitted for government approval must also include specific proposals for saving water.<sup>186</sup> Once a project receives approval, work must proceed on both the new development and the conservation project simultaneously,<sup>187</sup> ensuring that the conservation efforts come to fruition.

The law also establishes a two-tier permit system.<sup>188</sup> The first tier provides water-usage permits for a five-year period to new users.<sup>189</sup> As the water source

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177. Levin, *supra* note 9, at 44.

178. Griggs, *supra* note 2, at 436–37.

179. See Wouters, *supra* note 112, at 286 (citing seventeen different provisions in the 2002 China Water Law relating to water conservation).

180. Water Law of the P.R.C. art. 1 (promulgated by Order No. 74 of the President of the P.R.C., Aug. 29, 2002), <http://www.china.org.cn/english/government/207454.htm> [hereinafter 2002 China Water Law].

181. *Id.* art. 4–5.

182. *Id.* art. 5.

183. Wouters, *supra* note 112, at 286.

184. 2002 China Water Law, art. 8.

185. *Id.* art. 6.

186. Wouters, *supra* note 112, at 286.

187. *Id.*

188. Griggs, *supra* note 2, at 447–54.

189. *Id.* at 447–48.

fluctuates due to further development in the region and changing environmental conditions, the agency can renegotiate permitted levels of water use with each user every five years.<sup>190</sup> Compared to the U.S. system, where water-usage rights become permanent over time,<sup>191</sup> the short duration of the permit period in China gives the managing agency a great deal of flexibility.<sup>192</sup> This period has been criticized for its short duration because it leaves the user with a great deal of uncertainty about its future entitlement to water supplies.<sup>193</sup>

The second tier provides water usage permits for a period of twenty-five years.<sup>194</sup> However, these permits are not issued directly from the government agency to new users.<sup>195</sup> The only means for a user to acquire this length of permit is through the water right transfer process.<sup>196</sup> The transfer process allows users with permits to improve infrastructure and other system components to make the water allocation system more efficient.<sup>197</sup> After establishing water savings, the user can then sell the saved water quantity to a third party for a profit.<sup>198</sup> The third party is then transferred the right to use the saved quantity for up to twenty-five years.<sup>199</sup> Although a new user is added to the system, the overall quantity of allocated water remains constant because the new user is only entitled to the amount saved by the initial user.

The water right transfer process facilitates investment in infrastructure and system improvements.<sup>200</sup> While some have criticized the large discrepancy between the length of time allowed for new permit users and that allowed for transfer users,<sup>201</sup> the discrepancy actually contributes to the effectiveness of the transfer process. By allowing users who buy the transfer rights to have a longer period of authorized use, the government is encouraging new users to pursue these rights instead of new permits. The increased desirability of the transferred rights leads to greater demand from users who want more certainty, and ultimately raises the price and profitability of the transfer rights. With greater profitability comes greater investment.<sup>202</sup> As more users realize the potential to make money by implementing efficiencies and improving water system infrastructure, more users

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190. *Id.* at 448.

191. *Id.* at 450–51.

192. *Id.*

193. *See id.* at 454 (proposing the five-year period be extended to create more certainty for industrial and agricultural water users).

194. Griggs, *supra* note 2, at 453.

195. *Id.*

196. *Id.* at 452–53.

197. *Id.*

198. *Id.*

199. *Id.*

200. *See* Griggs, *supra* note 2, at 453 (explaining governmental role in ensuring quality of water saving projects).

201. *See id.* at 454 (arguing that the discrepancy needs to be addressed and remedied).

202. *See id.* (pointing to nineteen industrial enterprises that have purchased rights through the transfer system and forty-two kilometers of canals that have undergone infrastructure improvements leading to over 240 million cubic meters of water being saved annually).

will invest to realize the water savings and sell the rights through the transfer process.

## 2. Recommended adaptation in the United States

The United States can benefit from adopting the Chinese water rights transfer process.<sup>203</sup> Based on the results of an EPA survey in 2001, public utilities need to spend \$151 billion over the next two decades on infrastructure maintenance.<sup>204</sup> In addition to the drastic need for basic maintenance, some areas of the United States have had to cease all new water system extensions due to over-development.<sup>205</sup> Clearly, the United States could benefit by improving efficiencies in the water system in order to continue to provide water supplies to current customers as sources become scarcer and to extend development of the system to new areas.<sup>206</sup>

At a time when government budgets are already heavily scrutinized, incorporating a water rights transfer system in the public utility system in the United States would bring much needed investment to the aid of the public sector. The first step to regaining control over the system is to issue water usage permits that do not become permanent property rights. This is a departure from the current system where water usage does become “perfected” over time into permanent property rights.<sup>207</sup> However, property rights throughout the United States have always been subject to public interest and public policy exceptions.<sup>208</sup> It is unrealistic to change already existing water property rights, but government entities are not restricted in limiting future permits to short term use authorization.

The two-tier system should be adopted to limit new users to a short duration, perhaps even five years. This will give local governments the flexibility to adapt not only to changing water sources, but also to the changing needs of their communities. It will also make it more difficult for these permits to evolve into expectations, ultimately leading to permanent property rights. The second tier, allowing longer term durations, should be limited to water savings generated by other users of the system, or state and local governments who would be willing to invest in the necessary projects.

Some areas of the United States have attempted a milder form of the above

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203. Focusing on efficiency measures would also be consistent with the emphasis the U.S. Supreme Court has placed on evaluating conservation efforts as part of equitable apportionment decisions. *See Wyoming v. Colorado*, 259 U.S. 419, 494–95 (1922) (imposing a duty on states to make reasonable use of shared water sources); *Colorado v. New Mexico*, 459 U.S. 176, 186–90 (1982) (analyzing apportionment based mostly on relative conservation efforts by each state). For more examples of the Court’s emphasis on conservation, see generally *Nebraska v. Wyoming*, 325 U.S. 589, 618 (1945); *Washington v. Oregon*, 297 U.S. 517, 527 (1936).

204. Levin, *supra* note 9, at 43.

205. Griggs, *supra* note 2, at 454–55.

206. The Supreme Court has emphasized conservation efforts in several equitable apportionment cases as well, resolving disputes based on which states have taken measures to be as efficient as possible with their water usage. Tauer, *supra* note 27, at 914.

207. Griggs, *supra* note 2, at 452.

208. *See id.* at 454–55 (discussing water rights activities and legal issues in Kansas).

proposal. For example, Kansas ceased new groundwater development in certain areas and required new users to get permits through a transfer system.<sup>209</sup> However, in Kansas, the transfer process was both limited and complicated. Users attempting to transfer could only do so at the same point of diversion or place of use as their current usage.<sup>210</sup> If the user wanted to transfer to a third party at any other location, then the transfer required governmental study and approval.<sup>211</sup> The users could transfer any part of their current usage rights, unlike the Chinese system that only allowed transfers of water saved by improving efficiencies in the system.<sup>212</sup> The result was that users would transfer water rights to the highest bidder, leaving prior users out of luck.<sup>213</sup>

By adopting the more progressive system of water rights transfers that was implemented in China, the United States can achieve greater results and avoid the pitfalls experienced in Kansas. Forcing users to create greater efficiencies and water savings in order to sell rights for a profit will help the system improve as a whole, instead of merely transferring water from one user to another for more money. By allowing the transfer of water-usage rights to users at any other point on the same water system, rather than allowing transfer only at the same diversion point, marketability of transfer rights will improve, leading to an increase in demand, greater profitability, and ultimately more overall investment in improving the system's infrastructure. The regional commissions established by the states and assisted by the federal agency as discussed in the previous section provide the ideal marketplace for water rights transfers. The end result is greater use of existing water resources and improved infrastructure for the future.

Once utilities have a profitable outlet for saved water, they should turn their attention to their current customer base to increase profitability.<sup>214</sup> Utilities have resisted raising prices on existing water consumers for fear of losing revenue.<sup>215</sup> When prices increase, demand decreases, and users consume less water. This, in itself, is actually a good thing. Pricing pressure on consumers forces them to be more efficient and ultimately engage in lower water usage, thus putting less pressure on the already stressed water source.<sup>216</sup>

For the utilities, a moderate price increase will still lead to a revenue increase. The elasticity of demand for water, a measure of how drastically consumers respond to changes in prices, is estimated to be between 0.2 and 0.8.<sup>217</sup> As a general principle of economics, an increase in price when demand elasticity is less

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209. *Id.*

210. *Id.* at 455.

211. *Id.*

212. *Id.* at 454–55.

213. *See* Griggs, *supra* note 2, at 454–55 (discussing water right transfers' potential effect on agricultural productivity).

214. Similar recommendations have been made in the Chinese context to raise prices enough to encourage more reasonable and efficient use of water among the current customer base. *See, e.g.,* Wouters, *supra* note 112, at 303–05.

215. Levin, *supra* note 9, at 44.

216. *Id.*

217. *Id.*

than one leads to an increase in revenue. Therefore, a secondary result of creating the market for transfer water rights is that utilities will be able to raise prices on existing users to bring them more in line with the higher prices obtainable from new users of transfer rights. This price increase would reduce demand and lower the strain on increasingly scarce water resources while allowing the utilities to increase overall revenue and further invest in infrastructure and efficiency improvements.<sup>218</sup>

## V. CONCLUSION

There is no doubt that areas of the United States are already experiencing water scarcity challenges, at least on a short-term basis.<sup>219</sup> As the population grows, land is developed, and industry increases, water supplies in the United States will face even greater pressure and strain. As states look to increase their water supplies, conflicts over water sources shared by two or more states will increase in frequency and intensity.

There are three mechanisms available in the United States to resolve interstate water conflicts and ultimately determine how to allocate the shared water source: litigating before the Supreme Court, negotiating an interstate compact, and seeking enactment of legislation in Congress. All three mechanisms require a great deal of time, money, energy, and political will to move states closer to a resolution. The three mechanisms all have characteristics that prevent them from operating effectively, thus creating huge stumbling blocks for states that desperately need solutions.

China, like the United States, has faced water shortages, both short-term and long-term. Over-development especially in arid areas, a growing population, and water system infrastructure inefficiencies contribute to the challenges in both countries. While the United States has mechanisms that have been in place throughout most of its history, China's recently enacted 2002 China Water Law provides new mechanisms for determining water allocation amongst competing regions.

The Chinese water management system is characterized by strong, centralized control and a heavy emphasis on water conservation. Even though the countries have dramatically different political philosophies, some features of the 2002 China Water Law can be adapted to work in the United States to improve interstate water

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218. There is plenty of opportunity to increase efficiency in U.S. personal consumption. Estimated U.S. daily per capita water use is 382 liters, more than double the daily use in Germany, France, and the U.K. *Id.* The daily required amount, according to the World Health Organization, is 150 liters. A.O. Nyong & P.S. Kanaroglou, *Domestic Water Use in Rural Semiarid Africa: A Case Study of Katarko Village in Northeastern Nigeria*, 27 *HUM. ECOLOGY* 537, 537 (1999).

219. See, e.g., Anna Werner, *Texas City Faces Bone Dry Reality*, CBS NEWS (Nov. 22, 2011, 7:06 PM), [http://www.cbsnews.com/8301-18563\\_162-57329867/texas-city-faces-bone-dry-reality](http://www.cbsnews.com/8301-18563_162-57329867/texas-city-faces-bone-dry-reality) (reporting that a town in Texas had only a two-week water supply and twelve other cities had only enough to last until spring).

conflict resolution. By establishing one agency as the ultimate authority on all federal water-related policies, the United States can remove barriers that states currently face when attempting to negotiate compacts; coordinate water allocation across states to ensure a nationally-focused policy in times of great need; and monitor and enforce compliance with the terms of compacts or equitable apportionments in a way that is currently not possible.

Additionally, the United States should create a system of water rights transfers by eliminating or reducing new permits and allowing current users to sell rights to excess water resulting from conservation of water or improvements in system efficiencies. By making new permits less desirable and more difficult to receive, the market for transferred rights will be economically viable and encourage investment by current users in much needed system infrastructure improvements. It will also encourage current users to reduce their own demand, further alleviating the stress on the system. Ultimately, while interstate water conflicts will not go away, the new system can make conflict resolution easier to obtain, easier to enforce once obtained, and more economically reasonable for all users.