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NOTES

ANCIENT WATER LAW IN A MODERN WATER CRISIS: UNITED STATES WATER LAW REFORM IN THE AUSTRALIAN CONTEXT

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INTRODUCTION

Water scarcity is a precursor to climate migration and societal instability,[1] and the Earth is only a little over one billion people away from realizing this crisis.[2] At current consumption levels and once the world reaches nine billion people, there will not be enough fresh water on this planet to sustain the human population.[3] For a planet that is seventy percent covered by water,[4] running out of fresh water may seem impossible. However, a look at the use of this finite resource shows that accessible fresh water, which accounts for only 0.007% of global water,[5] is being consumed at speeds faster than nature can replenish.[6] Desalination and other freshwater capture methods have yet to provide adequate

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1. Charles Iceland, *Water Stress is Helping Drive Conflict and Migration*, WORLD RES. INST., https://www.wri.org/news/water-stress-helping-drive-conflict-and-migration [https://perma.cc/V6LL-6BVC].

2. *World Population Prospects 2019*, U.N. DEP'T ECON. & SOC. AFF., https://population.un.org/wpp/. [https://perma.cc/XL44-B896].

3. Deborah Zabarenko, *Water Use Rising Faster than World Population*, REUTERS (Oct. 25, 2011) https://www.reuters.com/article/us-population-water/water-use-rising-faster-than-world-population-idUSTRE79O3WO20111025. [perma.cc/UHR7-JUJG].

4. *Freshwater Crisis*, NAT'L GEOGRAPHIC, https://www.nationalgeographic.com/environment/freshwater/freshwater-crisis/#close [https://perma.cc/YW26-XUW7].

5. *Id.*

6. Zabarenko, *supra* note 3 ("The problem is that 97.5 percent of [the Earth's water] is salty and . . . of the 2.5 percent that's fresh, two-thirds of that is frozen. So there's not a lot of freshwater to deal with in the world." Less frequent rainfall and unpredictable weather patterns compounds the issue.).

and tested long-term solutions.[7]

An international legal regime that oversees water consumption and distribution would be ideal, but there is no large-scale international mechanism that can truly enforce water management guidelines to prevent global water shortages. Furthermore, because of the significance of water in domestic economic growth,[8] substantial international cooperative action is unlikely. Without sufficient international obligations to manage Earth's diminishing freshwater sources, nation-states must turn to meaningful domestic law to ensure water security far into the future.

In the United States, scientific evidence—or even just simple observance—establishes a troubling shift in water availability across the national landscape.[9] The incremental action taken to combat a water crisis has been mitigative at best. The problem lies in a lack of public acceptance of the connection between climate change and water scarcity due in large part to the public being cushioned by a system with lax and inconsistent policies governing water consumption. The United States needs a meaningful national water regulation system to ensure economic and social stability far into the future.

Extensive analysis has been done regarding United States water law, but frequently in the context of water quality or economic evaluations. Of those that do discuss reform of United States water laws as it relates to water scarcity, many are often jurisdictional or narrow in scope.[10] Other scholars continue to believe that the current infrastructure is capable of adapting to the new environmental reality.[11] This Note argues for a national reform of United States water law in relation to impending water scarcity conflicts through a centralized and accountable system that recognizes environmental needs.

Australia, a fellow common law state that has had to abolish common law water rights to avoid disaster, can offer the United States valuable insights into effective water law reform. Australia is the driest inhabited continent in the world.[12] Seventy percent of its mainland is classified as arid or semi-arid, and thirty-five percent of this land is effectively desert.[13] This has forced Australians

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7. Fred Kuepper, *The Impacts of Relying on Desalination for Water*, SCI. AM. (Jan. 20, 2009) https://www.scientificamerican.com/article/the-impacts-of-relying-on-desalination/ [https://perma.cc/N4HJ-NY6Y].

8. *See generally* U.N. ESCO World Water Assessment Programme, THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 2016: WATER AND JOBS (2016). https://unesdoc.unesco.org/ark:/48223/pf0000243938. [https://perma.cc/VE6B-BMA3]

9. *2014 National Climate Assessment: Water Sector*, U.S. GLOB. CHANGE RES. PROGRAM (2014), https://nca2014.globalchange.gov/report/sectors/water. [https://perma.cc/2TAP-J8GZ].

10. Lauren Taylor, *Drought Down Under and Lessons in Water Policy for the Golden State*, 40 ENVIRONS ENVTL. L. & POL'Y J. 54,68 (2016).

11. *See generally* Lawrence J. Macdonnel, *Prior Appropriation: A Reassessment*, 18 U. DENV. WATER L. REV. 228 (2015).

12. *Deserts*, AUSTL. GOV.: GEOSCIENCE AUSTL., https://www.ga.gov.au/scientific-topics/national-location-information/landforms/deserts [https://perma.cc/5TCH-JZFC].

13. *Id.*

to address water scarcity early on through both policy and legal reform. Australia has learned many lessons the United States could benefit from.

Part I of this Note will discuss the water shortage problem, its connections to climate change, and the need for domestic action in lieu of an impossible-to-realize functional international water law regime. Part II will discuss the U.S. and Australian water law systems and the divergence of these systems. Finally, Part III will examine the need for a centralized system under federal authority through constitutional and social solutions.

PART I: BACKGROUND

A. Climate Change

More than forty years ago, scientists predicted and quantified atmospheric temperature increases based on atmospheric carbon dioxide levels, predicting climate change.[14] Due to subsequent public inaction, those climate predictions have come true. Nearly all published climate research is in agreement that humans are the cause of current climate change.[15] An increase of one degree Celsius in global temperature average has already been directly linked to human activity, and climate change shows no signs of slowing any time soon.[16] Scientists today predict continuing temperature increases, large-scale crop failure, extreme and unpredictable rain patterns, prolonged droughts, stronger hurricanes, and a complete meltdown of the arctic in the near future if humans continue to do nothing to change their actions.[17] What science has not addressed directly, but which is equally concerning, is the proliferation of climate refugees,[18] economic[19]

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14. Jule G. Charney, AD HOC STUDY GROUP ON CARBON DIOXIDE AND CLIMATE (1979). This report predicted a 1.5° to 4.5° Celsius global temperature increase resulting from a doubling of atmospheric carbon dioxide levels. *Id.*

15. John Cook et al., *Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming*, 11 ENVIRON. RES. LETT. 1, 2 (Apr. 13, 2016).

16. *See Global Warming of 1.5°C: Summary for Policymakers*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (2018), https://www.ipcc.ch/sr15/ [https://www.ipcc.ch/sr15/]. A 1 degree increase in temperature average does not suggest that the earth is constantly increasing year after year. Such change is the mean of long-term data collection. More significantly is the association between minor increases in atmospheric temperature and extreme weather patterns such as colder winters and hotter summers—or in the context of this article, prolonged droughts, and severe rains. *Id.*

17. *The Effects of Climate Change*, NASA, https://climate.nasa.gov/effects/ (Feb. 17, 2021). [https://perma.cc/PZ3Z-NKAG].

18. *Climate Change and Disaster Replacement*, U.N. HIGH COMM'R FOR REFUGEES, https://www.unhcr.org/en-us/climate-change-and-disasters.html [https://perma.cc/N4YV-TQDY].

19. Justin Worland, *Climate Change Could Spark Another Great Recession. This Time, It May Be Permanent,* TIME (June 29, 2017, 5:41 PM), https://time.com/4837020/climate-change-economy-recession/ [https://perma.cc/WJS2-PXVD].

and political instability,[20] and massive humanitarian crises[21] that follow these environmental catastrophes.[22] At the foundation of all these humanitarian problems lies the cornerstone of existence: water, or more precisely, the lack thereof.

B. Water Scarcity

The global supply of fresh water is not being sustained. The Earth's fresh water is being consumed at a rate well above the capabilities of most water sources.[23] The leading human-influenced causes of global water stress are dams (57.6%), water diversion (34.7%), groundwater extraction (6.1%), and channelization (1.9%).[24] In addition, increases in world population, wealth, and access to water infrastructure have led to an almost quadrupled rate of domestic water use.[25] At the current rate, domestic water use could increase another eighty percent by 2030.[26] Adding to the growing problem, weather patterns are becoming more unpredictable, leading to unpredictable replenishment rates.[27]

The worldwide water scarcity problem is neither temporary nor limited geographically. South Africa is in the middle of a dystopian water crisis.[28] Australia's "day zero" for water is fast approaching.[29] India will be out of water

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20. *See* Jürgen Scheffran et al., *Climate Change and Violent Conflict*, 336 SCI. 869, 869-71 (2012). *See also* Charles Iceland, *Water Stress is Helping Drive Conflict and Migration*, WORLD RES. INST., https://www.wri.org/news/water-stress-helping-drive-conflict-and-migration [https://perma.cc/V6LL-6BVC].

21. *Humanitarian Crises and Climate Change—Preparing for the Challenges Ahead*, U.N. ENV'T PROGRAMME (Mar. 28, 2019), https://www.unenvironment.org/news-and-stories/story/humanitarian-crises-and-climate-change-preparing-challenges-ahead [https://perma.cc/5SJ3-BJTX].

22. *See Global Warming of 1.5°C: Summary for Policymakers*, *supra* note 16. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. For a more thorough look at the full-scale effects of 1.5°C global temperature increase, see *id*.

23. Zabarenko, *supra* note 3.

24. Sergi Sabater et al., Effects of Human-Driven Water Stress on River Ecosystems: A Meta-Analysis, Scientific Report, July 2018, at 4.

25. Martina Flo¨rke, Christof Schneider & Robert I. McDonald, *Water Competition Between Cities and Agriculture Driven by Climate Change and Urban Growth*, 1 NATURE SUSTAINABILITY 51 (2018).

26. *Id*.

27. *See* Ellen Gray, *Earth's Freshwater Future: Extremes of Flood and Drought*, NASA (June 13, 2019), https://climate.nasa.gov/news/2881/earths-freshwater-future-extremes-of-flood-and-drought/ [https://perma.cc/Q3Z8-2ARH].

28. Aryn Baker, *What It's Like to Live Through Cape Town's Massive Water Crisis*, TIME, https://time.com/cape-town-south-africa-water-crisis/ [https://perma.cc/R3LK-LMSA].

29. Nicole Trian, *Australia Prepares for 'Day Zero' – The Day the Water Runs Out*, FRANCE24 (Sept. 19, 2019), https://www.france24.com/en/20190919-australia-day-zero-drought-

in a few years and is sorely unprepared.[30] The United States is experiencing increasing strains on water supply, especially in the west.[31] Water shortages in China are slowing economic growth and forcing major infrastructure changes that will likely lead to more consumption problems.[32] Many other nations are also experiencing some degree of water scarcity,[33] but the responses to these issues do not fully address the problems. Time is running out, and the only appropriate remedy is meaningful and timely change.

C. International Water Law

There are few multinational agreements regarding water. Most water-related treaties deal with either bilateral cross-boundary water agreements or the right to clean drinking water in relation to internationally recognized human rights. Well-defined, binding, large-scale initiatives on the management of fresh water are nearly nonexistent.[34] The international agreements that do exist do not fully address water issues, and, because conservation requires sacrifice, it is unlikely that there will be any significant attempt at transboundary water conservation cooperation any time in the near future. Characteristic in the international environmental arena are a lack of accountability, failure to create firm obligations, and a lack of enforcement mechanisms.[35]

For example, the United Nations Convention to Combat Desertification of 1994 (UNCCD) is the sole legally binding international agreement linking the

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water-climate-change-greta-thunberg-paris-accord-extinction-rebe [https://perma.cc/4GNC-7QQT].

30. Jessie Yeung, Swati Gupta & Michael Guy, *India Has Just Five Years to Solve its Water Crisis, Experts Fear. Otherwise Hundreds of Millions of Lives Will Be in Danger*, CNN (July 3, 2019, 10:39 PM), https://www.cnn.com/2019/06/27/india/india-water-crisis-intl-hnk/index.html [https://perma.cc/DVH9-XJZY].

31. Emily Holden, *US States Face Water Crisis as Global Heating Increases Strain on Supplies*, THE GUARDIAN (Aug. 6, 2019), https://www.theguardian.com/global-development/2019/aug/06/us-states-water-stress-new-mexico-california-arizona-colorado [https://perma.cc/WJ4E-E97M].

32. Matthew Carney, *Forget Geopolitics, Water Scarcity Shapes Up as the Biggest Threat to China's Rise*, ABC NEWS (Nov. 26, 2018, 1: 22 AM), https://www.abc.net.au/news/2018-11-23/china-water-crisis-threatens-growth/10434116 [https://perma.cc/UYZ6-7FE3].

33. Tara Law, *The Climate Crisis Is Global, But These 6 Places Face the Most Severe Consequences*, TIME (Sept. 30, 2019, 6:19 PM), https://time.com/5687470/cities-countries-most-affected-by-climate-change/ [https://perma.cc/46YM-TA94].

34. *See generally* Dante A. Caponera, *The Law of International Water Resources*, FOOD & AGRIC. ORG. OF THE U.N. (1980). *See also* David J. Lazerwitz, *The Flow of International Water Law: The International Law Commission's Law of the Non-Navigational Uses of International Watercourses*, 1 IND. J. OF GLOBAL LEGAL STUD. 247 (1993).

35. *See* Vanessa Richard, *Mind the (Justiciability) Gap: Non-Judicial Remedies and International Legal Accountability for Environmental Damages*, 2016 J.-R. YEH CLIMATE CHANGE LIABILITY & BEYOND 108-148.

environment and development to sustainable land management.[36] 197 nations have joined it,[37] but progress with goal alignment has been slow. The Convention laid out four strategic objectives and five operational objectives to guide the parties' actions. However, by the end of 2012, almost halfway through the designated time period, only eleven countries had aligned their national programs with the objectives. In addition, as of 2015, just over half of the National Action Plans were actually being implemented.[38] The total number of parties that have followed through with such plans is unknown. The UNCCD recognizes that "much more needs to be done" and that the Sustainable Development Goals set through 2030 are merely "stepping stone[s] towards a true land-based sustainable future."[39]

More famously, the Paris Agreement of 2015 aims to prevent rising global average temperatures by controlling greenhouse gas emissions.[40] Before the Conference of the Parties, the countries responsible for 97 percent of global greenhouse gas emissions submitted climate commitments.[41] Despite over 160 party states agreeing to these commitments, it is safe to assume that, as with the UNCCD, many states will miss the mark or made commitments[42] that will produce insufficient remedies. The agreement "contains provisions to hold countries responsible to their commitments and mobilize greater investments to assist developing countries in building low-carbon, climate-resilient economies,"[43] but there is a lack of clear and binding language regarding enforcement. Not every agreement provision creates a legal obligation; they contain a mix of mandatory and non-mandatory language meant to avoid contest and maximize membership.[44] Furthermore, even if all parties meet their goals by

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36. *About the Convention,* U.N. CONVENTION TO COMBAT DESERTIFICATION, https://www.unccd.int/convention/about-convention [https://perma.cc/MPU9-54KA].

37. *Reporting Process and the PRAIS*, U.N. CONVENTION TO COMBAT DESERTIFICATION, https://www.unccd.int/convention/reporting-process-and-prais [https://perma.cc/92RB-HF4Y].

38. Jeremy Smith, *Evaluation of the Effectiveness of National Action Programmes to Implement the United Nations Convention to Combat Desertification*, UNCCD EVALUATION OFFICE (2015), https://www.unccd.int/sites/default/files/relevant-links/2017-01/NAP%20evaluation_0.pdf [https://perma.cc/6NRT-795E].

39. *World Day to Combat Desertification 2019 concept note*, U.N. CONVENTION TO COMBAT DESERTIFICATION, https://www.unccd.int/world-day-combat-desertification-2019-concept-note [https://perma.cc/5SD7-78UB].

40. Paris Climate Change Conference, Paris Agreement under the U.N. Framework Convention on Climate Change, U.N. Doc. FCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

41. Han Chen, *The Paris Agreement on Climate Change*, NAT. RES.'S DEF. COUNCIL (Nov. 2, 2017), https://www.nrdc.org/resources/paris-agreement-climate-change [https://perma.cc/28EL-QD26].

42. Han Chen, *Implementing the Paris Agreement: 1st Year Progress Report*, NAT. RES.'S DEF. COUNCIL (Nov. 2, 2017), https://www.nrdc.org/experts/han-chen/implementing-paris-agreement-first-year-progress-report [https://perma.cc/YH3A-UHY4].

43. Han Chen, *supra* note 41.

44. Daniel Bodansky, *The Legal Character of the Paris Agreement*, 25 REV. EUR. COMP. &

2030, the achievements will be inadequate.[45]

Regional or bilateral water treaties are much more common[46] but are by nature limited in scope. Overwhelmingly, such agreements pertain to boundary governance and economic negotiations.[47] For example, in the Utilization of Waters of The Colorado And Tijuana Rivers and of The Rio Grande treaty between the United States and Mexico, both nations agree to share navigation and access rights.[48] The treaty recognizes conservation only as it relates to storage reservoirs and merely as "holding and conserving the water for disposal thereof as and when required . . ."[49] It obliges both parties to construct dams for the "conservation, storage and regulation of the greatest quantity of the annual flow of the [Rio Grande] river in a way to ensure the continuance of existing uses and the development of the greatest number of feasible projects."[50] Nothing in the treaty expresses or implies an environmental conservation objective.

Looking beyond treaties to customary international law, obligatory norms regarding environmental matters are notoriously difficult to define and are open to interpretation.[51] If the universal right to access safe drinking water is still a debated topic in the international community,[52] how far can a discussion on water conservation possibly go? The uncertainty surrounding the enforcement of customary obligations will not work well in the area of water rights. Adding to the complication, water distribution patterns are shifting towards extremes across the entire planet.[53] Determining the specific obligations countries have under a water conservation norm is difficult and subject to great amounts of ambiguity and daunting enforcement issues.[54]

INT'L ENVT'L 142, 142 (2016).

45. Kieran Mulvaney, *Climate Change Report Card: These Countries Are Reaching Targets*, NAT'L GEOGRAPHIC (Sept. 19, 2019), https://www.nationalgeographic.com/environment/2019/09/climate-change-report-card-co2-emissions/#close [https://perma.cc/J4A8-P37G].

46. Molly Espey & Basman Towfique, *International Bilateral Water Treaty Formation*, 40 WATER RESOURCES RES. (2004) (using the Oregon State University Transboundary Freshwater Dispute Database to find that of 347 treaties dating from 1864 to 2001, 285 (about 82 percent) are bilateral and 62 (about 18 percent) are multilateral).

47. *See generally* Jennifer Song & Dale Whittington, *Why Have Some Countries on International Rivers Been Successful Negotiating Treaties? A Global Perspective*, 40 WATER RESOURCES RES. (2004). *See also* Marit Brochmann & Paul R. Hensel, *The Effectiveness of Negotiations over International River Claims*, 55 INT'L STUD. Q. 859-882 (2011).

48. Utilization of Waters of The Colorado And Tijuana Rivers and of The Rio Grande, Mex.-U.S., Feb. 3, 1994, 297 U.S.T. 994.

49. *Id.* art. 1(f).

50. *Id.* art. 5(I).

51. Daniel Bodansky, *Customary (And Not So Customary) International Environmental Law*, 3 IND. J. GLOBAL STUD. 105, 107 (Fall 1995).

52. *See* Ramin Pejan, *The Right to Water: The Road to Justiciability*, 36 GEO. WASH. INT'L L. REV. 1181 (2004).

53. Gray, *supra* note 27.

54. *But see* Sara De Vido, *The Right to Water as an International Custom: The Implications*

Scholars have posited the formation of a singular, global, non-appropriative right in the planetary water cycle for freshwater allocations;[55] nevertheless, the possibility of universal cooperation around such a valuable resource is not realistic. Human rights laws have recognized that obligations to provide clean water must be in the context of sustainability, but no guidance or interpretations have been provided regarding what obligations nations have to ensure future availability.[56] The vague language allowed widespread adoption of such laws; restrictive obligations simply would not obtain significant approval. Unfortunately, restrictions are the very foundation needed for an effective international water law system.

Given the shortcomings and challenges of international law in its current state, change in water laws must happen at the domestic level first. Treaties often seek to embody customary norms, and at the core of customary law is *opinio juris* and state practice. Without unified state practice, international law would not exist. Furthermore, enforcing laws from the top down is ineffective when no functional mechanisms exist at the bottom. Only through domestic groundwork can change at the global scale take hold. Thus, states must turn to the more certain and effective domestic realm to address their water resources before turning to the global stage.

PART II: COMPARISON

A. U.S. Water Law

The United States has the world's third-largest supply of renewable freshwater resources.[57] Such abundance has led to relative nonchalance regarding water availability for most of the country. However, water supply data reveals a serious problem. In 1962, the United States had an estimated 15.1 thousand cubic meters of renewable freshwater resources available per capita.[58] In 2014, fifty-two years later, that availability had declined to 8.85 thousand cubic meters in 2014.[59] Nationwide data can be misleading, however, due to the drastically different water situations in different regions of the country. Most of the available fresh

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in Climate Change Adaptation Measures, 6 CARBON & CLIMATE L. REV. 221 (2012).

55. *See generally* Philippe Cullet, *Water Law in a Globalised World: The Need for a New Conceptual Framework*, 43 J. ENVTL. L. 233-254 (2011).

56. *See* Jootaek Lee & Maraya Best, *Attempting to Define the Human Right to Water with an Annotated Bibliography & Recommendations for Practitioners*, 30 GEO. ENVTL L. REV. 75-123 (2018).

57. John Misachi, *Which Country Has the Most Fresh Water?*, WORLD ATLAS (Sept. 24, 2018), https://www.worldatlas.com/articles/countries-with-the-most-freshwater-resources.html [https://perma.cc/42U5-MLU8].

58. *Renewable Internal Freshwater Resources Per Capita (cubic meters)—United States*, WORLD BANK, https://data.worldbank.org/indicator/ER.H2O.INTR.PC?end=2018&locations=US&start=1960&view=chart [https://perma.cc/QN7V-NT7E].

59. *Id.*

water resides in the eastern half of the country, which may not notice shortages for some time to come. In contrast, the west (as divided along a line running from North Dakota to Texas) is already suffering from water scarcity.[60] The National Aeronautics and Space Administration (NASA) has outlined that every region in the United States will face varying degrees of declining water supplies in the near future, except for the northeast region, which will nonetheless deal with its own set of climate concerns.[61]

U.S. water use law, as it currently stands, is characterized by dissimilar and murky state schemes that are loosely held together by common law roots and federal regulations. The common law introduced from the relatively small and well-watered British Isles, adequate to the needs of the 2.5 million colonists that originally populated the east coast, is still in use in a country with six major ecological biomes and over 330 million inhabitants.[62] Incremental changes made in U.S. water use laws since colonial days are not enough to accommodate modern demands, and the situation is reaching a critical point.

To prevent an influx to the courts of water conflicts, the United States needs a centralized system of water allocations that relies on data and science. To better understand what can be done to effect change, it is important to recognize the highly complex and varied legal doctrines which govern water rights in the United States. Not only are there distinctions between state legal schemes, but laws also differ depending on the source of water itself, primarily between surface waters and groundwater. [63] For this Note, a general understanding of the surface water doctrines—the traditional riparian doctrine and the prior appropriation doctrine—will suffice.

1. Riparian Rights

Under the common law riparian rights doctrine, "owners of land bordering on a waterway have equal rights to use the water passing through or by their property."[64] While such activity has been judicially restricted across the riparian

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60. K. Hansen, Meeting the Challenge of Water Scarcity in the Western United States, Competition for Water Resources, 2-18 (2017), https://doi.org/10.1016/j.jenvman.2019.05.157.

61. *The Effects of Climate Change*, NASA (June 13, 2019), https://climate.nasa.gov/effects/ [https://perma.cc/PZ3Z-NKAG].

62. *U.S. and World Population Clock*, U.S. CENSUS BUREAU (Feb. 1, 2021, 5:44PM UTC), https://www.census.gov/popclock/ [https://perma.cc/FQF8-L5SR].

63. *See* Water Systems Council, *A Summary of Existing Water Rights Laws: Who Owns The Water* 1 (Aug. 2016), http://nationalaglawcenter.org/wp-content/uploads/2017/03/Who-Owns-the-Water-2016-Update-FINAL.pdf ("At the present time, states generally follow one of five common law 'rules' for groundwater rights: the Absolute Dominion rule (a.k.a. Absolute Ownership rule or English rule) (11 states), the Reasonable Use rule (a.k.a American rule or Rule of Reasonableness) (17 states), the Correlative Rights doctrine (five states), the Restatement (Second) of Torts rule (a.k.a. Beneficial Purpose doctrine) (two states) and the Prior Appropriation doctrine (a.k.a. First in Time, First in Right seniority system) (13 states).").

64. *Riparian-rights doctrine*, NAT'L BLACK L.J. (10th ed. 2014).

jurisdictions to uses that are "reasonable,"[65] this standard is simple to meet. Reasonableness is determined in relation to the reasonable use of other rights holders; such uses that do not unreasonably interfere with the other rights holders' reasonable use are unrestricted.[66] In other words, as long as other right holders have equitable access to water, then the use is reasonable. Riparian laws vary state by state, and disputes have been settled through the courts. The courts' broad and liberal application of "reasonableness" has led to great inequity and environmentally unreasonable use.

Because of its shortfalls, the riparian rights system has been through significant transformation in the eastern states. As environmental concerns have taken hold across the country, so too has a movement in most riparian states towards a more regulated riparian system. Changes over the past decades, such as water quality[67] and permit systems,[68] have signaled the beginning of a water law regime geared towards more conservation management. While policy may be catching up with reality overall, the changes to riparian states have been varied and incremental.

2. Prior Appropriation

At the start of the westward expansion and the California Gold Rush, the need to address scarce water resources and non-adjacent water access arose. The adoption of a non-riparian system was predictable given the unfamiliar environment and the new role of water for irrigation and mining. Prior to the west's new water rights system, the United States owned virtually all lands in the west, and Congress had yet to establish any uses for the associated waters.[69]

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65. For a validation of the common law riparian doctrine and the beginning of the reasonable use doctrine, see Tyler v. Wilkinson, 24 Fed. Cas. 472,474 (C.C.D.R.I. 1827) ("There may be, and there must be allowed of that, which is common to all, a reasonable use. The true test of the principle and extent of the use is, whether it is to the injury of the other proprietors or not…The diminution, retardation, or acceleration, not positively and sensibly injurious by diminishing the value of the common right, is an implied element in the right of using the stream at all. The law here, as in many other cases, acts with a reasonable reference to public convenience and general good, and it is not betrayed into a narrow strictness, subversive of common sense, nor into an extravagant looseness, which would destroy private rights.").

66. For a monumental moment for limiting reasonable use through the Commerce Clause via navigable waters, see United States v. Willow River Power Co., 324 U.S. 499 (1945) (finding that lands below the high-water mark are subject always to a "dominant servitude" in the public interests of navigation).

67. *See generally* Clean Water Act, 33 U.S.C. § §1251- 1388 (1972).

68. States have rolled out water use permit systems as alternatives or supplements to riparian rights via agency managed regulations. *See generally* Robert H. Abrams, *Water Allocation by Comprehensive Permit Systems in the East: Considering a Move away from Orthodoxy*, 9 VA. ENVTL. L.J. 255 (1990).

69. Lawrence J. MacDonnell, *Prior Appropriation: A Reassessment*, 18 U. DENV. WATER L. REV. 228, 243 (2015).

Under this uncertainty, the new settlers led the way by establishing an early form of prior appropriation, and the judiciary followed their lead.[70] As a result, discussions about replacing the riparian system with legislative water use grants never took hold. Congress was passive as newly formed legislatures each created their own legal system for water use in their territories.[71]

While riparian rights are based on adjacent land rights, prior appropriation is based on "first in time, first in right" use of water irrespective of land. As opposed to the rights that extend from the land itself, prior appropriation allows rights owners to access a water source regardless of the user's land location.[72] Users with rights created earlier in time (senior right holders) theoretically reserve the right to take as much water as they need before users with rights created later in time (junior right holders).[73]

More limits were applied to the prior appropriation doctrine through trial and error, including "beneficial use," a concept similar to the "reasonable use" principle of riparian rights. Once the user properly diverts water, a right is instantly perfected against junior uses *as long as* the senior right is put to continuous and beneficial use within a reasonable period of time.[74] The parameters of beneficial use are defined by state law, and thus vary across the prior appropriation jurisdictions. Most jurisdictions define beneficial use broadly, while some have attempted to clarify the term through broad statutory or constitutional language.[75] The lack of clear meaning has led to a burden on the courts to decide which types of uses and amounts used fall under beneficial use, and which fall under wasteful use.[76] The great difference in legislative and judicial application of the doctrine has led to confusing laws that create a lack of national coherence.

Prior appropriation proponents favor the doctrine because of two main benefits: priority rights and perpetual rights.[77] In regard to priority rights, "[s]eniority, and the assurances it provides, encourages long-term investment in

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70. *Id.*

71. *Id.*

72. *Id.* at 246 (discussing Irwin v. Phillips, 5 Cal. 140, 145-47 (1855)). This stems from the fact that miners did not own the land they mined on. The land was still federal property, and as such, riparian rights did not extend to non-landowners.

73. 78 AM. JUR. 2D *Waters* § 372 (2021) The first to divert the water for their use is the prior appropriator, or senior right holder in relation to the subsequent diverter, the junior right holder. ("When the flow of a watercourse is insufficient to satisfy all appropriative claims, each claim is entitled to its full appropriation before the next junior claimant becomes entitled to any water.").

74. A. Dan Tarlock, *Western Water Law and the Challenge of Climate Disruption*, 48 ENVTL. L. 1,4 (2018). If the appropriated water is no longer being used, the right holder could lose that right. *See United States v. Gila Valley Irrigation District,* 859 F.3d 789 (9th Cir. 2017).

75. Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Us*e, 28 ENVTL. L. 919, 923-24 (1998).

76. For more details of the variations over legislative and judicial application of the beneficial use doctrine, see *id*.

77. MacDonnell, *supra* note 69, at 229-30.

the facilities needed to enable water use."[78] Meanwhile, "[p]erpetual rights, such as those provided under prior appropriation, are superior to term-limited rights proposed by riparian law reformers because of the certainty they provide."[79] The fundamental flaw in this analysis is it does not account for the day where the historic amount of water no longer exists. Seniority encourages use over conservation due to the risk of losing rights to junior holders—the exact opposite of sustainable use. Perpetual rights provide certainty for access to a source of water that is no longer certain in the modern reality. Such benefits are limitations to addressing the water crisis. In addition, the ability of prior appropriation to adapt to changing uses and needs is overestimated.[80] As with riparian rights, how far can a system based on priority rights and perpetual rights go to address problems that were not known at its formation? Prior appropriation unfittingly trusts those with prior rights to do the proper thing while providing incentives to do the damaging thing.

The shift from riparian rights to prior appropriation correlates with the realities of water scarcity. Today, all western states have a form of prior appropriation system.[81] Some states switched to prior appropriation downright. Other states went through a hybrid phase before leaving the riparian system or have remained a hybrid jurisdiction. Many states have enacted further regulations such as licensing for major water consumers and agency-controlled flow rates. A trend towards limiting the parameters of beneficial use has started or begun in many jurisdictions, correlating with the realization of environmental needs. In some jurisdictions, such as Florida, permits have been introduced for heavy consumers.[82] In California, ecological use is being recognized, and caps are being placed in times of drought.[83] These initiatives are a step in the right direction, but the inconsistent and state-based structure of water laws will not solve the large-scale problems of the foreseeable future. The inherent flaw in both riparian and appropriative principles is the lack of judicial and legislative understanding of the very resource the doctrine was designed to govern. One problem—interstate conflict over water allocation—is already evident with the Colorado River.

3. The Colorado River

The Colorado River supplies water for one in eight Americans.[84] The river,

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78. *Id.* at230.

79. *Id.*

80. *But see* i*d.* at 232.

81. Chennat Gopalakrishnan, *The Doctrine of Prior Appropriation and Its Impact on Water Development: A Critical Survey*, 32 AM. J. ECON. & SOC. 61, 61 (1973).

82. *Consumptive Water Use Permits*, S. FLA. WATER MGMT. DIST., https://www.sfwmd.gov/doing-business-with-us/permits/water-use-permits [https://perma.cc/NC3E-5DNR].

83. Alastair Bland, *What Are Water Allocations for the Environment?*, WATER DEEPLY (Feb. 24, 2016) [https://perma.cc/8HRS-PR6X].

84. Eric Holthaus, *40 Million Americans Depend on the Colorado River. It's Drying Up.*, MOTHER JONES (Dec. 17, 2018) https://www.motherjones.com/environment/2018/12/40-million-

a force of nature for over six million years,[85] is now reduced to a trickle before it reaches the sea. As Americans withdraw more than eighty percent of the river's renewable water supply each year,[86] the diminishment continues to advance further upstream as consumption and climate change hastens its depletion. Climate change alone is expected to further reduce the river's flow by five to twenty percent over the next forty years.[87] Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming, and the United States federal government all have interests in the Colorado River. These entities now manage and operate the river under a combination of agreements, common law, federal law, state law, judicial opinions, judicial decrees, contracts, and regulatory guidelines that have formed as a result of enduring allocation conflicts.[88]

Conflicts over the Colorado River first arose in the early 1920s when the upper river states (senior rights holders) were concerned that the developing lower states (junior appropriators) would interfere with their rights to future flows under the prior appropriation doctrine.[89] The states attempted to apportion water allocations to each state,[90] but no consensus was reached.[91] With the help of then-Secretary of Commerce Herbert Hoover,[92] the Colorado River Compact (1922) was negotiated, apportioning the exclusive, beneficial consumptive use of 7.5 million acre-feet of water per year from the Colorado River system to each of the upper and lower basins in perpetuity.[93] But without firm and fair individual allocations, Arizona refused to sign for more than two decades.[94] The tension

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americans-depend-on-the-colorado-river-its-drying-up/ [https://perma.cc/H3AQ-2RWR].

85. Sarah Zielinski, *The Colorado River Runs Dry*, SMITHSONIAN MAG. (Oct. 2010) https://www.smithsonianmag.com/science-nature/the-colorado-river-runs-dry-61427169/ [https://perma.cc/SX8G-VNLW].

86. Brittany Malooly, *America Is Running Out of Water,* VICE (June 23, 2014, 1:20 AM) https://www.vice.com/en_us/article/8gdmpx/america-is-running-out-of-water [https://perma.cc/TC2B-YJZ7].

87. Zielinski, *supra* note 85.

88. *See* Charles V. Stern & Pervaze A. Sheikh, CONG. RES. SERV., R45546, Management of the Colorado River: Water Allocation, Drought, and the Federal Role (2019).

89. *The Law of the River,* U.S. BUREAU OF RECLAMATION (Mar. 2008) https://www.usbr.gov/lc/region/g1000/lawofrvr.html [https://perma.cc/VG7V-W2HN].

90. Colorado River compact's allocations were determined by looking at rainfall from prior years. To this day, almost a century later, those numbers are relied upon for water allocations.

91. *The Law of the River, supra* note 89.

92. *Id.*

93. Colorado River Compact (1922), Article III(a). *See generally* Colorado River Compact (1922), Article III(b) ("In addition to the apportionment in paragraph (a), the Lower basin is hereby given the right to increase its beneficial consumptive use of such waters by one million acre-feet per annum.").

94. *Reclamation and Arizona*, U.S. BUREAU OF RECLAMATION, https://www.usbr.gov/lc/phoenix/AZ100/1950/whiskey_drinking_water_fighting.html [https://perma.cc/85L5-8ZST]; The Boulder Canyon Project Act of 1928 apportioned the lower basin states' allocations, authorized construction of the Hoover Dam, and gave the Secretary of the Interior sole discretion to contract

reached a peak when Arizona directed its National Guard and militia units to the California border to protest California's diversions of the Colorado River under the motto "[w]hiskey is for drinking, water is for fighting."[95] The hostility turned into a series of cases captioned *Arizona v. California*,[96] one of which is considered one of the lengthiest and costliest water disputes in the Supreme Court.[97] This lengthy dispute caused other interested states and groups, either voluntarily or by motion, to become parties to stake their claims.[98] The desire by end-users, states, and even nations for certainty in their access to transboundary water continued the clash for decades to come.

In 1948, Arizona, Colorado, New Mexico, Utah, and Wyoming negotiated the Upper Colorado River Basin Compact to allocate the water amongst themselves.[99] Along with negotiating the interstate apportionments, the states were dealing with ongoing internal conflicts among their priority holders.[100] There was also conflict with Mexico over the river's usage, which gave rise to the 1944 Utilization of Waters of The Colorado And Tijuana Rivers and of The Rio Grande treaty.[101]

The Colorado River has been severely impacted by the push to build dams, which swept the nation in the twentieth century. From 1950 to 1980, the United States built roughly 40,000 dams.[102] The most famous of these is the Hoover Dam, which restricts the flow of the Colorado River and has the capacity to store up to more than nine trillion gallons of water in the Lake Mead reservoir at a depth of approximately 1,225 feet.[103] Halting and redirecting the flow of that much water has led to the destruction of entire downstream ecosystems and

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the lower basin's water usage. Boulder Canyon Project Act of 1928.

95. *Id*.

96. Arizona v. California et al., 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), and 531 U.S. 1 (2000).

97. *Arizona v. California*, U.S. DEP'T OF JUST. (Aug. 2017), https://www.justice.gov/enrd/arizona-v-california [https://perma.cc/Y48Z-85Q9] (discussing Arizona v. California, 373 U.S. 546 (1963)).

98. Arizona v. California, 373 U.S. 546, 551 (1963) (discussing that Nevada, New Mexico, Utah, and the United States were added to resolve the "basic controversy in the case . . . how much water each State has a legal right to use out of the waters of the Colorado River and its tributaries").

99. Upper Colorado River Basin Compact (1948), Article III (allowing for Arizona the use of 50,000 acre-feet of water per annum, allowing Colorado the use of 51.75 per cent, New Mexico the use of 11.25 percent, Utah the use of 23 percent, and Wyoming the use of 14 percent).

100. *See generally* Boulder Canyon Project Agreement: Requesting Apportionment of California's Share of the Waters of the Colorado River Among the Applicants in the State (1931).

101. Utilization of Waters of The Colorado And Tijuana Rivers and of The Rio Grande, Feb. 3, 1944, Stat. 994.

102. Anna Lieb, *The Undamming of America*, PBS (Aug. 12, 2015) https://www.pbs.org/wgbh/nova/article/dam-removals/ [https://perma.cc/63M5-GEB6].

103. *Lake Mead Hits All-Time Low Amid Ongoing Drought*, CBS NEWS (May 22, 2016, 10:31 AM), https://www.cbsnews.com/news/lake-mead-hits-all-time-low-amid-ongoing-drought/ [https://perma.cc/2TE8-YM9K].

restricted downstream water access. Also troubling is the decrease in Lake Mead's holdings. In January of 2019, Lake Mead's water level fell to 1,082.75 feet.[104] To note the severity of the situation, the lake can no longer generate hydroelectricity at 1,050 feet, and it will be unable to provide downstream water at 895 feet—the height of the lowest water outlet at Hoover Dam.[105]

States have begun measures for the day when the Colorado River can no longer supply water for current consumption patterns. Nevada has tunneled a path for water to be drained from the bottom of Lake Mead once levels reach 895 feet.[106] This 3-mile tunnel will supply water to Las Vegas, a city whose existence derives from excessive water appropriation.[107] California is investing in desalination.[108] Colorado is looking towards the controversial practice of cloud seeding.[109] All states are looking into appropriating other sources of water as well as redistributing allocations made under the Basin Compact. The dynamic among the Colorado Basin states and the impending water crisis along the Colorado River reinforces the need for a comprehensive and integrated water law system.

B. Australian Water Law

1. The System

Like the United States, Australia inherited the English common law and established a federalist governmental structure governed by a constitution as the supreme law of the land.[110] The Australian Constitution, like the U.S. Constitution, strictly separates the powers between the executive, legislative and judicial branches of government. [111] Significant to this analysis is Section 107 of the Australian Constitution, which lays out the principle of federalism by

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104. *Lake Mead at Hoover Dam, End Of Month Elevation (Feet),* BUREAU OF RECLAMATION (Jan. 5, 2021) https://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html [https://perma.cc/CS7A-QQLP].

105. Michael Hiltzik, *Column: Despite Signs of Interstate Cooperation, The Decline of Lake Mead Isn't Near Being Solved*, L.A. TIMES (Feb. 8, 2019, 12:14 PM), https://www.latimes.com/business/hiltzik/la-fi-hiltzik-lake-mead-20190208-story.html [https://perma.cc/AK8V-DXUB].

106. *Id.*

107. *The Third Straw*, NAT'L PARK SERV. (April 5, 2017), https://www.nps.gov/lake/learn/the-third-straw.htm [https://perma.cc/YB2D-22AF].

108. Robin Kundis Craig, *Water Supply, Desalination, Climate Change, and Energy Policy*, 22 PAC. MCGEORGE GLOBAL BUS. & DEV. L.J. 225, 241 (2009) (explaining that desalination has high energy costs and it poses other environmental concerns).

109. Jonathan Romeo, *As the Southwest Dries Out, Water Managers Increasingly Look to Cloud Seeding,* DURANGO HERALD (Jan. 18, 2020, 5:03 AM) https://durangoherald.com/articles/310889 [https://perma.cc/FDG8-BFMD].

110. Donald Gordon, *Legal Systems in Australia: Overview*, WESTLAW AUSTL. (last updated Jan. 1, 2020).

111. *Id.*

preserving the right of states to maintain their own state constitutions and laws.[112] As in the United States, the Australian federal government is forbidden to interfere with powers that have been vested in the individual states.

2. The Rapid Shift to Statutory Law

First arriving in Australia in 1788, early European settlers brought with them the common law riparian rights from England. [113] The adjacent rights and reasonable use principles were questioned early on, given the arid nature of the environment, but it was not until almost a century later that the first water legislation was established to replace the common law riparian doctrine. The Victoria Water Distribution and Conservancy Act of 1881 began to put control of water in an institutional waterworks trust.[114] Local governments could consequently borrow money from the federal government to construct waterways and charge water rates to repay the loan.[115] This legislation allowed control of water through water rates and paved the way for control of the water through the constructed waterways themselves.[116] An 1883 amendment added the creation of irrigation trusts.[117]

Around the 1880s, severe drought and the lure of efficient national action led to lobbying for a federally backed irrigation system took place in the state of Victoria.[118] Alfred Deakin, a member of Parliament and future prime minister, traveled to the United States to study the irrigation laws in California and Colorado.[119] He saw that the "legal uncertainty" of implementing a similar system without altering water rights was to be avoided.[120] However, Deakin was inspired by Colorado law regarding government ownership of all surface waters.[121] With his urging, the Victorian Irrigation Act of 1886 was passed, abolishing the creation of any new riparian rights and replacing all current rights to water in Victoria with statutory rights.[122]

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112. *Id.*

113. Edwyna Harris, *Lobbying for Legislation: An Examination of Water Rights Transition in Colonial Australia 1840-1886*, Monash Univ. Dep't of Econ. (Dec. 2006).

114. *Water Distribution and Conservation Act 1881* (Vict.) (Austl.) (allowing local districts to borrow funds from the federal government to build water infrastructure. These trusts would implement charge rates for water use to pay back those funds).

115. 1 Context Pty Ltd, VICTORIAN WATER SUPPLY HERITAGE STUDY: THEMATIC ENVIRONMENTAL HISTORY 32 (2007).

116. *Id.*

117. *Water Conservation Act 1883* (Vic) s 105 (Austl.).

118. Harris, *supra* note 113, at 2.

119. *Id.*

120. Memorandum from The Hon. Alfred Deakin, President of the Royal Comm'n on Water Supply, to the Members of the Royal Comm'n on Water Supply (Jun. 15, 1885) (on file with Cal. State Univ., Monterey Bay).

121. *Id.*

122. Harris, *supra* note 113, at 12. S*ee also* Hanson v. Grassy Gully Gold Mining Co., (1900)

In an effort to develop irrigation of its uninhabited land, New South Wales adapted the Victorian Act into its own Water Rights Act of 1896.[123] The Act statutorily vests in the Crown, i.e., the state, the common law right to water in rivers and lakes.[124] While its purpose was primarily productivity, water conservation was a consideration in its enactment. Together, the Victorian Irrigation Act and the Water Rights Act introduced one of Australia's earliest models for water rights[125] and water management.[126] As fate would have it, by 1905, Victoria's irrigation trusts became insolvent after irrigation canals ran dry from use and further drought.[127] The Water Act of 1905 abolished all irrigation trusts and gave complete control of all irrigation systems to the state of Victoria,[128] furthering government control over the statutorily allotted water resources.

While the overall shift toward a unified, statutory system occurred relatively fast, states have experimented with water policies. For example, in a short-lived experiment with water management beginning in 1930, New South Wales adopted the United States' prior appropriation doctrine to provide more secure rights in times of shortage.[129] By 1946, the doctrine had disappointed and was abandoned in favor of the previous nonpriority permit system.[130] New South Wales did, however, retain the "beneficial use" classifications to define certain classes of irrigation within the permit system.[131]

3. The Rise of Intergovernmental Cooperation

An early development in Australia's intergovernmental cooperation over water resources was the 1914 River Murray Waters Agreement, negotiated by Victoria, South Australia, New South Wales, and the Commonwealth (i.e., the federal government).[132] While focused only on sharing interjurisdictional waters,

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21 NSWLR. 271, 275 (Austl.).

123. Peter N. Davis, *Australian and American Water Allocation Systems Compared*, 9 B.C. L. REV. 647, 656 (1968).

124. *Water Rights Act* 1896 (Vic) (Austl.).

125. Today, water rights planning varies across the states. These volumetric allocations to a right holder, either permanent or yearly, fluctuate based on changing conditions defined by water plan guidelines and the water market. Some states prioritize certain entitlements, while others do not recognize certain entitlements altogether. For example, licenses and permits are required for all activities involving water extraction in South Australia while Queensland rejects exclusive environmental allocations in favor of environmental flow regulations. For more information, see *Productivity Commission*, WATER RIGHTS ARRANGEMENTS IN AUSTRALIA AND OVERSEAS (2003).

126. *Id.* at 43.

127. Davis, *supra* note 123, at 657.

128. *Id.*

129. *Id.* at 661.

130. *Id.* at 662.

131. *Id.*

132. Paul Kildea & George Williams, *The Constitution and the Management of Water in*

this agreement's cooperation scheme became a common theme in developments throughout the twentieth century. The parties to the 1914 River Murray Waters Agreement continued the cooperation by adopting the 1987 Murray-Darling Basin Agreement in response to the need to address increasing water problems.[133] Subsequent amendment of the 1987 agreement introduced transboundary water accounting methods, interstate transfer of water entitlements, and caps on future water allocations at baseline conditions.[134]

A public movement for even stricter water management grew out of the severe droughts of the 1990s.[135] Although the country was making significant strides toward a more efficient water management system, the mechanisms in place at the time were not enough to ensure continued sustainability; more considerable change needed to occur. The Council of Australian Governments' (COAG) Water Reform Framework, established in 1994, laid the foundation for efficient and sustainable water industry.[136] Under this comprehensive framework, water markets[137] were formed, water pricing and property rights were clearly defined, the environment was recognized as a legitimate water user, regulatory authority was removed from water service providers, and a more holistic pricing scheme for water was established.[138]

While environmental urgency drove cooperation among the states, federal authority to give grants under Section 96 of the Constitution helped incentivize

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Australia's Rivers, 32 SYDNEY L. REV. 595, 598 (2010).

133. *Id.*

134. *Id.* at 598-99.

135. Anthony S. Kiem, *Drought and water policy in Australia: Challenges for the future illustrated by the issues associated with water trading and climate change adaptation in the Murray–Darling Basin*, 23 GLOBAL ENVTL. CHANGE 1615, 1616 (2013).

136. Water Rights Act 1896 (NSW) (Austl.).

137. Australian Water Markets, Austl. Gov't: Dep't of Agric., Water and the Env't (Oct. 15, 2020), https://www.agriculture.gov.au/water/markets [https://perma.cc/BUG4-XDU7]. Water markets are a mechanism through which the country assigns value to water, thereby creating incentives for allocating water usage to higher priority consumption and encouraging efficient usage. Permanent entitlements (an ongoing share of volumetric allotments) and seasonal allocations (the remaining volumes after permanent entitlement allotments). In times of scarcity (high water value), the market allows users to buy or sell their water allocations according to the value of the water against the value of its use. *See also* Lauren Taylor, *Drought Down Under and Lessons in Water Policy for the Golden State*, 40 ENVIRONS ENVTL. L. & POL'Y J. 53, 71-72 (2016). Because licenses are capped and limited, sales of allocations (either on a term basis or in perpetuity) occur in a government facilitated online water market management system. This allows for highly accurate, real-time price tracking, and right transfer. Similar to a stock trading system where prices fluctuate based on supply and demand, but this water market only facilitates transactions rather than active trading (buyers and sellers of water rights negotiate independently. Volumetric trading (known as temporary trading) is also allowed in addition to permanent transfers. The trend in water trading is the lower the seasonal allocation, the higher activity on the market.

138. *Water Rights Act 1896* (NSW) (Austl.).

positive collaboration.[139] The Commonwealth used this power to encourage the formation of interstate agreements or opt-in initiatives to be facilitated by the federal government.[140] States were encouraged to invoke their exclusive rights to govern their water with the help of federal benefits. In 1995, the Water Reform Framework was implemented as part of the National Competition Policy to promote efficient water use and achieve environmental goals.[141] The policy, a national initiative for economic reform, distributes payments to participating states and territories that have achieved satisfactory progress on their reform commitments pursuant to the Commonwealth Competition Policy Reform Act.[142] This balance remains at the core of Australia's modern water system. Water regulation remains a matter of state law while sustainability and regulatory objectives are established at the federal level.

With the establishment of the interstate agreement framework, Australia continued its reformative water management vision. Fueled by the Millennium Drought beginning in 1997 and the desire for more specificity, the 2004 National Water Initiative (NWI) was enacted.[143] The NWI aims to achieve economically efficient water use and improved environmental water outcomes.[144] The initiative mandated water planning provisions for environmental needs and standardized a national water entitlements system.[145] Other goals introduced under water reform include intergovernmental risk allocation for water availability scenarios and effective water accounting standards for a more robust water market.[146]

4. Invoking Constitutional Authority

Despite the progress made under interstate cooperation and federal grant power, a movement for a more unified federal system continued to grow. The most effective route for reform of a state-controlled area was under Section 51 (xxxvii) of the Constitution. It provides that the Commonwealth Parliament may make laws on "matters referred to the Parliament of the Commonwealth or

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139. Kildea & Williams, *supra* note 132, at 604.

140. *Id.*

141. COUNCIL OF AUSTL. GOV'TS, COUNCIL OF AUSTRALIAN GOVERNMENTS' WATER REFORM FRAMEWORK (1994).

142. *About the National Competition Policy*, NAT'L COMPETITION COUNCIL, http://ncp.ncc.ov. au/pages/about [https://perma.cc/76LZ-MSQ6].

143. Taylor, *supra* note 137, at 65.

144. Intergovernmental Agreement on a National Water Initiative, 1(2004) (Between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory); Under the NWI, risk allocation is placed on the Commonwealth for any governmental actions that lead to water shortage while entitlement holders bear the remaining risk for climate situations.

145. *NWI Objectives*, AUSTL. GOV'T: NAT'L WATER COMM'N (Jun 15, 2016), https://ebarchive.la.gov.au/awa/20160615061116/http://www.nwc.gov.au/nwi/objectives [https://perma.cc/P2P8-VTJ5].

146. *Id.*

Parliaments of any State or States, but so that the law shall extend only to States by whose Parliaments the matter is referred, or which afterwards adopt the law."[147] No laws prevent states from restricting their own water rights. The referral powers were brought up during the creation of the Water Act of 2007 ("the Act").[148] However, Victoria's hesitance to refer its authority led to additional action by the Commonwealth to enforce the Act.[149]

In the context of public support for water management and economic reform, the Commonwealth Parliament relied on constitutional maneuvering to enact large-scale influence over the exclusive power of the states. Parliament turned to its constitutional authority over external affairs, corporations, trade and commerce, and other matters.

The first authority Parliament used was the ability to enact laws concerning external affairs, i.e., international treaty compliance, under Section 51(xxix) of the Constitution.[150] The High Court broadly interpreted this power in the 1983 *Tasmanian Dam* case as giving general authority to implement international obligations assumed by Australia.[151] This authority has remained a key component of environmental action at the federal level, and there is no sign of diminishment of this power given the relevance of global concerns over climate change.[152]

Section 51(i) provides legislative authority relating to "trade and commerce with other countries, and among the states."[153] Despite the broad language, the Australian courts have never applied such authority to include anything remotely related to commerce.[154] This power to regulate interstate commerce is limited by Sections 92 and 99 regarding protectionist practices[155] and Section 100 regarding the use of river waters for conservation and irrigation.[156]

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147. *Australian Constitution* s 51.

148. Kildea & Williams, *supra* note 132, at 605.

149. Paul Kildea & George Williams, *The Water Act and the Murray-Darling Basin Plan*, 22 PLR 9 (2011). It was not until the 2008 Intergovernmental Agreement on Murray-Darling Basin Reform that all parties agreed to refer limited powers for the Commonwealth. After intense negotiations, each state and territory agreed to use their best endeavors to enact legislation to refer powers to the Commonwealth Parliament for specific Water Act reform purposes.

150. *Australian Constitution* s 51; s*ee also* Robyn Briese et al., Legal Briefing No. 90, AGS (Jul. 21, 2009), https://www.ags.gov.au/publications/legal-briefing/br90.htm.

151. *Commonwealth v Tasmania* (1983) 158 CLR 1 (Austl.); Section 109 of the Constitution provides that a Commonwealth law on the same topic as a State law will override that State law to the extent of any inconsistency. Because of the court's broad application of the external affairs and corporations power, the Tasmanian legislation to build a dam is inconsistent with the federal environmental legislation.

152. Kildea & Williams, *supra* note 132 at, 602.

153. *Australian Constitution* s 51.

154. Greg Taylor, *The Commerce Clause – Commonwealth Comparisons*, 24 B.C. INTL. & COMP. L. REV. 235, 247-48 (2001).

155. *Australian Constitution* s 92, 99.

156. *Australian Constitution* s 100. To compromise with the broad federal powers vested in

To supplement the Trade and Commerce Clause, the Commonwealth turned to the Section 51(xx) corporations power over "foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth."[157] The 2006 decision in *Work Choices*[158] laid the groundwork for broader federal discretion:

> the power conferred by s 51(xx) of the Constitution extends to the regulation of the activities, functions, relationships and the business of a corporation described in that sub-section, the creation of rights, and privileges belonging to such a corporation, the imposition of obligations on it and, in respect of those matters, to the regulation of the conduct of those through whom it acts, its employees and shareholders and, also, the regulation of those whose conduct is or is capable of affecting its activities, functions, relationships or business.[159]

This was a major shift to a more centralized federalist system and a literalist approach to constitutional interpretation.[160] With this decision in hand, along with previous interpretations, the Commonwealth passed the Water Act of 2007.

As the most extensive project on water management, the Commonwealth allotted ten billion dollars for the Act's objectives to invest in irrigation infrastructure, remedy over-allocation problems through large scale entitlement buyback programs, centralize water information, and reform decision making processes in the Murray-Darling Basin.[161] Section 3 of the Act highlights the objective to create a transparent, unified, and purposeful water use system that "optimizes economic, social, and environmental outcomes."[162] The Act remains in force, but recent amendments contain measures that conflict with the centralized approach and environmental policies.[163] As politics influence the outcome of the interstate water system, the conflicts over water consumption and environmental conservation are ongoing.[164]

While constitutional authority has been upheld, Australia's system has been mostly driven by state cooperation and federal incentives.[165] The interplay

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section 51(i) and section 98, Section 100 of the Constitution states that "[t]he Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation."

157. *Australian Constitution* s 51.

158. New South Wales v Commonwealth (2006) 229 CLR 1, 75 (Austl.).

159. *Id.*

160. Michael Olds, *Spheres of Power: The High Court as Custodian of Co-Ordinate Federalism*, 6 WESTERN AUSTL. JURIST 241, 253, 256 (2015).

161. Kildea & Williams, *supra* note 149.

162. *Water Act 2007* (Austl.).

163. *Id.*

164. Emma Carmody, *Less water, less transparency – the latest amendment to the Commonwealth Water Act 2007*, ENVTL. DEFENDERS OFF. (Jul. 5, 2018), https://www.edonsw.rg.au/amendment_cwealth_water_act_2018 [https://perma.cc/7H5G-H883].

165. Hon. Justice Rachel Pepper, *The Constitutionalisation of Water Rights: Solution or*

between constitutional restrictions on federal authority and the interests of states over their exclusive water rights remains. The Australian system is not a perfect model, but it offers significant lessons for the U.S. if Americans are willing to learn.

PART III: THE UNITED STATES REFORM

As the preceding brief history of Australia's water laws shows, Australians have been working on water law reform for nearly two hundred years. Even so, reforms have proven insufficient to stop the impending depletion of water throughout the country.[166] While Australia has not managed to fully address its water concerns, it is in a much better place to solve its water problems than the United States. The United States could benefit from the same constitutional maneuvering, federal coercion, and interstate cooperation that Australia has used to implement a more cohesive water law system based on accountable water consumption and environmental considerations.

A key component for change in Australia was and is public support; this may be a stumbling block for reform in the United States. Before any talk of using federal constitutional powers to effect change in water laws, an important shift in society and its values would have to occur. Many Americans still deny that climate change is real.[167] This has changed in recent years,[168] but whether there is enough public support for such a significant change remains unknown. Without the backing of a public that understands the severity of the situation, the political environment would be in no shape to take on reform of this magnitude. Droughts and water problems like those of Australia are unknown to a significant number of Americans. It is difficult to start a national transformation when only a few states are under pressure to change. Different experiences in the various regions of the United States have led to further differentiated water law systems as states attempt to address the problems individually. Australia shifted from individual property rights to a more centralized system motivated by social support, and that is where the United States must start.

A unified, statutory reform of the common law systems in the United States would bring much more certainty and efficiency to water management. While a complete discussion of what this reform would look like is beyond the scope of this paper, the United States has the potential to follow Australia's path. There are similarities between the two countries' water histories; the main divergence point lies in the urgency to act. Australia, which recognized the urgency early on, has shown that change is possible by first recognizing the federal role in unifying state-vested systems.

Levee? 26 AUSTL. ENV'T REV. 1, 6-7 (2011).

166. Trian, *supra* note 29.

167. Oliver Milman & Fiona Harvey, *US is hotbed of climate change denial, major global survey finds*, THE GUARDIAN (May 8, 2019), https://www.theguardian.com/environment/019/may/07/us-hotbed-climate-change-denial-international-poll [https://perma.cc/94PN-3YJS].

168. *Id.*

A. Temporary Remedies

Several states have statutorily listed or defined beneficial uses.[169] Some states have embraced modern interpretations of common law water use concepts. To varying degrees, the two antiquated doctrines have seen an evolution in how they are implemented across the United States, including the emphasized concept of wasteful use.[170] Though a temporary solution, one path for reform lies in the beneficial use and reasonable use language of prior appropriation and riparian doctrines, respectively. Having a more specific and purposeful classification structure allows for more effective allocation of water use. A small-scale example of potential reform exists in the sweeping classification of agriculture as a beneficial use by all western states.[171] The problem inherent in this classification is the varied nature of agricultural water consumption.[172] Certain crops, like avocados, require exorbitant amounts of water, while others are more water-efficient.[173] To address this, states could classify low-water-consuming crops as beneficial and high-water-consuming crops as less or not beneficial. This, in effect, causes rights holders to, at minimum, consider water availability in their use decisions—especially in context of shared waters. Narrowly and strategically defining the scope of beneficial use and reasonable use can allow for change without invoking a major Takings Clause[174] discussion.

In the case of the Colorado River, the actions by the individual basin states are misplaced. Digging tunnels to drain the lake from the bottom or renegotiating water allocations are temporary solutions that will only build upon an imminent crisis. These states must undertake full-scale reform of these outdated water laws by implementing a national system of statutory laws or regulations that manage the country's water supply as a single resource. Australia has done precisely this and provides a valuable model.

B. Federal Influence

The federal governments of both Australia and the United States have gained

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169. Frank J. Trelease, *The Concept of Reasonable Beneficial Use in the Law of Surface Streams*, 12 WYO. L.J. 1 (1957).

170. Brian E. Gray, *The Reasonable Use Doctrine in California Water Law and Policy*, in SUSTAINABLE WATER: CHALLENGES AND SOLUTIONS FROM CALIFORNIA (Allison Lassiter ed., 2015).

171. Janet Neuman, *Beneficial Use, Waste, And Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 923-24 (1998).

172. Agricultural water usage and subsidization is an interesting topic, but one that exceeds the needs of this conversation.

173. Tom Philpott, *It Takes HOW Much Water to Grow an Avocado?!*, MOTHER JONES (Oct. 1, 2014), https://www.motherjones.com/food/2014/10/avocado-drought-chile-california/ [https://perma.cc/2QT2-ZM2C].

174. U.S. CONST. amend. V ("[P]rivate property [shall not] be taken for public use, without just compensation.").

more power relative to their states over time.[175] Because of this, both federal governments have gained a high degree of persuasive influence. Australia has used this leverage to facilitate state cooperation over state-vested water regulation through its grants power. The United States has likewise used its leverage to regulate "waters of the United States" and highways under the Clean Water Act[176] and Clean Air Act,[177] laws that were monumental for environmental reform.[178] If national initiatives for a centralized regulation system for water and air pollution can exist, so can an initiative for a unified water management system.

C. The Constitution

Constitutional amendment and full national reform are the only true solutions to our coming water crisis. However, these are unlikely in the current political climate[179] and the continued conflicts over water rights among the states.[180] Short of the ideal, the United States has potential entry points for reform in the Commerce Clause, the Treaty Clause, the Spending Clause, and the public trust doctrine. These entry points are not unlike the authority used by the Australian federal government derived from various powers in the Australian Constitution.

1. Commerce Clause

Australia has relied on a combination of several constitutional authorities to implement its reform: external affairs power, trade and commerce power, and corporations power, among others.[181] On the other hand, the United States' Commerce Clause has been the main, if not sole, authority used for broad application of federal power.[182] Regarding transboundary rivers, "disputes are resolved in one of three ways: by interstate compact; by congressional apportionment of the waters using the Commerce Clause in the United States

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175. *Amalgamated Soc'y of Eng'rs v Adelaide Steamship Co Ltd* (1920) 28 CLR 129 (Austl.); M'Culloch v. Maryland, 17 U.S. 316 (1819).

176. Federal Water Pollution Control Act of 1972, Pub. L. 92-500 (amended 1972) (current version at 33 U.S.C. § 1251 et seq.).

177. Clean Air Act, 42 U.S.C. § 7401 et seq. (1970).

178. CONG. RES. SERV., FEDERAL GRANTS TO STATE AND LOCAL GOVERNMENTS: A HISTORICAL PERSPECTIVE ON CONTEMPORARY ISSUES 1 (2019). Beyond environmental protection, federal influence can be seen in the realm of health care, transportation, income security, public education, economic growth, social services, and community development.

179. Oliver Milman, *Political polarisation over climate crisis has surged under Trump*, THE GUARDIAN (Oct. 11, 2019), https://www.theguardian.com/environment/2019/oct/11/political-polarisation-climate-crisis-trump [https://perma.cc/R73Q-E8SX].

180. Brian Clark Howard, *Water Wars Threaten America's Most Endangered Rivers*, NAT'L GEOGRAPHIC (April 12, 2016), https://www.nationalgeographic.com/news/2016/04/160412-americas-most-endangered-rivers-list-conservation/ [https://perma.cc/6GP9-7FM2].

181. *See* Part II (B)(4).

182. U.S. CONST. art. I, § 8, cl. 3.

Constitution; or by litigation before the United States Supreme Court."[183] The Commerce Clause has been used in the water context since the recognition of navigable waters under the riparian system in *U.S. v. Willow River Power Co*.[184]

The Australian "Trade and Commerce Clause" is broader at face value. Still, its courts have refused to interpret it so broadly as to include any activity affecting commerce,[185] going as far as excluding "production" as a part of trade or commerce.[186] Contrastingly, the American Commerce Clause was interpreted to include anything imaginably related to commerce up until *U.S. v. Lopez*[187] and *U.S. v. Morrison*.[188] It is here that much change could be gained toward a more centralized water governing system. Water is the foundation of economies across the world, and as such, the argument could be made that water is a channel or instrumentality of interstate commerce or that the regulation of water substantially affects interstate commerce. However, in a post-Lopez world, the fate of the Commerce Clause is unclear. While the clause has been applied liberally in the environmental context until the 1995 decision, the direction is uncertain regarding the future of federal regulation of environmental conservation.[189] Because of the abstract nature of water, courts have a hard time defining its role in interstate commerce.[190] Some sources of water, such as navigable waters,[191] are more situated for federal regulation than others.[192] This

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183. Adam Webster, *Sharing Water from Transboundary Rivers in Australia—An Interstate Common Law?*, 39 MELB. U. L. REV. 263, 267 (2015).

184. United States v. Willow River Power Co., 324 U.S. 499 (1945).

185. *R v Burgess; Ex Parte Henry* (1936) 55 CLR. 608, 628 (Austl.).

186. *Grannall v Marrickville Margarine Ltd* (1955) 93 CLR. 55, 64 (Austl.); The United States equivalent is found in United States v. E.C. Knight, 156 U.S. 1, 12 (1895).

187. United States v. Lopez, 514 U.S. 549 (1995).

188. United States v. Morrison, 120 S. Ct. 1740 (2000).

189. George Cameron Williams & Robert L. Glicksman, PUB. NAT. RESOURCES L. § 3:16 (2d ed.).

190. Rapanos v. United States, 547 U.S. 715 (2006). The plurality contests the identity of the water source and the scope of the Commerce Clause in light of the significant nexus test. *See also* John A. Leman, *The Birds: Regulation of Isolated Wetlands and the Limits of the Commerce Clause*, 28 U.C. DAVIS L. REV. 1237 (1995); *see also* Mark S. Davis & Michael Pappas, *Escaping the Sporhase Maze: Protecting State Waters Within the Commerce Clause*, 73 L.A. L. REV. 175 (2012).

191. Glenn J. MacGrady, *Navigable Waters: The Navigability Concept in the Civil and Common Law: Historical Development, Current Importance, and Some Doctrines That Don't Hold Water*, 3 FL. ST. U. L. REV. 511 (1975).

192. Arizona v. California, 283 U.S. 423, 456-57 (1931) ("As the river is navigable and the means which the act provides are not unrelated to the control of navigation, the erection and maintenance of the dam and reservoir are clearly within the powers conferred upon Congress. Whether the particular structures proposed are reasonably necessary is not for the Court to determine. The possible abuse of the power to regulate navigation is not an argument against its existence." (citations omitted)). The court also implicated the role of international obligations in its decision.

is not to say that a water reform under the Commerce Clause is not possible; the trend toward a more environmentally conscious judiciary has been unfolding for some time.[193] Agencies have found many alternatives, including broadly defining statutory and constitutional language. A post-Lopez era simply means that federal authority needs to navigate the uncertainty carefully and deliberately.

2. The Takings Clause

Australia's acquisition of property power has never had the same force as the United States' Takings Clause, which is partly due to the substantial value placed on property rights in the U.S.[194] To survive a takings claim arising from the federal assertion of power over water, the U.S can look to Australia in applying its altruistic public trust doctrine.[195] The interesting situation in United States water law is the lack of actual property rights in the water itself, combined with the lack of enforcement of that principle until recently.[196] The public trust doctrine is the recognition that some resources are universal and should belong to society at large, not a single person.[197] The doctrine has been confusingly limited and expanded recently as agencies and environmental groups have claimed broad public interest claims.[198] At the same time, states continue to assert their rights over their water resources as individuals assert their rights to private property. A recent conflict regarding the public trust doctrine arose in the Great Lakes Compact, the language of which aims to assert that "[w]aters of the Basin are precious public natural resources shared and held in trust by the States."[199] In response, the state of Ohio amended its constitution to declare that water may not be held in trust in the state.[200]

Despite ongoing debate over the scope of the public trust doctrine, it is generally agreed that "regulatory bodies are afforded an impregnable environmental protection technique."[201] As such, a public interest in water sustainability has the potential to be a predominant route for centralizing federal powers. This would align with the route taken by Australia under the Water

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193. Williams & Glicksman, *supra* note 190.

194. H. W. Brands, *Why Have Americans Always Been So Obsessed with the Land?*, HIST. (Jan. 31, 2019), https://www.history.com/news/american-land-frontier [https://perma.cc/JP9C-L8EZ].

195. As discussed in Part II, the social value of a water regime that addresses drought and water scarcity allowed the country to curtail common law water rights for a statutory system that vests water rights in the states, and thereby the people.

196. Water Sys. Council, A Summary of Existing Water Rights Laws: Who Owns the Water? 10 (2016).

197. Zachary C. Kleinsasser, *Public and Private Property Rights: Regulatory and Physical Takings and The Public Trust Doctrine*, 32 B.C. ENVTL. AFF. L. REV. 421, 423-424 (2005).

198. *Id.* at 425-26; s*ee also* Ill. Cent. R. Co. v. Illinois*,* 146 U.S. 387, 455 (1892).

199. Great Lakes—St. Lawrence River Basin Water Resources Compact, § 1.3 (2008).

200. OHIO CONST. art. I, § 19b.

201. Kleinsasser, *supra* note 198, at 453.

Rights Act of 1896.

D. Centralization, Accounting, and the Environment

As the public trust doctrine would suggest, water has no borders and needs to be treated as such. In the conceptual sense, it does not belong to any land or any person. The United States and Australia have many parallels in their water law history, but the key differences have allowed Australia to excel. While the Colorado River Compact is a small taste of the potential of a national initiative that facilitates interstate cooperation, Australia went beyond interstate compacts and encouraged federal facilitation of such agreement. It is also around the Colorado River that environmental considerations are increasingly recognized. Australia's climate has pushed it far beyond the loose water flow guidelines enforced in the United States and into the development of the exclusive right to water for the environment at large. After the unification of the country's water rights, the real impact of Australia's reform has remained in its water accounting system. The emphasis on "every drop is accounted for" has led to revolutionary metering practices that have ensured stringent water management of all users[202] and have allowed for a robust national water market.[203] This was all possible beginning with the removal of all common law private rights in the Victorian Irrigation Act of 1886, an act ironically influenced by Colorado water rights ideology.

As seen with the Colorado River, interstate cooperation in the United States has its challenges. The question of water allocations among the states led to highly inefficient judicial processes, conflicts over water scarcity remain, and current water accounting mechanisms are lacking. However, without measures like the Colorado River Basin Compact or the Great Lakes Compact,[204] armed conflicts such as the Arizona militia protest may play a larger role in resolution in the future. A national mechanism that clearly outlines water accounting and

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202. Corporations have different standards for water consumption. Nestlé has been the face of wasteful and abusive water consumption and ineffective water laws. The company has based its bottling operations in states that have lax water laws, giving it virtually unrestricted access to water for its business. The water is eventually drained from local sources, bottled, and transported across the globe while the company pays essentially nothing for the water. This is the result of an outdated rights system. Hundreds of companies have similarly obtained the exact same appropriative rights to water sources and have freely used such water for their "beneficial" or "reasonable" use. *See* Caroline Winter, *Nestlé Makes Billions Bottling Water It Pays Nearly Nothing For*, BLOOMBERG (Sept. 22, 2017), https://www.bloomberg.com/news/features/2017-09-21/nestl-makes-billions-bottling-water-it-pays-nearly-nothing-for [https://perma.cc/CS7X-9HKC].

203. Exposing water into the capital market will prioritize the importance of water use to the American people and businesses, and force big consumers to prioritize efficient and purposeful usage. Currently, several states have embraced water markets. For more information about water markets in the U.S. *See* Kurt Schwabe et al., *Water Markets in the Western United States: Trends and Opportunities*, 12 WATER 233 (2020).

204. Great Lakes—St. Lawrence River Basin Water Resources Compact (2008).

management practices may be helpful to facilitate more adhesive and well-defined cooperation among the states and the federal government.

A more ideal but difficult to realize lesson is the need to entirely remove untouchable private water rights present in the majority of the United States. Whether that happens or not, the goal of meaningful water reform needs a national shift in the direction of the public trust doctrine as it relates to water. Australia has tried and erred on its own water reform path, and it would be wasteful not to consider its experiences.

CONCLUSION

Accurate and all-encompassing water monitoring and vesting interest of all sources of water into a single governing entity are a vital parts of successful water management. However, without a strong policy and public support behind the change, as there was in Australia, reform is unlikely to occur.[205] This kind of public support and policy recognition is present in regions like California and New Mexico but lackluster in many riparian states with abundant fresh water. However, momentum is gaining for meaningful environmental action,[206] and only with such social standing can reform occur. Several routes to a more centralized regulation, namely through the Commerce Clause and the public trust doctrine, are available and capable of carrying on such reform. Environmental water needs have already been recognized and proposed in many states.[207] A water accounting system is vital in maintaining environmental allocations in times of drought; a system has been initiated in California[208] with the help of voters.[209] Water markets

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205. "[D]rought awareness is actually a stronger predictor of concern for water shortages and support for water policy than drought severity, showing that understanding what determines drought awareness may be crucial for building policy support." *See* David Switzer & Arnold Vedlitz, *Investigating the Determinants and Effects of Local Drought Awareness*, 9 WEATHER CLIM. SOC. 641 (2017).

206. Drew Kann, *More Americans are alarmed by global warming than ever before, survey reveals*, CNN (Jan. 17, 2020, 3:30 PM), https://www.cnn.com/2020/01/17/us/survey-shows-more-americans-alarmed-by-global-warming/index.html [https://perma.cc/U38H-4W6U].

207. Jeffrey J. Opperman et al., *Securing Environmental Flows Through System Reoperation and Management: Lessons from Case Studies of Implementation*, 7 FRONTIERS ENVTL.L SCI., 1 (2019).

208. California has been the primary focus of water law reform. Its Central Valley and the San Joaquin Valley specifically are home to the most productive agricultural region in the United States. It produces a fourth of the nation's food supply. As such, it is also the country's largest consumer of fresh water, thus making it the target of water discussions. The state has seen the most dramatic changes to its water laws, all of which were made out of a necessity in a game of catch-up to unparalleled droughts, fires, flooding, and other environmental catastrophes. *See California's Central Valley*, USGS, https://ca.water.usgs.gov/projects/central-valley/about-central-valley.html.

209. Katy Grimes, *Just the Facts About California's New Household Water Rationing Law*, CAL. GLOBE (Jan. 2, 2020, 11:41 AM), https://californiaglobe.com/section-2/just-the-facts-about-californias-new-household-water-rationing-law/ [https://perma.cc/WKQ6-QP6K].

have emerged in several states.[210] The changes have been jurisdictional and inconsistent, but it will only be a matter of time before water takes center stage in the national conversation. Only through effective domestic water planning and management can the question of an international water law system be brought. Until then, the question that Americans must ask is whether the planet can be patient while America hesitates to change.

210. Schwabe et al., *supra* note 204.