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A Half Full Circle: The Reserved Rights Doctrine and Tribal Reacquired Lands

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The Oklahoma Water Sale Moratorium: How Fear and Misunderstanding Led to an Unconstitutional Law

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The Insufficiency of New Hampshire's Instream Flow Regulation to Ensure the Viability of its Rivers as Economic, Environmental, and Social Assets

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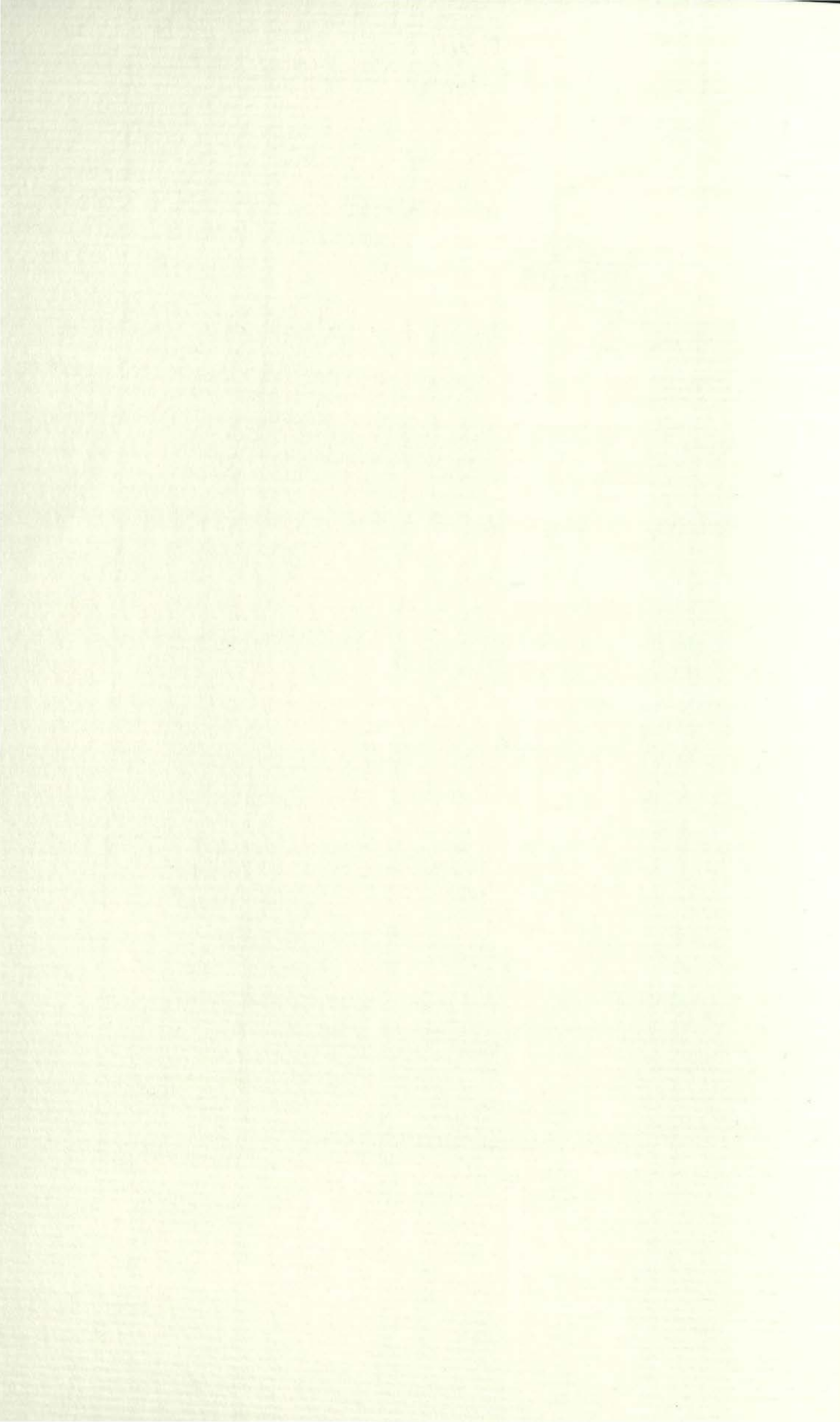
Colorado Water Court's Decision Towards the Availability of Unappropriated Water: *Buffalo Park Development Company v.*

Mountain Mutual Reservoir Company

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The *Water Law Review* welcomes the submission of articles of timely interest to the water law community. Articles should discuss topical issues in water law and related areas, such as environmental and natural resource law, land use. They should provide an original, analytical, and in-depth treatment of the issue rather than a summary of previous research efforts. Anonymous peer review of articles is available upon request. In addition to articles, the *Water Law Review* also invites submissions of shorter works, such as book reviews, commentaries, and bibliographies.

STYLE

Articles should be well organized, concisely written, and presented in an articulate and scholarly manner. Accordingly, authors should minimize their use of direct quotes.

FORMAT

Manuscripts considered for publications must be typed, double-spaced, and formatted to fit on 8½ x 11 paper. The text should be broken into appropriate headings and subheadings and should conform to the *Chicago Manual of Style* (15th ed. 2003). Citations to references and authorities should be contained in footnotes. Footnotes may also include elaboration on points raised in the text or references to research sources pertaining to points peripheral to those discussed in the text. Footnotes must conform with *The Bluebook: A Uniform System of Citation* (18th ed. 2005), published by the Harvard Law Review Association. Footnotes should be current as of the date of submission. Send hardcopy submissions to: University of Denver Water Law Review, 2255 East Evans Avenue, #447, Denver, Colorado, 80208. Email electronic submissions, as an attached file in Microsoft Word format, to wlr@law.du.edu.

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EDITOR'S NOTE

In last fall's edition, I reflected on the Presidential election of 2008 and how the billing of "change" versus "experience" fell apart after the economic collapse late in the election cycle. What I stated then remains true 100, 200, or 365 days into the new Administration: what matters most are not pithy slogans during elections, but the ability of government at all levels to deliver services, solutions, or policies of non-interference when the governed are in dire straits.

As is in the world of Washington politics and international affairs, the world of water has not quieted since the last publication of *The University of Denver Water Law Review*. In the Western United States, the seriousness of California's drought is matched only by a budget crisis certain to curtail any spending efforts to mitigate the droughts impact. Meanwhile, in another part of the continent, opposition to water bottling operations in Great Lakes states provided the straw on the camel's back for the Great Lakes-St. Lawrence River Basin Water Compact, an eight-state agreement that bans forever most diversions out of the Great Lakes basin.

A few *Water Law Review* editors were at the American Bar Association's 28th annual Water Law Conference earlier this year to hear Professor Noah Hall of Wayne State University give a presentation on the public policy adventure of the Great Lakes Compact. To paraphrase his words, Michigan is more than happy to share its water with the rest of the world, as long as the rest of the world is willing to share its jobs. Perhaps we are finally seeing a convergence of the great truth in western water law that the water is never where it is needed most. Except now the truth is somehow buried in the death of Pontiac, power plant cooling towers, and San Diego condos rather than a family of homesteaders digging canals for dryland farming.

This edition of *The University of Denver Water Law Review* looks at a number of public policy proposals across the country pertaining to water issues and the legal complications arising from them. These articles are a timely addition to the important conversation about water law this journal strives to provide for its subscribers and the legal community at large.

Jason Weiner addresses New Hampshire's instream flows in his article, "The Insufficiency of New Hampshire's Instream Flow Regulation to Ensure the Viability of its Rivers as Economic, Environmental, and Social Assets." Ruth Langridge's article, "Confronting Drought: Water Supply Planning and the Establishment of a Strategic Groundwater Reserve" tackles an important question in the midst of a historic drought for California. Mark Willingham discusses the legal implications of an Oklahoma anti-export statute in his article "The Oklahoma Water Sale Moratorium: How Fear and Misunderstanding Led to an Unconstitutional Law." Finally, Nicole Salamander addresses some unanswered questions regarding federal reserved water rights in her

article "A Half Full Circle: The Reserved Rights Doctrine and Tribal Reacquired Lands." I want to thank all of our authors for their generous contribution to this edition of the *Water Law Review*.

In addition to these articles, readers of the *Water Law Review* will also find our regular review of developing case law, a handful of book reviews on new literature in the area of water law, notes on the happenings of various water law conferences across the country (including the *Water Law Review's* annual symposium), and an in depth treatment of three water law cases of particular importance. We hope you find these resources useful.

Finally, I would be remiss not to mention a handful of improvements the *Water Law Review's* hardworking staff implemented over the course of this last volume. The editorial board and staff undertook a series of improvements in the production of the journal that greatly improved its inner workings. In the past, our "cite and source" process of verifying all of an author's citations cost the journal a great deal in time, paper and financial resources. This year, however, we implemented a paperless production process that digitized all of those steps and moved the data onto secure servers. It has been a rewarding transition.

Additionally, in order to make sure that our passing of the torch between teams of editorial staff is as smooth as possible, this edition marks the first time that the graduating class of editors handed over the operations of the journal before graduation. It is our plan that this will also lead to a more timely and well-produced law review. I would like to thank the incoming team of editors, especially Danielle Sexton, Kathlyn Bullis, and Brandon Campbell for making this new process a success.

I will close this editor's note with the same call to action that ended the note in our previous volume. We have a responsibility, in good times and bad, to pick our heads out of the sand and address our shortcomings before they become our downfall. We must capitalize on our strengths and make them the key to our success.

The governed remain in the same economic dire straits that showed themselves during the Presidential election. Our recovery is steady, but not miraculous. In many places in the country the water is under supply and demand pressures, and private and public resources to alleviate those pressures have troubles of their own. From the perspective of many law students, the prospect of education as a means of improving one's station in life is a three-year gamble lost, at least in the short-term.

Despite all this, now is the time to act with our better governance, better economy, better water, and better selves in mind. Be well.

Paul Tigan
Editor-in-Chief

This issue is dedicated to our wonderful colleague and friend, Roberta Kennedy. Her significant contributions to the Water Law Review will be missed. Roberta's professionalism, intelligence, and kindness continue to inspire us.

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**CONFRONTING DROUGHT: WATER SUPPLY
PLANNING AND THE ESTABLISHMENT OF A
STRATEGIC GROUNDWATER RESERVE**

RUTH LANGRIDGE^{1,2}

"And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."

- John Steinbeck, *East of Eden*³

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2. The author would like to thank Joseph Sax, Andrew Fisher and Robert Gottlieb for very helpful comments on early drafts of this paper.

3. JOHN STEINBECK, *EAST OF EDEN* 6 (Penguin Books 2002) (1952).

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INTRODUCTION

California's rainfall varies considerably from year to year, and data indicate that in the past California experienced very dry climatic conditions. Evidence also continues to accumulate that global climate change will have significant impacts on the state's water resources, including increased warming effects in the Sierra Nevada Mountains that will affect snow pack, snowmelt, and the timing and magnitude of runoff in California.⁴ Scientists warn that California could be subject to more prolonged climate-induced droughts in the future.⁵

At the same time, human-generated pressures on the state's water supplies have also increased. The population has increased by more than 6 million people since the last relatively short dry period of 1987 to 1992,⁶ and legal mandates are having major impacts on water availability for consumptive use.⁷ Concomitantly, the financial, environmental and social costs of building new above ground water storage

4. GUIDO FRANCO, CLIMATE CHANGE IMPACTS AND ADAPTION IN CALIFORNIA 10-11 (2005). See also Katharine Hayhoe et al., *Emissions Pathways, Climate Change and Impacts on California*, 101 PROC. OF THE NAT'L ACAD. OF SCI. OF THE U.S.A., Aug. 24, 2004, at 12422-12427.

5. Brad Udall, *Potential Climate Change Impacts on Colorado River Streamflows During the 21st Century*, in CAL. DEP'T OF WATER RES., CALIFORNIA DROUGHT: AN UPDATE 61, 61 (2008) [hereinafter CALIFORNIA DROUGHT UPDATE]; H. G. Hidalgo, M. D. Dettinger & D. R. Cayan, *Changes in Aridity in the Western United States*, in CALIFORNIA DROUGHT UPDATE, *supra*, at 54 (A climatic drought occurs when "broad areas . . . are subjected to drier conditions than normal, imposing—at least temporarily—arid climatic conditions on many semiarid and even humid areas.").

6. CAL. DEP'T OF WATER RES., URBAN DROUGHT GUIDEBOOK 2008 UPDATED EDITION 15 (2008) [hereinafter URBAN DROUGHT GUIDEBOOK 2008].

7. CALIFORNIA DROUGHT UPDATE 2008, *supra* note 5, at 16.

reservoirs and transmission systems to increase supply are now formidable.⁸

Californians are more at odds than ever about how to establish sufficient and reliable water supplies to address these dual issues. While they are related, as climate-induced water scarcity will intensify demand-induced water shortages, to a large extent researchers and policymakers have failed to focus on strategies that could mitigate *both* conditions. A significant problem is that some of the proposed solutions to address human generated water problems could create increased water shortages when a severe dry period does occur.

This paper examines water supply planning through the lens of a climate-induced drought. It is divided into two parts. The first discusses water supply planning in the state and exposes areas of disconnect between (1) planning for a prolonged climate-induced drought and (2) planning to accommodate the state's burgeoning demand for water. Planning for a climate-induced drought is primarily response oriented, including generating surface and groundwater data and preparing and implementing water shortage contingency plans. Planning for ways to generate additional water to satisfy growing demand by more diverse interests includes strategies such as desalination, recycled water, and increased water use efficiency.⁹ While experts often describe these strategies as also creating water for extended dry periods, the first part of this paper concludes with the strong caveat that if California primarily utilizes water generated through strategies to satisfy increasing demand to support continued growth in water-stressed regions, the outcome could be an eventual upsurge in future water requirements along with a hardening of demand side conservation strategies.¹⁰ This could actually increase vulnerability to water shortages when a severe drought does occur.

The second part of the paper elaborates on the legal, institutional, and management issues surrounding an alternative proactive approach that could both augment supply *and* reduce vulnerability to drought, namely by reconfiguring groundwater management to emphasize recharge along with the creation of a *strategic groundwater reserve*. This

8. See Ruth Langridge, *Changing Legal Regimes and the Allocation of Water Between Two California Rivers*, 42 NAT. RESOURCES J. 283, 299-300 (2002). See also, Brian E. Gray, *The Modern Era in California Water Law*, 45 HASTINGS L.J. 249, 278 (1994).

9. CAL DEP'T OF WATER RES., FUTURE PLANS, <http://www.publicaffairs.water.ca.gov/swp/future.cfm> (last visited Mar. 8, 2009) ("Based on recent studies, increased urban water conservation efforts could save up to 2.5 million acre-feet annually by the year 2030; another 1.2 million acre-feet could be generated by municipal recycling projects; and new agricultural conservation could supply an additional 500,000 acre-feet." (internal citations omitted)).

10. See CAL DEP'T OF WATER RES., PREPARING FOR CALIFORNIA'S NEXT DROUGHT 50 (2000) [hereinafter PREPARING FOR CALIFORNIA'S NEXT DROUGHT] (recommending monitoring effects of demand hardening on water agencies' ability to implement shortage contingency measures).

would involve bringing groundwater basins into hydrologic balance through recharge processes to reduce groundwater level decline rates,¹¹ and establishing and maintaining sufficient groundwater levels to sustain a strategic groundwater reserve.¹² The state would only withdraw and use the reserve during a prolonged dry period. The reserve is critical to conserving nature's capital for the inevitable long-term drought. This approach is similar to reserving money for emergencies in a bank account. Thus, water would be "deposited" in an aquifer through recharge techniques best suited to the characteristics of the aquifer, and a portion of that capital would only be withdrawn and used to mitigate severe water scarcity resulting from a climate-induced drought. Conjunctive management methods could be re-designed to encourage recharge processes, to augment seasonal supply, and most important, to guarantee the maintenance of a reserve for use during extreme drought events. The paper concludes with a discussion of the legal authority to create the reserve.

If, as the California Department of Water Resources ("DWR") projects, improving groundwater management is a key strategy to generate more water to meet the state's growing demand, then it is critical that at the same time that the state also create incentives both to protect the quality and quantity of groundwater for future generations *and* to maintain a reserve for future severe droughts.

I. BACKGROUND

California's Mediterranean climate has distinct spatial and temporal characteristics, with three quarters of the state's precipitation and runoff occurring in Northern California and little or no precipitation occurring during the summer and early fall months.¹³ The inverse relationship between the locations of the State's population and large agricultural regions to its surface water runoff is an additional challenge, with more than seventy percent of California's runoff occurring north

11. See Marios Sophocleous, *On the Elusive Concept of Safe Yield and the Response of Interconnected Stream-aquifer Systems to Development*, in PERSPECTIVES ON SUSTAINABLE DEVELOPMENT OF WATER RESOURCES IN KANSAS 61, 62-63 (Marios Sophocleous ed., 1998) (explaining that balancing pumping and recharge will generally result in a balance that reflects the initial status of the aquifer).

12. Marios Sophocleous, Senior Scientist, Kan. Geological Survey, Speech at the California Colloquium on Water: Groundwater Sustainability and its Application in Kansas (Nov. 11, 2008) (PowerPoint presentation available at http://www.lib.berkeley.edu/WRCA/pdfs/ccow_Sophocleous_18Nov2008.pdf). To establish a reserve in an already over-drafted and depleted aquifer, withdrawal will need to be less than recharge over a period of time. In this case, the sustainable yield of an aquifer is then significantly less than recharge to allow adequate amounts of water to both sustain rivers, wetlands and streams and to be available for withdrawal during periods of extended climate-induced droughts.

13. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 1.

of Sacramento and about the same percentage of water demand south of Sacramento.¹⁴ California has dealt with these limitations and achieved its growth by developing federal, state, and local projects that capture and store winter and spring runoff, primarily from snow melt in the Sierra and Cascade Mountains, and through a network of transmission systems that carry the stored water to major urban areas and central valley farming regions.¹⁵ In addition, California meets significant portions of its water supply needs with groundwater.¹⁶ Communities not connected to the big projects also rely on water storage, albeit smaller systems, and on groundwater.¹⁷

Over the past 30 years, claims to water by an expanding number of interests, along with population growth, have caused water supply systems to come under increasing stress. The California Department of Finance projects that population will increase by another 14 million by 2030 adding to demand.¹⁸ However, legal mandates, such as those to protect endangered species, to support public trust values, and to restrict the pumping of water through the San Francisco Bay Delta, have resulted in a reduction in water availability for consumptive use.¹⁹ In addition, while groundwater supplies approximately one third of water use in California,²⁰ annual overdraft from groundwater pumping is already in the range of one million to two million acre-feet statewide, and many aquifers are overdrawn.²¹

Added to concerns about insufficient water to accommodate the state's growth and development are worries regarding the impacts of global warming on the state's water supply²² and fears of more extreme

14. CAL. DEP'T OF WATER RES., CAL. WATER PLAN UPDATE BULLETIN 160-98, 3-2 (1998) [hereinafter BULLETIN 160-98].

15. CAL. DEP'T OF WATER RES., CALIFORNIA'S GROUNDWATER: BULLETIN 118 20, 24 (2003) [hereinafter BULLETIN 118], *available at* <http://www.groundwater.water.ca.gov/bulletin118/update2003/index.cfm>.

16. *Id.* at 24.

17. *See generally id.*

18. MARY HEIM & MELANIE MARTINDALE, NEW STATE PROJECTIONS SHOW 25 MILLION MORE CALIFORNIANS BY 2050; HISPANICS TO BE STATE'S MAJORITY ETHNIC GROUP BY 2042 1 (2007), *available at*

<http://www.dof.ca.gov/HTML/DEMOGRAP/ReportsPapers/Projections/P1/P1.php>; *see also* ELLEN HANAK, WATER FOR GROWTH: CALIFORNIA'S NEW FRONTIER, 1 (2005), *available at* <http://www.ppic.org/main/publication.asp?i=429>.

19. *See generally* 4 CAL. DEP'T WATER RES., CALIFORNIA WATER PLAN UPDATE 2005 (2005), *available at* <http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm#vol4> (follow "PDF" hyperlink located to the right of "Water Allocation, Use and Regulation in California").

20. BULLETIN 160-98, *supra* note 14, at ES3-5.

21. *Id.* at ES3-7. Analysis of data from the California Water Plan Update projects that, even under a less resource intensive scenario, net water demand in the state could continue to grow. HANAK, *supra* note 18, at 19-20.

22. FRANCO, *supra* note 4, at 16.

drought events.²³ As changes in temperature directly affect runoff, it is likely that in California there will be increased runoff in late winter/early spring resulting in higher water yields earlier in the season.²⁴ In addition, projections are that Sierra snowpack could decrease by 10 to 40 percent from historic levels.²⁵ These conditions could exacerbate water shortages in the state.²⁶ While the shifts associated with climate change may be small compared to historical year-to-year variations, they will be superimposed onto normal variations and will likely result

23. The state has always been subject to periodic droughts including two epic ones. The first lasted more than two centuries before the year 1112, when a wetter century ensued and rainfall was higher than in modern times. The second drought before 1350 lasted more than 140 years. A 1994 study of tree stumps rooted in present day lakes, rivers, and marshes suggest that California sustained two epic drought periods, extending over more than three centuries. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 9. During the middle-12th century drought, there existed a period of 23 consecutive years that represented the single greatest North American mega-drought since AD 951. Larry Benson, *Impact of Drought on Prehistoric Western Native Americans*, in CALIFORNIA DROUGHT UPDATE, *supra* note 5, at 28. Historical multi-year droughts in the twentieth century include: 1912-13, 1918-20, 1923-24, 1929-34, 1947-50, 1959-61, 1976-77, and 1987-92. While measured hydrologic data for droughts in California prior to 1900 are minimal, multi-year dry periods in the second half of the 19th century can be qualitatively identified from the limited records available combined with historical accounts. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 9.

24. FRANCO, *supra* note 4, at 1.

25. CAL. ENV'T'L PROT. AGENCY, CLIMATE ACTION TEAM REPORT TO GOVERNOR SCHWARZENEGGER AND THE LEGISLATURE 28 (2006) [hereinafter CLIMATE ACTION TEAM REPORT], available at <http://caclimatechange.net/> (follow "Reports" hyperlink; then follow "2006 California Climate Action Team Final Report" hyperlink and view the entire report). Studies by the National Water Assessment Team for the U.S. Global Change Research Program's National Assessment of the Potential Consequences of Climate Variability and Change point to potentially higher snow levels leading to more precipitation in the form of rain, earlier runoff, a rise in sea level, and possibly larger floods. PETER H. GLEICK, WATER: THE POTENTIAL CONSEQUENCES OF CLIMATE VARIABILITY AND CHANGE FOR THE WATER RESOURCES OF THE UNITED STATES 4 (2000), available at <http://www.gcrio.org/NationalAssessment/water/water.pdf>. This would affect the balance between storage and flood control of reservoirs, and could cause changes in vegetative water consumption that would impact patterns of irrigated and dry land farming. While a warmer, wetter winter would increase the amount of runoff available for groundwater recharge, the additional winter runoff would occur when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapo-transpiration because of warmer temperatures could reduce the amount of water available for recharge and surface storage.

26. CLIMATE ACTION TEAM REPORT, *supra* note 25, at 28. This is particularly the case because surface water runoff stored in reservoirs, along with water directly diverted from streams, provides much of the current water used in California. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 1-2. Note that because droughts vary in their spatial and temporal dimensions and no single definition of drought applies in all circumstances, determining precise changes in drought frequency or intensity that might be expected to result from climate changes is complicated and uncertain. *Id.* at 12.

in new extremes in the areas subjected to unusual aridity as well as in the severity of drought episodes.²⁷

A prolonged drought affects all sectors of the economy. During the 1988-92 drought, urban users in California paid more for water, lost jobs, saw electricity costs rise, and had their water-based recreation and major fisheries adversely impacted.²⁸ Groundwater aquifers suffered significantly as most agricultural users increased their pumping.²⁹ The eastern San Joaquin Valley and Tulare Basin had significant overdraft and subsidence, and Kings and Kern Counties had overdraft-induced groundwater pollution.³⁰

It is noteworthy that in past droughts those not connected to the major projects were particularly vulnerable to water shortages,³¹ including rural and less populated coastal areas and in new developments in the Sierra Nevada foothills where communities typically rely on small capacity storage systems fed by annual rainfall and on groundwater.³² As California's population growth shifts from the State's densely urbanized coastal areas to inland regions where per capita water use is high, these regions will become even more vulnerable.³³

Under existing water supply strategies, water requirements in many areas of the state are barely met during dry and critical water years, yet many water agencies continue to strategize to satisfy projected demand

27. Hidalgo, Dettinger & Cayan, *supra* note 5, at 58.

28. See Brian E. Gray, *The Market and the Community: Lessons from California's Drought Water Bank*, 1 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 17, 18-20 (1994). During the 1987-92 drought, statewide reservoir storage was about 40 percent of average by the third year of the drought, and did not return to average conditions until 1994. *Id.* at 18-19. Water districts did utilize price incentives, conservation, fallowing, water re-allocation and water transfers to cope, and there were changes in irrigation practices including an increase in low volume irrigation systems, but there was also a 25 percent annual increase in the sale of pumps during the drought and groundwater pumping accounted for a significant portion of the water substitution resulting from a lack of surface water supplies. DAVID ZILBERMAN ET. AL., INDIVIDUAL AND INSTITUTIONAL RESPONSES TO THE DROUGHT: THE CASE OF CALIFORNIA AGRICULTURE 19, http://www.ucowr.siu.edu/updates/pdf/V121_A3.pdf (last visited April 15, 2009).

29. Gray, *supra* note 28, at 19.

30. *Id.*

31. See PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 55.

32. *Id.* at 48, 50.

33. *Id.* Regions expected to have the highest percent growth rates over the next 20 years are the Inland Empire, Central Valley, and Sierra Nevada foothills. As greater development occurs in these inland areas, the ex-urban ring around them also will expand. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 48. Rural homeowners with private wells are largely an un-served population with respect to drought-related assistance programs. The majority of past drought problems in these small systems resulted from dependence on groundwater in fractured rock systems or in small coastal terrace groundwater basins. Even though the total population served by small water systems statewide is relatively small, these communities are typically isolated and have limited back-up water supplies. *Id.* at 48, 50; see also CALIFORNIA DROUGHT UPDATE, *supra* note 5, at 21.

without setting aside sufficient reserves to be tapped during severe dry periods.³⁴ This is despite the fact that urban water agencies throughout California have generally failed to even make good on conservation promises,³⁵ and many groundwater aquifers in agricultural regions remain in overdraft.³⁶

II. OVERVIEW OF CALIFORNIA'S WATER RIGHTS SYSTEM

California's water rights regime plays an important role in how communities and individuals address water scarcity issues. The state recognizes a system of water rights that distinguishes between two legal categories of water.³⁷ First, surface waters, including surface streams and subterranean streams,³⁸ are subject to permitting and regulation,³⁹ and riparian and appropriative doctrines primarily govern private rights to use surface water.⁴⁰ Riparian rights are correlative and land based.⁴¹ Appropriative rights to surface water are priority based, require diversion to demonstrate beneficial use, and the state extensively regulates the rights through an administrative permit system.⁴²

34. See Mike Lee and Michael Gardner, *Builders Facing Water Pressure: New Developments Urged, or Required, to Offset Impact*, SAN DIEGO UNION TRIBUNE, May 22, 2008, available at http://www.signonsandiego.com/uniontrib/20080522/news_1n22water.html. For example, the Eastern Municipal Water District, an Inland water agency, indicated it could serve nine major new industrial and residential projects in the southwest Riverside County area, utilizing conservation measures and other resources that would provide enough water for the long-term future. Dan Lee, *Water Agency Approves Project*, THE PRESS ENTERPRISE (Riverside, Cal.), June 5, 2008, at C01.

35. Matt Weiser, *Capital Gushes Wasted Water: Metropolitan Region's Per-Capita Use Tops U.S. Daily Average as Conservation Pledges Go Unmet*, THE SACRAMENTO BEE, June 19, 2008, available at <http://www.sacbee.com/101/story/1024692.html>.

36. BULLETIN 118, *supra* note 15, at 2 (“[I]t is estimated that overdraft [of state aquifers] is between 1 million and 2 million acre-feet annually.”).

37. ARTHUR L. LITTLEWORTH & ERIC L. GARNER, CALIFORNIA WATER 27 (1995) (dividing water into two classes: surface waters and underground waters). *But cf.* BULLETIN 118, *supra* note 15, at 3 (“Surface water and groundwater are connected and can be effectively managed as integrated resources.”).

38. Joseph L. Sax, *We Don't Do Groundwater: A Morsel of California Legal History*, 6 U. DENV. WATER L. REV. 269, 273 (2003) (explaining that a subterranean stream consists of the underflow or subflow of a surface stream and is defined as water in the soil, sand, and gravel immediately below the bed of the open stream, which supports the surface stream in its natural state or feeds it directly).

39. *Id.* at 272.

40. *People v. Shirokow*, 605 P.2d 859, 864 (Cal. 1980) (“California operates under the so-called dual system of water rights which recognizes both the appropriation and the riparian doctrines.”).

41. JOSEPH L. SAX, BARTON H. THOMPSON, JR., JOHN LESHY & ROBERT H. ABRAMS, LEGAL CONTROL OF WATER RESOURCES 27-37 (4th ed. 2006).

42. *Id.* at 124-126, 131-132.

Second, groundwater, legally defined as percolating groundwater,⁴³ follows a dual system of rules. Owners overlying the basin follow a correlative doctrine, which gives all overlying landowners equal rights to a reasonable amount of the water in the basin, but limits that right to water applied to a reasonable beneficial use on land overlying the basin, and requires all to share in any shortages.⁴⁴ Groundwater exporters follow an appropriative doctrine of first in time first in right, which in times of shortage limits them to water that overlying owners do not need.⁴⁵

The California State Water Resources Control Board is the authority for the distribution of surface appropriative water rights,⁴⁶ and the California Water Code contains the permit application process for appropriating surface water.⁴⁷ The permit process does not apply to riparian rights or, most importantly, to percolating groundwater.⁴⁸ While legal definitions of surface and groundwater bear little resemblance to the hydrologic and geologic reality of water, nevertheless Section 1200 of the California Water Code, which defines the permitting scope of the State Water Resources Control Board, still distinguishes between these categories.⁴⁹

Along with doctrines that specify the rules for private rights to water, there are several very important public interest principles that oversee all water use in the state. There is no private ownership of water, and all water rights are usufructory, conferring a right to use water.⁵⁰ The Public Trust Doctrine, the California courts interpret it, holds that the state must protect public trust values where feasible,⁵¹ and that public trust values are flexible enough to encompass changing

43. *Vineland Irrigation Dist. v. Azusa Irrigation Co.*, 58 P. 1057, 1059 (Cal. 1899) ("It is essential to the nature of percolating waters that they do not form part of the body or flow, surface or subterranean, of any stream. They may either be rain waters, which are slowly infiltrating through the soil, or they may be waters seeping through the banks or bed of a stream, which have so far left the bed and other waters as to have lost their character as part of the flow.")

44. *See Katz v. Walkinshaw*, 74 P. 766, 771-72 (Cal. 1903).

45. *City of Barstow v. Mojave Water Agency*, 5 P.3d 853, 864 (Cal. 2003). In addition, prescriptive rights can be acquired, although water rights held by a public agency cannot be lost by prescription. *Los Angeles v. San Fernando*, 537 P.2d 1261, 1304 (Cal. 1975).

46. CAL. WATER CODE § 179 (West 2009).

47. *See id.* §§ 1250-76.

48. *City of Pasadena v. City of Alhambra*, 207 P.2d 17, 33 (Cal. 1949).

49. CAL. WATER CODE § 1200 ("Whenever the terms stream, lake or other body of water, or water occurs in relation to applications to appropriate water or permits or licenses issued pursuant to such applications, such term refers only to surface water, and to subterranean streams flowing through known and definite channels.")

50. *Nat'l Audubon Soc'y v. Superior Court of Alpine County*, 658 P.2d 709, 724 (Cal. 1983).

51. *See id.* at 712.

public needs.⁵² Most importantly, the Doctrine of Reasonable and Beneficial Use, as required by the 1928 Amendment to the California Constitution,⁵³ requires that the use of all water in the state be exercised reasonably. This principle, now codified in the California Water Code, will be discussed later in the paper.

III. WATER SUPPLY PLANNING

The first question this paper examines is whether water supply planning as presently configured sufficiently addresses the problems associated with a climate-induced drought. The process of water supply planning in California is fragmented, proceeding along several different tracks that include urban water management planning, groundwater management planning, and drought management planning. In addition, administrative authority is divided between federal, state, and local institutions.⁵⁴ The Bureau of Reclamation ("BOR") administers California's massive federal Central Valley Water Project,⁵⁵ and the California Department of Water Resources ("DWR") administers the large State Water Project, with both agencies coordinating operations.⁵⁶

52. See *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971).

53. CAL CONST. art. X, § 2 ("Because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable and that the waste or unreasonable use or unreasonable method of use of water be prevented and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interests of the people and for the public welfare.").

54. See Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES J. 1, 3 (1995); see generally NATIONAL DROUGHT MITIGATION CENTER, MITIGATING DROUGHT (2007), <http://drought.unl.edu/mitigate/status.htm>. There is considerable variation among states with respect to drought planning: "as of October 2006, thirty-seven states had drought plans . . . two delegated planning to local authorities instead of having a single state-level plan, and two states were in the process of developing a plan. Only nine states did not have formal drought plans."

55. U.S. DEP'T OF THE INTERIOR: BUREAU OF RECLAMATION, THE CENTRAL VALLEY PROJECT (2008), <http://www.usbr.gov/mp/cvp/index.html>. However, in *California v. United States*, 438 U.S. 645, 674-75 (1978) the New Melones decision, the Supreme Court held that states may condition Reclamation project water rights if "not inconsistent with congressional provisions authorizing the project in question."

56. CAL. DEP'T. OF WATER RES., STATE WATER PROJECT (2009), <http://www.publicaffairs.water.ca.gov/swp/>. The major urban areas in the state also administer large water projects that import water. San Francisco Public Utilities Commission, a department of the City and County of San Francisco, provides water to San Francisco and 28 wholesale water agencies that supply water to 1.6 million additional customers within three Bay Area counties. SAN FRANCISCO PUB. UTIL. COMM'N, WATER, http://sfwater.org/mc_main.cfm/MC_ID/13 (last visited Apr. 16, 2009). The Metropolitan Water District serves approximately 18 million people within about 5,200 square miles in Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties. THE METRO. WATER DIST. OF S. CAL., THE DISTRICT AT A GLANCE (2008), <http://www.mwdh2o.com/mwdh2o/pages/news/news01.html>. The East Bay Municipi-

The state administers the California Water Code, provides data and financial incentives to support the local management of water supplies,⁵⁷ provides broad goals and objectives to manage the state's water resource through a statewide water plan produced every five years, and administers the permit process for appropriative rights to surface water.⁵⁸ However, cities and counties are important drivers of local water demand and do most of the water supply planning.⁵⁹ Through their authority over land use decisions, their governments affect local development and, in turn, water demand.

IV. PLANNING FOR A CLIMATE-INDUCED DROUGHT

Drought planning is a response process centered on how to manage water shortages *after* a dry period occurs. The state has the authority to declare a water shortage emergency and to utilize broad powers to enforce regulations and restrictions,⁶⁰ and the California Department of Health Services ("DHS") can impose terms and conditions on permits for public water systems to assure that sufficient water is available.⁶¹ Two statewide bonds, Proposition 50 passed in November 2002,⁶² and Proposition 84 passed in November 2006,⁶³ established monetary incentives to encourage a regional approach to water management that includes drought planning.

Proposition 84 provides public water suppliers with the authority, after a water shortage has occurred, to declare an emergency drought

pal Utility District (EBMUD) supplies water for parts of Alameda and Contra Costa counties on the eastern side of San Francisco Bay in northern California. EBMUD, OVERVIEW, http://www.ebmud.com/about_ebmud/overview/ (last visited Apr. 16, 2009). All three districts rely on large storage and transmission systems that import water.

57. CAL. DROUGHT UPDATE 2008, *supra* note 5, at 17-18. Funding for water supply planning has included Proposition 204 (The Safe, Clean, Reliable Water Supply Act of 1996), and additional state general obligation bond acts that, among other things, provide funding for water supply infrastructure improvements. These acts include the \$1.97 billion Proposition 13 (The Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act) in 2000, the \$3.44 billion Proposition 50 (The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002), and the \$5.4 billion Proposition 84 (The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006).

58. CAL. WATER CODE § 10621 (West 2009).

59. HANAK, *supra* note 18, at v.

60. CAL. WATER CODE § 350, 353 (Water needed for domestic purposes is given priority and discrimination within a class of customers is not permitted.); URBAN DROUGHT GUIDEBOOK 2008, *supra* note 6, at 17.

61. See e.g. CAL. DEP'T OF PUB. HEALTH, DROUGHT PREPAREDNESS AND WATER CONSERVATION (2009),

<http://www.cdph.ca.gov/certlic/drinkingwater/Pages/DroughtPreparedness.aspx>.

62. CAL. WATER CODE §§ 79510-79512.

63. Prop. 84 (Cal. 2006) (Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006).

condition within its service area.⁶⁴ This allows the supplier to prioritize use, make water available for domestic use, sanitation, and fire protection, and adopt regulations covering measures to stretch supplies, including mandatory rationing or connection bans.⁶⁵ Municipal water districts, for example, have specific authority to adopt a drought ordinance restricting use of water, including the authority to limit the use of water for any purpose other than household use, sanitation and fire protection.⁶⁶ However, in practice the emphasis is on collecting supply and demand data to estimate water availability under different shortage conditions,⁶⁷ and on developing water shortage contingency plans that both reduce demand and find alternate sources of water to temporarily increase supply.⁶⁸ A strategic reserve could provide an important alternate water source during a severe drought. While the State's Urban Water Management Planning Guide does indicate that the *best* possible solution to drought is to have emergency supplies already held in reserve such as in local groundwater basins, the guidebook does not lay out any strategies or incentives to maintain a groundwater reserve as a buffer against a prolonged drought.⁶⁹

V. PLANNING TO SUPPORT GROWTH AND DEVELOPMENT

Water supply strategies to satisfy demand, while often presented as all-purpose tools to mitigate water scarcity no matter what the cause, are generally centered on finding more water to support growth and development and on mitigating regulatory constraints on current supplies. Planning historically focused on the construction of very large

64. CAL. WATER CODE § 353.

65. *Id.* §§ 353-54.

66. *Id.* §§350-53

67. *Id.* § 350. However, for small systems, those most vulnerable to drought, there is no explicit statutory requirement to plan for drought, and emergency response plans have been completed for only a limited number of these systems.

68. *See e.g.* CITY OF MOUNTAIN VIEW, URBAN WATER MANAGEMENT PLAN 2005 UPDATE, 29-36, 43-45, 61-65, available at http://www.ci.mtnview.ca.us/city_hall/public_works/urban_water_management_plan.asp; CITY OF BENICIA, URBAN WATER MANAGEMENT PLAN 2005 UPDATE, Sec. 7-1 to 7-3, 9-1 to 9-14, available at <http://www.ci.benicia.ca.us/vertical/Sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/%7B2045C66E-6F35-466B-A070-307306EA6566%7D.PDF>; *see also* Donald A. Wilhite and Mark D. Svoboda, *Drought Early Warning Systems in the Context of Drought Preparedness and Mitigation*, in EARLY WARNING SYSTEMS FOR DROUGHT PREPAREDNESS AND DROUGHT MANAGEMENT, 1, 1 (Donald A. Wilhite, M.V.K. Sivakumar, and D.A. Woods eds., 2000) Proceedings of an Expert group Meeting, Lisbon, Portugal, September 5-7, 2000, World Meteorological Organization, Geneva, Switzerland, available at www.unisdr.org/eng/library/Literature/7819.pdf (stating that plans generally contain three critical components: (1) a comprehensive early warning system; (2) risk and impact assessment procedures; and (3) mitigation and response strategies that are specifically targeted at mitigating impacts when dry conditions are actually being experienced.).

69. URBAN DROUGHT GUIDEBOOK 2008, *supra* note 6, at 40.

storage and transmission systems to move water around the state from regions of high rainfall and runoff to areas with little water and to alleviate groundwater overdraft. Local land-use authorities assumed that water would always be available to satisfy continued growth, and as a result, important land-use decisions were disconnected from water supply planning.

As local land-use decisions began running into water supply concerns, the disconnect between water supply availability and land-use planning came to the forefront. In 1983, the state legislature addressed urban water planning by passing the Urban Water Management Planning Act.⁷⁰ It required the largest wholesale and retail municipal suppliers⁷¹ prepare 20-year UWMPs and submit them to DWR every five years.⁷² The plans must include water supply assessments with written verifications of water supply and a water shortage contingency analysis that addresses their response to supply reductions of up to 50%.⁷³ The Act also requires suppliers to implement the demand management measures described in their UWMPs in order to be eligible for specified state financial assistance.⁷⁴ Additional senate bills added requirements to assess the quality of available water sources and to verify long-term water supply prior to a project's construction,⁷⁵ but enforcement of these requirements relies largely on citizen challenges for

70. CAL. WATER CODE §§ 10600-10656.

71. Largest wholesale and retail municipal suppliers are those with at least 3,000 connections or delivering at least 3,000 acre-feet of water per year. *Id.* § 10617.

72. *Id.* § 10621(a). The Management plans must also be submitted for review to any city or county within which the supplier provides water. The act does not require DWR to review the plan's quality. *Id.* § 10631(a)-(b).

73. *Id.* §§ 10631(b), 10632(a).

74. *Id.* § 10631.5.

75. See S.B. 901, 1995 Sess. (Cal. 1995) (enacted). Senate Bill 901 requires local governments to conduct water supply assessments during the environmental reviews for projects above 500 units, including the quality of existing sources of water available to an urban water supplier and the effect of water quality on supply. It also requires a lead agency to identify the water system that would likely supply water to the project, assess whether the projected water demand associated with the proposed project was included as part of its most recently adopted urban water management plan, and whether its total projected water supplies available during normal, single-dry, and multiple-dry water years would meet the need of the projected water demand associated with the proposed project. In 2001, the Senate added a requirement for verification of water supply sufficiency. S.B. 610, 2001 Sess. (Cal. 2001) (enacted). The same year, a Senate Bill also added verification of long-term water supply as a precondition of final subdivision map approval for more than 500 dwelling units. Verification has to be by the water purveyor, city, or county. This requirement also applies to increases of 10 percent or more of service connections for public water systems with less than 500 service connections. The law defines criteria for determining "sufficient water supply," including using normal, single-dry, and multiple-dry year hydrology and identifying the amount of water that the supplier can reasonably rely on to meet existing and future planned uses. S.B. 221, 2001 Sess. (Cal. 2001) (enacted).

non-compliance.⁷⁶ Importantly, plans have to substantiate rights to extract additional groundwater, if used for the project.⁷⁷ These plans are an initial step in planning for climate-induced water scarcity, but the problem is that only 400 systems are large enough to be required to file UWMPs.⁷⁸

While the new planning requirements and “show me the water” legislation resulted in greater oversight of water supply availability for new municipal developments, they also pushed suppliers to seek more diverse sources of water to accommodate future growth and deal with regulatory constraints on their accustomed supplies. Water providers emphasized creating a diverse “portfolio” of strategies,⁷⁹ including three major ones: desalination of ocean water and brackish groundwater, water use efficiency, and recycling of municipal wastewater.

Desalination is the process of removing the salt to make certain bodies of water drinkable and usable for other purposes.⁸⁰ The process of desalination is expensive, energy intensive, and waste producing,⁸¹ but more importantly, it is not economically feasible to run desalination plants only during dry periods.⁸² Given the high operating and capital costs of desalination, it is likely that without incentives for appropriate conjunctive management arrangements, “new” water produced would not be primarily reserved for use during a severe drought.⁸³ Recycled water as a source of additional supply is generally used to satisfy current demand, but it can be costly and the health as-

76. See generally CAL. WATER CODE § 10850.

77. *Id.* § 10631(b); but see Jim Holt, *Tainted Water Still Counts for Land Developers*, SANTA CLARITA SIGNAL, June 3, 2008, available at <http://www.the-signal.com/news/archive/2178/> (Land developers can still use tainted water, despite an unsuccessful attempt by the California Assembly to set tougher conditions on the quality and quantity of groundwater being assessed for the water supply for a 500 unit housing development.).

78. HANAK, *supra* note 18, at 2. With more than 500 members of the Southern California Water Utilities Association, this leaves a number of water suppliers not required to develop UWMPs. See S. CAL. WATER UTIL. ASS'N, WELCOME TO SCWUA, <http://www.scwua.org/> (last visited Apr. 18, 2009).

79. See 2 CAL. DEP'T OF WATER RES., CALIFORNIA WATER PLAN UPDATE 2005 1-2 (2005), available at <http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2ch01.pdf>

80. HEATHER COOLEY, PETER GLEICK & GARY WOLFF, DESALINATION, WITH A GRAIN OF SALT: A CALIFORNIA PERSPECTIVE 10, 13 (2006), available at www.pacinst.org/reports/desalination/desalination_report.pdf.

81. See *id.* at 4-6, 39, 41-42, 45, 44-57, 59; see also CAL. RURAL WATER ASSOC., CALIFORNIA DROUGHT PREPAREDNESS, <http://www.cadrroughtprep.net/watshort.htm> (last visited Mar. 16, 2009) (explaining that water from a \$250 million desalination plant proposed for Long Beach would produce as much as 50 million gallons of fresh water daily and would sell for \$800 per acre-foot, which is considerably more than other water sources).

82. COOLEY, GLEICK, & WOLFF, *supra* note 80, at 57.

83. See *id.*

pects of recycled water are controversial.⁸⁴ Most importantly, management of recycled water is rarely designed to create an emergency reserve.⁸⁵ Water use efficiency is a demand-side measure that can free up water supplies.⁸⁶ Estimates are that water use efficiency could result in millions of acre-feet of untapped, cost-effective conservation.⁸⁷ But while many communities and water suppliers now require water-use efficiency practices, there is no automatic lever to induce conservation in communities that choose not to conserve, and incentives such as tiered pricing tend to be least prevalent in some of the fastest growing regions of the state.⁸⁸ A common complaint is that the water that communities require residents to conserve generally goes to new development, reducing the likelihood of this water being available during a long-term drought.⁸⁹

Desalination, water use efficiency, and recycling are very valuable strategies that are integral to a comprehensive program for the sustainable management of the state's water resources. Water use efficiency, for example, is more environmentally friendly and less costly than constructing new surface storage.⁹⁰ Peter Gleick and his col-

84. See HANAK, *supra* note 18, at 24; see also PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 40 (Substantial federal funding through Public Law 102-575 and Public Law 104-266, has resulted in plans to implement regional projects in densely urbanized coastal areas). Most experts agree, depending on the treatment process, recycled water, wastewater that has been treated and had contaminants removed, is safe for everything but drinking. A downside of recycled water for residential use is found in the cost of installation for extra pipes for pure and recycled water. CAL. RURAL WATER ASSOC., CALIFORNIA DROUGHT PREPAREDNESS, <http://www.cadroughtprep.net/watshort.htm> (last visited Mar. 16, 2009).

85. Ronnie Lipschutz & Ruth Langridge, *Securing Access to Water: Institutional Strategies for Coping with Drought*, 2007-08 ANNUAL REPORT UNIV. OF CAL. CTR. FOR WATER RES., available at www.lib.berkeley.edu/WRCA/WRC/pdfs/LIPSCHUTZ08WRC.pdf.

86. See CAL. DEP'T OF WATER RES., CALIFORNIA WATER PLAN UPDATED 2009, WORKING PLAN, URBAN WATER USE EFFICIENCY 1 (2008), available at <http://www.waterplan.water.ca.gov/strategies/index.cfm> (follow hyperlink for "Urban Water Use Efficiency").

87. PETER H. GLEICK, ET AL., WASTE NOT, WANT NOT: THE POTENTIAL FOR URBAN WATER CONSERVATION IN CALIFORNIA 2 (2003), available at www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf; see also HANAK, *supra* note 18, at 21.

88. HANAK, *supra* note 18, at 98.

89. See, e.g. CAL. WATER RES. CONTROL BOARD, DEVELOPMENT OF AN URBAN WATER CONSERVATION REGULATORY PROGRAM, PUBLIC WORKSHOP OCTOBER 1, 2008, SUMMARY OF COMMENTS 3 (2008) [hereinafter PUBLIC WORKSHOP COMMENTS], www.swrcb.ca.gov/water_issues/programs/water_conservation/docs/.../urban_conservation_workshop_comments_summary_121908.pdf.

90. GLEICK ET AL., *supra* note 87, at 122. However, the debate over increasing surface storage remains contentious. See, e.g., Lester Snow, *With Water Precious, State Faces Heat, Fires—and Drought*, CAPITOL WEEKLY, July 10, 2008, <http://www.capitolweekly.net> ("But here's the plain truth: conservation will not help much in the sixth or seventh year of a statewide drought. To mitigate dry periods, California needs more surface storage to capture excess water provided in wet years."); but see Mindy McIntyre, *Cali-*

leagues at the Pacific Institute have argued that with very aggressive efforts, by 2030 human use of water in California could decline by as much as 20 percent from 2000 levels by phasing out subsidies to reflect the true costs of water, increasing the use of water-efficient technologies, supporting water transfers that improve efficiency, and integrating water supply planning with land use planning.⁹¹

The important caveat is that if communities *just* use “new” water, whether from desalination, recycling or water use efficiency, to further development in the short term, future demand could actually increase, thus exacerbating the impacts of future droughts.⁹² That is the historical narrative of water use in California.⁹³ Recycling and water-use efficiency can also result in demand hardening. For example, as urban water agencies implement water programs that include plumbing fixture retrofit programs and stocking new housing with low water use fixtures, it becomes increasingly difficult for the agencies to implement rationing programs during a drought.⁹⁴ Demand hardening also applies to agricultural water use. For example, in recent years, a number of farmers in the Central Valley shifted from annually planted field and row crops to more profitable permanent plantings of less water intensive orchards and vineyards.⁹⁵ However, farmers can leave row crops fallow a water-short year, whereas withholding water from permanent plantings will ultimately result in loss of a grower’s capital investment.⁹⁶

formia's Water Management Must Adapt to Climate Change, CAPITOL WEEKLY, July 10, 2008 available at <http://www.capitolweekly.net> (“[W]hile many policy makers have accepted that we need to reduce our production of greenhouse gases in order to combat climate change, fewer are willing to acknowledge that our conventional wisdom on water management must also change. Much of the water conversation in the Legislature focuses on a water bond to support old water strategies. The proposed water bonds would allocate billions of dollars for new dams to capture water in ‘wet’ years. Yet, state and federal agencies have spent over \$100 million studying those dams and, even based on past hydrology, the dams fail to provide benefits that are worthy of their price tags. No one has even considered how these dams would work under a drier future.”).

91. GLEICK, ET AL., *supra* note 87, at 2, 32-33.

92. See PUBLIC WORKSHOP COMMENTS, *supra* note 89, at 3.

93. See generally *id.*

94. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at ix.

95. Jacob Adelman, *Water Cuts Force Farmers to Scramble*, THE ASSOCIATED PRESS, Nov. 10, 2007, available at http://www.pe.com/business/local/stories/PE_Biz_D_watershortage11.738d56.html

96. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 50, 52-53. Vineyard acreage in Amador and San Luis Obispo Counties, for example, is up by 36 to 37 percent since the last drought. In the San Joaquin Valley, the problem is that agricultural water users rely extensively on less secure Delta exports and on already over-drafted groundwater basins. Yet the San Joaquin Valley is also the area experiencing the greatest increase in acreage of permanent plantings since the last drought—more than 230,000 acres.

VI. THE SPECIAL CASE OF GROUNDWATER

In an average year, groundwater meets approximately 30% of California's overall water needs.⁹⁷ It is particularly important during a drought, when consumptive use rises to as much as 60% and Californians turn to groundwater extraction as a key strategy to increase supply.⁹⁸ A major problem is that experts also project groundwater to be the largest single source of "new" supply for growth in the UWMPs, and anticipate that two thirds of the increase will be in areas outside fully managed basins where unsustainable use is more likely.⁹⁹ Yet, estimates of groundwater overdraft in the state are already at about 1-2 million acre-feet annually.¹⁰⁰

In overdrafted basins, groundwater pumping has led to a depletion of the storage reserve with undesirable results,¹⁰¹ including subsidence,

97. BULLETIN 118, *supra* note 15, at 2. Californians have always relied on groundwater to support agriculture and municipal development. *Id.* at 14. Today about 43 percent of all Californians rely on groundwater. Most groundwater results from rain and melted snow that has soaked into the ground, making it a self-replenishing source, and some has existed for millions of years. *Id.* at iii.

98. *Id.* at 2; *see also* PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at x (explaining the total number of well construction/modification reports filed during the last drought was approximately 25,000 reports per year, up from less than 15,000 prior to the drought).

99. HANAK, *supra* note 18, at 99.

100. BULLETIN 118, *supra* note 15, at 2. Most of the overdraft is occurring in the Tulare Lake, San Joaquin River, and Central Coast hydrologic regions California Water Plan Update. BULLETIN 160-98, *supra* note 14, at 3-7. As early as 1980, DWR Bulletin 118-80 identified 11 over-drafted basins where the continuation of present water management practices "would probably result in significant adverse overdraft-related environmental, social, or economic impacts." BULLETIN 118, *supra* note 15, at 98. Estimates of groundwater overdraft in California today are 1.5 million acre feet annually; 1 million acre feet of this comes from the San Joaquin Valley. PREPARING FOR CALIFORNIA'S NEXT DROUGHT, *supra* note 10, at 7; *see also* Hanak, *supra* note 18, at 8. There is also concern that the basins that are not yet in over-draft may show evidence of overdraft in the future. David Sandino, *Symposium on the Effective Management of Groundwater Resources: California's Groundwater Management Since the Governor's Commission Review: The Consolidation of Local Control*, 36 MCGEORGE L. REV. 471, 474 (2005).

101. *See* City of Pasadena v. City of Alhambra, 207 P.2d 17, 30 (Cal. 1949). The phrase *undesirable result* means a gradual lowering of the ground water levels resulting eventually in depletion of the supply. *See id.* When more water is removed than is recharged, the aquifer is described as being out of safe yield. Safe yield is an ambiguous concept however, and the term is both basin-specific and reliant on management objectives. It is generally described as a groundwater management goal to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area. METRO. WATER DIST. OF S. CAL., GROUNDWATER ASSESSMENT STUDY III-3 (2007), *available at* <http://www.mwdh2o.com/mwdh2o/pages/yourwater/supply/groundwater/gwas.htm#1>. The term sustainable yield is also used and refers to a policy that selects a specified amount of groundwater use based on an appraisal of social and hydrologic condi-

salt-water intrusion, and water quality degradation. Severely overdrafted basins may never fully recover even in wet years,¹⁰² and groundwater overdraft can impact surface waters and other groundwater-dependent ecosystems, as well as the base flow of streams and rivers.¹⁰³ Aside from the negative physical impacts of overdraft, the condition of the groundwater basin at the beginning of a drought is critical to maintaining adequate water supplies throughout drought events, as an overdrafted basin reduces opportunities to utilize groundwater during a severe drought.¹⁰⁴ When the governor issued a drought declaration in June 2008 that allowed farmers in the Westlands Water District to pump groundwater into the California Aqueduct and move it to parts that were in critical need, one farmer noted that nobody has much extra groundwater to pump because, "we already do that."¹⁰⁵

VII. JURISDICTION OVER GROUNDWATER

California has over four hundred identified groundwater basins,¹⁰⁶ and the amount of water stored in these aquifers is far greater than that stored in the state's surface water reservoirs.¹⁰⁷ Hydrologists estimate that about 143 million of storage capacity could be used as potential storage space, considerably more than surface reservoirs, which can

tions. Sustainable yield may be expressed as a percentage of recharge. VICTOR PONCE, *SUSTAINABLE YIELD OF GROUNDWATER* (2007), <http://gwsustainability.sdsu.edu>.

102. I. Portoghesi et al., *Groundwater Safe Yield in Semi-Arid Regions*, 5 *GEOPHYSICAL RES. ABSTRACTS* 12287 (2003), available at <http://www.cosis.net/abstracts/EAE03/12287/EAE03-J-12287.pdf> (stating that research has actually indicated that an inter-annual cycle of dry years followed by a wet year run in a Mediterranean climate of strong inter/intra-annual variability of rainfall together with a water demanding cropping policy does not even imply the full recovery of the quantitative status of a groundwater reservoir).

103. PONCE, *supra* note 101.

104. See *PREPARING FOR CALIFORNIA'S NEXT DROUGHT*, *supra* note 10, at 6 (2000). For example, "Paul Hendrix, manager of the Tulare Irrigation District, said the agency has entered into partnership with the county to build more ground-water recharge facilities. 'People are relying heavier on their wells,' he said. 'It used to be that we only used groundwater in the driest of years. Now we are using ground water in modest or average years.'" Valerie Gibbons, *Drought Hits Ranchers Hard*, *VISALIA TIMES-DELTA*, June 27, 2008, at A1.

105. Seth Nidever, *Westside Farmers Say Drought Declaration Unlikely to Help Situation*, *HANFORD SENTINEL*, June 13, 2008, available at <http://www.hanfordsentinel.com/articles/2008/06/13/news/doc4852c3686a050002951533.prt>.

106. CAL. DEP'T WATER RES., *INDIVIDUAL BASIN DESCRIPTIONS*, http://www.groundwater.water.ca.gov/bulletin118/basin_desc/index.cfm (last visited Apr. 18, 2009) ("There are currently 431 groundwater basins delineated, underlying about 40 percent of the surface area of the State. Of those, 24 basins are subdivided into a total of 108 subbasins, giving a total of 515 distinct groundwater systems.").

107. Ella Foley-Gannon, *Institutional Arrangements for Conjunctive Water Management in California and Analysis of Legal Reform Alternatives*, 6 *HASTINGS W. NW. J. ENVTL. L. & POL'Y* 273, 276 (2000).

store approximately 42 million of.¹⁰⁸ Who may claim the right to use and manage groundwater are clearly important to creating the capacity to cope with water shortages during a severe drought.

The California Legislature has repeatedly decided that management of groundwater should not be subject to the permitting authority of the State Water Resources Control Board ("SWRCB") but should instead be a local responsibility.¹⁰⁹ Although the state does not have the authority to issue permits for groundwater, through the California Constitution, Article X, Section 2, various sections of the California Water Code, and the Public Trust Doctrine, it does have authority to regulate certain aspects of groundwater use. For example the state may regulate pumping that is adversely affecting surface in-stream benefits such as fish populations and riparian values,¹¹⁰ and pumping that it deems unreasonable.¹¹¹ These regulatory powers will be discussed in greater detail later in the paper. In practice, because of the reluctance of the state to step in with a comprehensive program, local authorities generally initiate groundwater management.¹¹² In keeping with the emphasis on local management, in the last twenty-five years, the California Legislature has enacted a series of laws giving local water agencies more authority and providing them with financial incentives to improve groundwater management.¹¹³

108. *Id.* (explaining that these can accommodate approximately eight hundred fifty million acre feet of water); see also Tara L. Taguchi, *Whose Space is it Anyway: Protecting the Public Interest in Allocating Storage Space in California's Groundwater Basins*, 32 Sw. U. L. REV. 117, 118 n.6 (2003) (One acre foot of water is the amount needed to cover an acre one foot deep and is equal to 325,851 gallons).

109. Sax, *supra* note 38, at 302-303; BULLETIN 118, *supra* note 15, at 33. This lack of a statewide groundwater regulatory system is an anomaly among western state. Sandino, *supra* note 100, at 474.

110. See Marks v. Whitney, 491 P.2d 374, 380 (Cal. 1971).

111. CAL. WATER CODE § 275 (West 2009).

112. See BULLETIN 118, *supra* note 13, at 32 (explaining that the State sees its role as a provider of technical and financial assistance to local agencies for their groundwater management efforts, such as through the Local Groundwater Assistance Grant Program). Water districts and agencies manage groundwater supplies under four basic methods: (1) Under authority granted in the California Water Code or other applicable state statutes, (2) Under adopted groundwater management plans developed in accordance with water code provisions, (3) Under groundwater ordinances or joint powers agreements, and (4) Under court adjudications. Local ordinances and basin adjudications are generally a response system instituted after a specific groundwater problem is recognized. Some groundwater basins are not governed, managed or adjudicated. Kelley J. Hart, *The Mohave Desert as Grounds for Change: Clarifying Property Rights in California's Groundwater to Make Extraction Sustainable Statewide*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y, 1213, 1224-25 (2008).

113. Sandino, *supra* note 100, at 471-72.

VIII. GROUNDWATER MANAGEMENT TO PROACTIVELY ADDRESS WATER SHORTAGES AND DROUGHT

Groundwater is clearly a critical component of any drought planning strategy. A groundwater aquifer, unlike most surface water reservoirs, can provide natural ready-made long-term water storage for unlimited periods of time, thus sustaining a reserve for drought years. By controlling flow at the pump, one can extract water only when needed, and as long as the aquifer has water and the well is deep enough.

This paper offers the following proposals:

- Groundwater recharge should be a prime objective of water supply planning for drought.
- Groundwater management should include the establishment of a *strategic groundwater reserve*.
- The reserve should only be used to alleviate severe water shortages during a prolonged drought. Recovery of water to satisfy reasonable short-term demand could occur so long as the reserve is maintained.

The strategies of groundwater recharge, groundwater storage and conjunctive management of surface and groundwater are outlined below, followed by an analysis of the issues involved in utilizing these approaches to establish a groundwater reserve.

A. GROUNDWATER RECHARGE

Groundwater recharge is the first step in stabilizing and sustaining groundwater aquifers over the long term and building up a groundwater reserve.¹¹⁴ Three basic processes can replenish aquifers: (1) natural recharge, (2) active recharge (also referred to as enhanced, direct, or artificial recharge), and (3) in-lieu recharge.¹¹⁵ Natural recharge can occur as part of the hydrologic cycle or as the result of water seeping or percolating into the aquifer from various surface water sources: streams, rivers, lakes; surface water conveyance facilities; and irrigation water when rainfall infiltrates the land surface and percolates into the underlying aquifers.¹¹⁶ Natural recharge rates differ across areas due to

114. See generally GREGORY A. THOMAS, DESIGNING SUCCESSFUL GROUNDWATER BANKING PROGRAMS IN THE CENTRAL VALLEY: LESSONS FROM EXPERIENCE (2001) (discussing the benefits of groundwater recharge).

115. DEP'T OF WATER RES., STATE OF CAL., CALIFORNIA WATER PLAN UPDATE 2009 PUBLIC REVIEW DRAFT, 8-1, 8-2 (2009) [hereinafter CALIFORNIA WATER PLAN UPDATE 2009]; see also TOCCOY DUDLEY & ALLAN FULTON, CONJUNCTIVE WATER MANAGEMENT: WHAT IS IT? WHY CONSIDER IT? WHAT ARE THE CHALLENGES? 2 (2005).

116. *Id.*

variations such as soil type, plant cover, land slope, and rainfall intensity.¹¹⁷

A second replenishment method, active recharge, occurs when water is pumped or injected into wells or spread over a land surface to allow it to seep into the aquifer.¹¹⁸ This method uses imported water in several different scenarios. A storage and release regime can modify an existing reservoir to allow it to capture a larger fraction of peak flow events and move a substantial portion of this imported water into groundwater basins with un-utilized aquifer storage capacity.¹¹⁹ Alternatively, users can extract native groundwater from full aquifers, export it to create storage space, and subsequently fill the space with the imported water through injection or spreading.¹²⁰

A third process, in-lieu recharge, reduces groundwater extraction so that a depleted aquifer can recharge through natural or active processes. Parties then substitute more available surface water supplies that often include imported water.¹²¹ Recharge processes depend upon factors such as the area available for recharge, surface and subsurface geology in the groundwater basin and recharge rate, and are influenced by whether the source of recharge water is local or imported.¹²²

B. GROUNDWATER STORAGE

One can also use some groundwater aquifers as storage reservoirs.¹²³ A range of physical systems utilizes managed underground storage of recoverable water¹²⁴ to provide more secure water supplies.¹²⁵

117. See MARIOS SOPHOCLEOUS, UNIV. OF KAN., GROUNDWATER RECHARGE 17, 25 (2004) (discussing general effects on natural recharge and specific results of a daily water balance modeling analysis in south-central Kansas).

118. See CALIFORNIA WATER PLAN UPDATE 2009, *supra* note 115, at 8-2 (discussing this recharge methodology).

119. THOMAS, *supra* note 114, at 2.

120. *Id.* at 2-3. The Kern Water Bank and Arvin Edison/MWD arrangements are an example of this approach which generally requires large areas dedicated to recharge and good soil permeability. KERN WATER BANK AUTHORITY, THE KERN WATER BANK 2 (2009), available at <http://www.kwb.org/main.htm>; The Metro. Water Dist. of Southern Calif., *Expanded Central Valley Groundwater Banking Program Offers Southern California Additional Drought Insurance*, May 8, 2007, http://www.mwdh2o.com/mwdh2o/pages/news/press_releases/2007-05/arvin_edison.htm.

121. TOCCOY & FULTON, *supra* note 115, at 1. Parties use this method where soils have low permeability, such as the east side of the Sacramento Valley. See THOMAS, *supra* note 114, at 3.

122. TOCCOY & FULTON, *supra* note 115, at 1.

123. THOMAS, *supra* note 114, at 2

124. For example, different aquifer types, hydro-geological and geochemical conditions, and depths. See *generally* THE NAT'L ACADEMIES, PROSPECTS FOR MANAGED UNDERGROUND STORAGE OF RECOVERABLE WATER (2007) (discussing the properties of general underground water storage techniques).

125. CALIFORNIA WATER PLAN UPDATE 2009, *supra* note 115, at 8-1.

The significant advantages to storing water in groundwater basins include avoiding expensive surface storage and conveyance facilities, protecting stored water from evaporation, and providing a natural purification system through percolation. Moreover, groundwater storage uses less energy to extract water when the groundwater table rises and causes less environmental damage.¹²⁶ Challenges include design, construction and monitoring costs, chemical reactions with aquifer materials, environmental impacts, spillover costs to third parties, and potential over-consumption of stored water leading to further overdraft.¹²⁷

California courts address the rights to store, protect, and recapture water in underground basins in several cases. For example, courts have held: (1) Los Angeles has the right to import river water from the Owens Valley and bank it underground in the San Fernando Valley;¹²⁸ (2) public agencies have the right to store water and a right to the return flow from water imported into a groundwater basin (adding that "natural underground basins should be used as storage reservoirs ... whenever practicable");¹²⁹ and (3) Alameda County Water District has the authority to store water in a groundwater basin pursuant to its police powers.¹³⁰

C. CONJUNCTIVE MANAGEMENT OF SURFACE AND GROUNDWATER

A conjunctive water management program coordinates the use of groundwater and surface water.¹³¹ Natural, active, or in-lieu recharge processes deposit surface water in groundwater aquifers, and the program then "banks" the water there until its extraction for use.¹³² Using different combinations of recharge and recovery methods, an aquifer typically recharges in winter months and during years of abundant surface water availability, and recovery occurs in the summer and fall or during several consecutive years of less water availability.¹³³

Conjunctive water management clearly lacks a "one-size-fits-all" approach, and the unique set of local conditions such as institutional constraints, environmental concerns, economic considerations, and

126. Ella Foley-Gannon, *Institutional Arrangements for Conjunctive Water Management in California and Analysis of Legal Reform Alternatives*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 1105, 1111-12 (2008).

127. *See id.* at 1118-1120; THOMAS, *supra* note 114, at 12, 34-35.

128. *City of Los Angeles v. City of Glendale*, 142 P.2d 289, 294 (Cal. 1943).

129. *City of Los Angeles v. City of San Fernando*, 537 P.2d 1250, 1292-96 (Cal. 1975).

130. *Niles Sand and Gravel Co. v. Alameda County Water Dist.*, 112 Cal. Rptr. 846, 855 (Cal. Ct. App. 1974).

131. *See* CALIFORNIA WATER PLAN UPDATE 2009, *supra* note 115, at 8-1.

132. *Id.*

133. THOMAS, *supra* note 114, at 2-3.; *see also* CAL. WATER CODE § 1011.5 (West 2009) (explaining that for a conjunctive use program to function properly, the rights of parties who depend on each source of water, and the right to store and withdraw the water must be clarified).

political climate dictate the management method. Today, elaborate conjunctive management programs operate in southern Central Valley counties, including Kern and Tulare, where farmers initially relied almost exclusively on groundwater to irrigate their crops.¹³⁴ This resulted in severely over-drafted and degraded groundwater basins.¹³⁵ To remedy the deteriorating basins, water districts attempted to find other sources of water through conjunctive management arrangements that utilized imported surface water primarily from the State Water Project.¹³⁶ Today, these programs still rely heavily on this imported surface water as a major component of their conjunctive management programs.¹³⁷

Localities administer these projects, and while the rule is generally that groundwater overdraft conditions cannot worsen, a very significant issue is that no requirements exist for any district utilizing a conjunctive management arrangement to actually attain and maintain sustainable groundwater levels. For example, Semitropic Water District has a fifteen-foot/three-year rule, where Semitropic will not make groundwater withdrawals that cause the average groundwater levels in an area to decline more than fifteen feet over a three-year period compared to the average groundwater levels that would occur without the project.¹³⁸ But these levels existed when the aquifer was already in serious overdraft.¹³⁹ While the Orange County Water District has one of the more sustainable groundwater management programs in the state and focuses on the prevention of groundwater depletion, if a series of very dry years occurs, it will be unable to replenish the withdrawal that would occur.¹⁴⁰

An important objective of conjunctive management is cycling recharge and recovery over a time period to achieve an appropriate balance.¹⁴¹ However, as presently designed and practiced, the strategy can and typically does cause larger than normal declines in local groundwater levels during more intensive periods of recovery, potentially posing problems for other groundwater and surface water users in the

134. THOMAS, *supra* note 114, at 79.

135. *Id.*

136. See generally ROBERT GOTTLIEB & MARGARET FITZSIMMONS, THIRST FOR GROWTH: WATER AGENCIES AS HIDDEN GOVERNMENT IN CALIFORNIA 194-201 (1991) (providing a detailed history of these arrangements).

137. See generally THOMAS, *supra* note 114 (offering examples of large regional projects, such as those operated by the Semitropic Water Storage District, Arvin-Edison Water Storage District, Kern Water Bank Authority and Sacramento Water Storage District).

138. *Id.* at 13.

139. Telephone Interview with Paul Oshel, Dist. Eng'r, Semitropic Water Dist. (July 7, 2008).

140. Paula K. Smith, *Coercion and Groundwater Management: Three Case Studies and a Market Approach*, 16 ENVTL. L. 797, 839 (1986).

141. TOCCOY & FULTON, *supra* note 115, at 3.

basin not part of the conjunctive management effort, as well as for surface water flows. This is particularly problematic in already overdrafted basins during a severe drought. In addition, many of the large projects rely on: (1) recharge supplies exported from the Sacramento-San Joaquin Delta subjecting operations to present Delta export restrictions; (2) the availability of conveyance capacity; and (3) the availability of non-firm water from the State Water Project and/or the Central Valley Project.¹⁴² While benefiting banking partners, these projects impact non-participating parties as the recovery of banked water can increase the pump lift for other local landowners, increase aquifer contamination, and cause subsidence and damage native vegetation.¹⁴³

IX. DISCUSSION

According to the 2009 DWR Draft State Water Plan, the state still fails to provide for sustainable use of groundwater, including the protection of recharge and discharge areas.¹⁴⁴ Yet future water supply security depends on managing groundwater to prevent overdraft and pollution, boost recharge, and support more sustainable conjunctive management programs that incorporate a strategic groundwater reserve. Similar to a bank savings account, protecting natural capital in groundwater basins provides essential backup for extended and severe water shortages. Issues to consider in establishing standards to maintain a groundwater reserve include both hydrologic and geologic characteristics of groundwater aquifers and legal and political questions.

142. See generally CALIFORNIA WATER PLAN UPDATE 2009, *supra* note 115, at 8-8 to 8-13. Additionally, federal litigation over the role the Clean Water Act's National Pollutant Discharge Elimination System (NPDES) permitting process plays in water transfers causes further uncertainty for conjunctive management systems. See, e.g., *S. Fla. Water Mgmt. Dist. (SFWMD) v. Miccosukee Tribe of Indians*, 541 U.S. 95 (2004). In *SFWMD*, the Supreme Court held that the transfer of water from one body of water to another could require an NPDES permit if the waters differed in quality. *Id.* at 106-07; see also *Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York*, 451 F.3d 77, 84-85 (2d. Cir. 2006) (affirming New York City's need to obtain an NPDES permit for the conveyance of water from its Catskill Aqueduct system into a local creek). The U.S. Environmental Protection Agency published a proposed rule in 2006 to exclude water transfers from its NPDES permitting system. See National Pollution Discharge Elimination System (NPDES) Water Transfers Proposed Rule, 71 Fed. Reg. 32887 (proposed June 7, 2006). The agency has taken no further action on this rule, and further litigation is likely.

143. *Foley-Gannon*, *supra* note 126, at 1118.

144. CAL. DEP'T OF WATER RES., PUBLIC REVIEW DRAFT OF THE CALIFORNIA WATER PLAN UPDATE 2009 8-12 to -13 (2009), available at http://www.waterplan.water.ca.gov/docs/cwpu2009/1208prd/vol2/ConjMgmt-GWStor_PRD_09_r1.pdf; see *Foley-Gannon*, *supra* note 126, at 1119.

A. HYDROLOGIC AND GEOLOGIC CHARACTERISTICS

“Because the physical characteristics of groundwater basins vary greatly, the suitability of a particular basin to serve as an area for immediate storage and later extraction depends on its hydrological and geological features, as well as on the quality of the water stored within the basin.”¹⁴⁵ Pertinent factors include the movement of water between hydrologically connected surface and groundwater systems; movement between other aquifers;¹⁴⁶ the porosity of the basin material and the depth of the basin;¹⁴⁷ and the geologic and hydrologic variability in the character, thickness, and hydraulic conductivity within geologic materials overlying aquifers.¹⁴⁸ At present, there is limited geologic mapping to identify the geologic, hydrologic, and geochemical characteristics of aquifer sites, and limited spatial and temporal information characterizing groundwater levels and groundwater storage zones.¹⁴⁹

The source of storage water may be contentious, particularly regarding imported or recycled water. Pollution concerns arise when chemically and microbiologically different waters mix, and a conjunctive management program may need to include control over the type of land uses overlying the basin. The fluctuation in water levels in a basin can alter the rate or direction of groundwater flow, which forces contaminated water in the basin to flow towards wells. In this way, project water can exacerbate pollution problems within a basin by hastening the dispersal rate of pollutants throughout the aquifer. Thus, prior to recharge, an assessment of the level and location of contaminants within a basin is important.¹⁵⁰ When a basin is adjacent to the ocean or

145. Interview with Andrew Fisher, Professor, Univ. of Cal.-Santa Cruz, in Santa Cruz, (May, 29, 2008); Foley-Gannon, *supra* note 126, at 1113.

146. Foley-Gannon, *supra* note 126, at 1114 (“[t]he movement ... will depend on the relative water levels in each system. For example, when the water table of a groundwater basin intersects with a streambed, the groundwater will provide a base flow for the stream. In this circumstance, water added to the basin will not increase the amount of water contained within the basin, but will increase the flow of the connected stream. Similarly, extractions from a groundwater basin can result in the lowering of the water table and cause water from a connected surface water system to percolate into the basin”).

147. *Id.* at 1115 (discussing that porosity partly determines the available storage space, as well as the amount of energy required to extract water from a well).

148. *Id.* This causes great variability in recharge to underlying aquifers, and recharge must be inferred from measurements and determinations of related geologic and hydrologic properties. *See id.* (discussing variables impacting water mobility).

149. *See* Cal. Geological Survey – Geologic Maps Home Page, http://www.consrv.ca.gov/CGS/information/geologic_mapping/Pages/index.aspx (last visited April 22, 2009) (illustrating the limits of California’s geologic maps).

150. ALEX N. HELPERIN ET AL., NATURAL RES. DEF. COUNCIL, CALIFORNIA’S CONTAMINATED GROUNDWATER vi-vii, ix (2001) (stating the most recent edition of the report produced by the State Water Resources Control Board, and updated every two years, the “305(b) Report,” suggests that more than one third of groundwater in the

a saline aquifer, the withdrawal of water can allow for intrusion of salt-water into the freshwater aquifer, potentially rendering the water stored within the basin unusable without treatment.¹⁵¹

B. LEGAL AND INSTITUTIONAL

Groundwater governance and management clearly require strategies that take into account not only the physical characteristics of a local aquifer, but also its long-term integrity, the needs of communities overlying a basin, and the overall needs of the state particularly under conditions of climate change and potential prolonged droughts. Yet, authority over groundwater today is complex and fragmented with overlapping jurisdictions, and the management arrangements presently in place function as a response system that averts "crisis and system collapse," and suffers from "a variety of dysfunctional results."¹⁵²

The first question is what presently available sources of authority would allow the state to step in to achieve the establishment and maintenance of healthy groundwater aquifers, including a strategic groundwater reserve? Second, given the political resistance thus far to state regulation, what authority do local entities have that could enable them to establish these goals; is it sufficient; and how could policymakers improve this authority?

1. State Authority

As already indicated, the state currently does not have clear authority to regulate the pumping of percolating groundwater through a permitting process. Despite the legislature's frequent consideration of whether more comprehensive groundwater regulation is necessary,¹⁵³

state is highly contaminated. The causes of this contamination include septic systems, landfills, leaking underground storage tanks, and agricultural operations. The State Water Resources Control Board, the Department of Health Services, and the Department of Water Resources are the agencies responsible for addressing this pollution).

151. Foley-Gannon, *supra* note 126, at 1116 (noting that a basin adjacent to a saltwater body is not necessarily unsuitable for a groundwater storage project: "[i]f the groundwater levels are maintained at a sufficiently high level, contaminated water will not migrate into the basin. Moreover, even if the water table is significantly lowered during extraction, the flow of water from an adjacent system can be prevented by the use of injection wells to create a hydraulic barrier and block the movement of water into the basin").

152. Sax, *supra* note 38, at 271.

153. For example, the background study for the Governor's Commission to Review California Water Rights Law raised the issue of whether to require permits where critical groundwater problems existed or were threatened. See GOVERNOR'S COMM'N TO REVIEW CAL. WATER RIGHTS, STATE OF CAL., SUMMARY FINAL REPORT 7 (1978). Even in 1957, the State Water Plan stated: "...[w]hile it is not an immediate problem, it is evident that effective administration of the development and utilization of ground water resources, either by the State or by local agencies, or by both, will become mandatory

political reality has precluded the adoption of a permit-based groundwater management program administered at the state level, and the legislature's preference so far is for the local administration of groundwater management.¹⁵⁴

Given the reluctance of the state to step in through a permitting system, other existing sources of state authority allow the state to regulate groundwater more broadly, including the establishment of a no overdraft policy, incentives for recharge, and sufficient groundwater levels to sustain a strategic reserve. These sources include the California Constitution Article X, Section 2, and various sections of the California Water Code.

The California Constitution, Article X, Section 2, codified in Section 100 of the California Water Code, mandates the reasonable use of the state's water resources.¹⁵⁵ In *Peabody v. City of Vallejo*, the court held that Article X, Section 2 applied to both surface and groundwater rights.¹⁵⁶ The court stated:

The right to the use of water is limited to such water as shall be reasonably required for the beneficial use to be served Such right does not extend to unreasonable use or unreasonable method of use or unreasonable method of diversion of water The foregoing mandates are plain, they are positive, and admit to no exception. They apply to the use of all water, under whatever right the use may be enjoyed.¹⁵⁷

In *Joslin v. Marin Mun. Water Dist.*, the court affirmed once again that the 1928 Constitutional Amendment applied to all the waters of the

as the stage of full water development is approached." DEP'T OF WATER RES., STATE OF CAL., THE CALIFORNIA WATER PLAN 221 (1957).

154. See Sax, *supra* note 38, at 303 (illustrating the legislature's reluctance to regulate groundwater by pointing to the area-of-origin law where the legislature added §1221 to the water code that states "[t]his article shall not be construed to authorize the board to regulate groundwater in any manner," and to the provision that grants the Board authority over general adjudications of stream systems but specifically excludes percolating groundwater).

155. CAL. WATER CODE § 100 (West 2009) (stating "because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interests of the people and for the public welfare").

156. *Peabody v. City of Vallejo*, 40 P.2d 486, 498-99 (Cal. 1935) (holding that "the rule of reasonable use as enjoined by . . . the Constitution applies to all water rights enjoyed or asserted in this state, whether the same be grounded on the riparian right or the right, analogous to the riparian right, of the overlying land owner, or the percolating water right, or the appropriative right").

157. *Id.* at 491.

state including groundwater.¹⁵⁸

In addition, the courts interpret reasonable use broadly, holding that water use must be reasonable for both the needs of water rights holders and in light of competing public uses of the resource. As the court stated in *Joslin*,¹⁵⁹ “what is a reasonable use of water depends on the circumstances of each case, such an inquiry cannot be resolved in vacuo from statewide considerations of transcendent importance.”¹⁶⁰ Most importantly, the courts employ a dynamic definition of reasonable use, and the law must keep pace with the needs and transformations constantly taking place in a rapidly changing society.¹⁶¹ As stated in *Envtl. Def. Fund v. E. Bay Mun'l Utility Dist.*: “What constitutes reasonable water use is dependent upon not only the entire circumstances presented but varies as the current situation changes.”¹⁶² Thus, the state could limit groundwater withdrawals that are unreasonable within the broader context of drought planning and the need to sustain a strategic groundwater reserve.

The next issue is what constitutes a violation of unreasonable use in the context of establishing a groundwater reserve. California Water Code, Section 12922 gives the state the authority to prevent impaired use or irreparable damage to groundwater basins caused by overdraft and depletion.¹⁶³ In addition, Section 104 states that: “It is hereby declared that the people of the State have a paramount interest in the use of all the water of the State and that the State shall determine what water of the State, surface and underground, can be converted to public use or *controlled for public protection*.”¹⁶⁴ The sections of the California Water Code and court cases discussed above affirm the authority of the state to regulate groundwater with respect to (1) reasonable use, where reasonable use encompasses the public interest; (2) the prevention of

158. *Joslin v. Marin Mun. Water Dist.*, 429 P.2d 889, 893 (Cal. 1967) (holding that “[t]he [constitutional] amendment was generally construed as applying a rule of reasonable use ‘to all water rights enjoyed or asserted in this state, whether the same be grounded on the riparian right or the right, analogous to the riparian right, of the overlying land owner, or the percolating water right, or the appropriative right.’” (quoting *Peabody*, 40 P.2d at 499)).

159. *Id.* at 894.

160. *Envtl. Def. Fund v. E. Bay Mun. Util. Dist.*, 605 P.2d 1, 6 (Cal. 1980) (quoting *Joslin*, 429 P.2d at 894).

161. *See Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 45 P.2d 972, 1007 (Cal. 1935) (stating “[w]hat may be a reasonable beneficial use, where water is present in excess of all needs, would not be a reasonable beneficial use in an area of great scarcity and great need”); *Foley-Gannon*, *supra* note 126, at 1126-27.

162. *Envtl. Def. Fund*, 605 P.2d at 6.

163. CAL. WATER CODE §12922 (West 2009) (stating “[i]t is hereby declared that the people of the State have a primary interest in the correction and prevention of irreparable damage to, or impaired use of, the ground water basins of this State caused by critical conditions of overdraft, depletion, sea water intrusion or degraded water quality”).

164. CAL. WATER CODE § 104 (emphasis added).

groundwater overdraft, depletion and degradation; and (3) public protection.

Given the reasonable use requirement and the above water code provisions, the next question concerns whether the State Board can step in to remedy groundwater withdrawals that are unreasonable when they deplete a strategic reserve established to protect the public against statewide drought conditions? Joseph Sax argues that the State Board can issue remedial orders against water users not abiding by the reasonable use mandate despite its lack of permitting authority, and "that the Board, through the California Attorney General, can institute litigation to control groundwater use that . . . constitutes waste, unreasonable use, or method of use within the meaning of Article X, Section 2 of the California Constitution, and Section 100 of the Water Code . . .

..¹⁶⁵

Sax adds that, under Section 275 of the California Water Code, the Board can also assert its own jurisdiction to adjudicate and remedy complaints about unreasonable groundwater use.¹⁶⁶ In *United States v. State Water Res. Control Bd.*,¹⁶⁷ (the Racanelli decision), and *Imperial Irrigation Dist. v. State Water Res. Control Bd.*,¹⁶⁸ the courts affirmed that Section 275 of the Water Code¹⁶⁹ gives the Board the power to take any necessary steps to prevent unreasonable use of water. As Sax notes, these are lower court decisions, and while the California Supreme Court has not expressly addressed whether Section 275 provides an independent source of jurisdiction over groundwater pumpers, the lower courts establish that the Board can assert jurisdiction over the pumping of percolating groundwater to adjudicate and remedy claims that come within the scope of waste and unreasonable use covered by

165. Sax, *supra* note 38, at 308-09.

166. *Id.* at 309; CAL. WATER CODE, § 275 ("The department and board shall take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state").

167. *United States v. State Water Res. Control Bd. (Racanelli)*, 227 Cal. Rptr. 161, 195 (Cal. Ct. App. 1986).

168. The court in *Imperial Irrigation Dist.* cited the Racanelli decision, which also pointed to section 275 of the Water Code as giving the Board "the separate and additional power to take whatever steps are necessary to prevent unreasonable use or methods of diversion" *Imperial Irrigation Dist. v. State Water Res. Control Bd.*, 275 Cal. Rptr. 250, 265 (Cal. Ct. App. 1990). In an earlier case, the court concluded "section 275 is not to be construed as a limitation on the Board's adjudicatory authority, but rather as a statute granting separate, additional power to the Board." *Imperial Irrigation Dist. v. State Water Res. Control Bd.*, 231 Cal. Rptr. 283, 289 (Cal. Ct. App. 1986).

169. "The department and board shall take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state." CAL. WATER CODE § 275 (West 2009).

section 275 of the Water Code.¹⁷⁰ This points to the Board having the authority to remedy claims of pumping that causes overdraft of a basin and potentially to remedy unreasonable withdrawals that deplete a reserve.

2. Local Authority

Given the political resistance thus far to broad state regulation of groundwater, and that the California Water Code also enables local agencies to manage groundwater and control groundwater use to some degree, the second question concerns whether these entities have the authority to mandate more sustainable groundwater management practices, and whether it is sufficient to enable the establishment of a groundwater reserve program on a basin by basin basis?¹⁷¹ The following is a summary of local districts' ability to engage in sustainable groundwater management and some of the problems with this approach.

3. Local Agencies and Districts with Authority Under the California Water Code or Legislation

More than 20 types of local agencies have authority to manage some aspect of groundwater depending upon the individual agency's enabling legislation¹⁷² including, for example, water replenishment districts¹⁷³ and water conservation districts.¹⁷⁴ Depending on their enabling legislation, these districts can limit or regulate extraction, levy groundwater extraction fees,¹⁷⁵ and collect fees to establish recharge programs that address overdraft.¹⁷⁶

170. In the *Racanelli* decision, the court also cited section 275 of the Water Code as authority for the proposition that "the Board has the separate and additional power to take whatever steps are necessary to prevent unreasonable use or methods of diversion." *Racanelli*, 227 Cal. Rptr. at 195.

171. Both special and general act districts, by virtue of their statutory powers, and especially adjudicated districts, have made progress in protecting and managing water resources around the state and courts have also supported groundwater management at the local-regional level. *Foley-Gannon*, *supra* note 126, at 1108.

172. These number more than two thousand and "include irrigation districts, water conservation districts, water districts, county service areas, community services districts, and water storage districts." *Sandino*, *supra* note 100, at 482-83; *BULLETIN 118*, *supra* note 16, at 33-34.

173. CAL. WATER CODE §§ 60221, 60230. The legislature authorized the groundwater management districts to establish groundwater recharge programs that address overdraft and to collect fees for that service.

174. *Id.* § 74508. The groundwater management districts can levy groundwater extraction fees.

175. *Id.*

176. *Id.* §§ 60221, 60230(j).

In addition, the legislature also creates special groundwater management districts¹⁷⁷ that can manage groundwater to control in-basin pumping upon evidence or threat of overdraft, limit exports out of the district, regulate well spacing to minimize well interference, and levy fees for groundwater management activities and for water supply replenishment.¹⁷⁸ While these special districts have stronger mandates and could serve as a model for regulation in the public interest, they exist in only a few regions.¹⁷⁹

4. Local Districts with Groundwater Management Plans

Assembly Bill 3030, passed in 1992,¹⁸⁰ expanded the ability of agencies to address the problem of critical overdraft by increasing the number of public agencies authorized to develop a groundwater management plan; however, this ability is contingent on receiving a majority of votes in favor of the plan in a local election.¹⁸¹ When adopted, the plan allows the agency to fix and collect fees for groundwater management.¹⁸² Senate Bill 610 added that if groundwater is a source available to a water supplier in a non-adjudicated basin, and if the basin is in overdraft, the plan must include current efforts to eliminate any long-term overdraft.¹⁸³

Groundwater Management Plans may, *but are not required to*, address the control of salt-water intrusion, the management of recharge areas, the regulation of contaminated groundwater migration, the mitigation of overdraft, the replenishment of extracted groundwater, the monitoring of groundwater levels and storage, and the coordination with land use planning agencies to assess activities that create a risk of

177. The seven districts are Sierra Valley Groundwater Management District, *Id.* § 119-102; Honey Lake Valley Groundwater Management District, *Id.* § 129-102; Long Valley Groundwater Management District, *Id.* § 119-102; Mono County Tri-Valley Groundwater Management District, *Id.* § 128-201; Ojai Basin Groundwater Management Agency, *Id.* § 131-102; Fox Canyon Groundwater Management Agency, *Id.* § 121-102; and Willow Creek Valley Groundwater Management District, *Id.* § 135-102.

178. *See id.* § 119-709 (providing districts with authority to regulate overdrafts).

179. DEP'T OF WATER RES., GROUNDWATER MANAGEMENT IN CALIFORNIA: A REPORT TO THE LEGISLATURE PURSUANT TO SENATE BILL 1245 (1997), at 4, 6 (1999), *available at* http://www.dpla2.water.ca.gov/publications/groundwater/gwm_report.pdf [hereinafter SENATE BILL 1245 REPORT]; Sandino, *supra* note 100, at 483-84.

180. BULLETIN 118, *supra* note 16, at 35 (discussing that prior to AB 3030, the legislature passed AB 255 in 1991, authorizing some overdrafted basins to develop plans to manage for extraction, recharge, conveyance and quality control); *see also* CAL. WATER CODE § 10750 (codifying AB 3030).

181. CAL. WATER CODE § 10754.3; Sandino, *supra* note 100, at 484-85.

182. CAL. WATER CODE § 10754.

183. *Id.* § 10910 (mandating any project subject to the California Environmental Quality Act (CEQA) and supplied with water from a public water system to provide a water supply assessment compiled by the water or by the city or county).

groundwater contamination.¹⁸⁴ A significant issue is that *groundwater management plans are not mandatory and do not have to be reported to DWR*,¹⁸⁵ limiting both their reach and an understanding of their effectiveness.¹⁸⁶ Legislation now requires that any public agency seeking state funds for groundwater projects to prepare and implement a groundwater management plan that includes basin management objectives and monitoring protocols.¹⁸⁷

5. City and County Ordinances

A third general method of managing groundwater in California is through ordinances that local governments adopt. Almost 30 percent of California's counties have local groundwater management ordinances¹⁸⁸ in which a county will only issue a permit if an export of groundwater will not cause overdraft, affect safe yield, reduce water quality, cause subsidence, or injure water users within the county.¹⁸⁹

184. *Id.* § 10753.8 (identifying twelve technical components that may be included in the groundwater management plan); *See also* DEP'T OF WATER RES., AB 3030-GROUNDWATER MANAGEMENT ACT,

http://www.groundwater.water.ca.gov/water_laws/ab3030_gma/ (noting AB 3030 plans cannot be adopted in adjudicated basins or in basins where groundwater is managed under other sections of the Water Code without the permission of the court or the other agency).

185. *See* DEP'T OF WATER RES., LAWS AND LEGISLATION, http://www.groundwater.water.ca.gov/water_laws/index.cfm#sb1938 (noting that the requirements apply to agencies adopting groundwater management plans as well as agencies that do not overlie groundwater basins identified in Bulletin 118 and its updates, but the requirements do not apply to funds administered through the Local Groundwater Management Assistance Act or to funds authorized or appropriated prior to September 1, 2002).

186. SENATE BILL 1245 REPORT, *supra* note 179, at IX, 1 ("The water code does not establish a mechanism requiring local agencies to report such information, so DWR relied on information obtained from three surveys conducted by the Association of California Water Agencies, a DWR questionnaire mailed to more than 1,000 local agencies, and local agency contact with DWR staff; 650 agencies responded to DWR's questionnaire." Because the plans are not monitored, some agencies that enacted them under AB 3030 are not implementing them). Some plans are simply summaries of an agency's existing programs, and no state clearinghouse reviews the plans despite the DWR requirement to publish a report to the legislature listing all agencies that have adopted groundwater management plans. BULLETIN 118, *supra* note 16, at 44; SENATE BILL 1245 REPORT, *supra* note 179, at 1.

187. CAL. WATER CODE §§ 10753.7, 10755.2 (encouraging coordinated plans between public agencies and public or private entities that provide water service); BULLETIN 118, *supra* note 16, at 35 ("At least 20 coordinated plans have been prepared to date involving nearly 120 agencies, including cities and private water companies.").

188. DEP'T OF WATER RES., PREPARING FOR CALIFORNIA'S NEXT DROUGHT: CHANGES SINCE 1987-1992, at x (July 2000), *available at* http://www.water.ca.gov/drought/docs/Drought_Rpt_Chpl.pdf.

189. Sandino, *supra* note 100, at 479-80 (noting only three of the twenty-seven counties that have adopted groundwater ordinances maintain the goal of managing their groundwater basin to account for users needs inside and outside the county whereas

The court upheld the authority of counties to regulate groundwater in *Baldwin v. County of Tehama*,¹⁹⁰ stating that state law does not occupy the field of groundwater management; therefore, cities and counties may adopt ordinances to manage groundwater under their police powers.¹⁹¹ Groundwater-rich counties adopted these ordinances out of concern that their groundwater resources will be exported to meet the growing demands of the Bay Area and Southern California. Counties also adopted these ordinances to protect against someone purchasing land within a county with groundwater resources for purposes of obtaining groundwater rights, and then transferring water outside of the county for a fee, to the detriment of users within the county.¹⁹²

6. Adjudication

Groundwater over-pumping that results in the decline of the water table, salt-water intrusion and subsidence can stimulate basin adjudications or settlements.¹⁹³ A lawsuit generally initiates the adjudication, and then a court decides the groundwater rights of all the overlying owners and appropriators. Adjudicated basins operate according to specific rules, including who may pump and how much they may pump. A court-appointed water master or a user committee from a groundwater district monitors compliance and resolves disputes. Thus far, adjudicated basins account for a small percentage of California's groundwater resources, with the limiting factor being the cost and delay associated with adversarial litigation.¹⁹⁴

The first basin-wide adjudication in the Raymond Basin in Southern California, which took thirteen years to resolve,¹⁹⁵ established the

the remaining counties have not attempted to restrict overdraft or establish management objectives for the basins).

190. *Baldwin v. County of Tehama*, 36 Cal. Rptr. 2d 886, 891 (Cal. Ct. App. 1994).

191. *Id.* at 890-91 (leaving a Tehama County ordinance in effect).

192. "There are currently twenty-seven counties that have adopted groundwater ordinances within the state. Three counties, including Glenn County, aim to manage their groundwater basin to account for users [*sic*] needs both inside and outside the county. However, the remaining counties have not attempted to restrict overdraft or establish management objectives for the basins. Instead, their ordinances only serve to restrict the exportation of groundwater from the basin. In such counties, it is unlawful to export groundwater outside of the county or use groundwater in lieu of exported surface water without an extraction permit issued by the county Board of Supervisors ("Board") and without first complying with the California Environmental Quality Act. The Board typically has discretionary authority over the issuance of the permit and the permit may be issued only if the Board first determines that the export will not cause overdraft, will not affect safe yield, and will not injure water users within the county." Sandino, *supra* note 100, at 479-80 (internal citations omitted).

193. Sax, *supra* note 38 at 271.

194. Sandino, *supra* note 100, at 478 (internal citations omitted).

195. *See City of Pasadena v. City of Alhambra*, 207 P.2d 17, 22-23 (Cal. 1949).

doctrine of mutual prescription.¹⁹⁶ Modified in *Techachapi-Cummings County Water Dist. v. Armstrong*,¹⁹⁷ the court ruled that overlying owners' quantified water rights rest on the basis of current, reasonable and beneficial need, not past use. In *City of Los Angeles v. City of San Fernando*,¹⁹⁸ the court stated that all public agency rights are prior to rights dependent on ownership of overlying land.¹⁹⁹

Adjudicated basins generally result in either a reduction or no increase in the amount of groundwater extracted, and these basins have the best record for establishing mandates for sustainable groundwater management. However, any increase in demand generally requires the use of imported surface water, and adjudicated basins account for a only a small percentage of California's groundwater resources, and adjudication is costly and time-consuming.²⁰⁰

7. Urban Water Management Plans

Additional legislation addresses groundwater overdraft by requiring urban areas with groundwater as an available source of water to include groundwater management in its Urban Water Management Plan, and if the basin is in overdraft, the plan must detail current efforts to eliminate any long-term overdraft.²⁰¹

8. Court Directives

The courts also affirmed a constitutionally based authority for local public institutions to prevent aquifer degradation.²⁰² In a footnote in *City of Barstow v. Mojave Water Agency* the court stated: "If Californians expect to harmonize water shortages with a fair allocation of future use, courts should have some discretion to limit the future groundwa-

196. *Id.* at 32-33 (holding all parties gained prescriptive rights against each other and the extraction of water from the basin should be limited by a proportionate reduction by the amount taken by each party throughout the statutory period).

197. *Techachapi-Cummings County Water Dist. v. Armstrong*, 122 Cal. Rptr. 918, 924 (Cal. Ct. App. 1975).

198. *City of Los Angeles v. City of San Fernando*, 537 P.2d 1250, 1314 (Cal. 1975).

199. In *City of Barstow v. Mojave Water Agency*, 5 P.3d 853, 858, 861 (Cal. 2000), the court upheld equitable apportionment as a tool for adjudicating basin groundwater rights, but only if all parties stipulate to its use.

200. *Sandino*, *supra* note 100, at 478 (stating the SWRCB may initiate and referee groundwater adjudications on behalf of the state to protect groundwater quality but does not use this authority).

201. CAL. WATER CODE §10631(b)(1)-(2) (West 2009).

202. *Alameda County Water Dist. v. Niles Sand and Gravel Co.*, 112 Cal. 846, 854-55 (Cal. Ct. App. 1974) (upholding the trial court's decision in favor of the water district and finding Niles' practice of pumping and discharging water into the bay wasteful and unreasonable and that the California Constitution's demand that "'waste or unreasonable use or unreasonable method of use of water be prevented,'... expressed a legitimate exercise of the police power of the state"); *see Baldwin*, 36 Cal. Rptr. 2d at 890-91 (upholding a state ordinance implementing protection for subterranean waters).

ter use of an overlying owner who has exercised the water right and to reduce to a reasonable level the amount the overlying user takes from an overdrafted basin.”²⁰³

9. Financial Incentives

Financial incentives are available to local agencies to encourage them to implement improvement programs for recharge and water quality.²⁰⁴ Recent bond measures, voter approved propositions, and legislation provide significant financing for groundwater studies, recharge projects, groundwater storage facilities, and conjunctive management programs.²⁰⁵ The bulk of funding, thus far, goes to the large water districts in Southern California, the San Joaquin/Tulare Central Valley region, and the Sacramento Region.²⁰⁶

10. Problems with Local Groundwater Management

While local entities clearly have authority and incentives to improve groundwater management, numerous problems with local supervision presently exist. Management is primarily reactive rather than proactive, and movement towards sustainable management usually occurs *after* a groundwater basin is in trouble due to overdraft and/or contamination. Most policies are voluntary, highly variable in the degree of protection against overdraft, and essentially non-existent with respect to the establishment and maintenance of a groundwater reserve as a hedge against prolonged drought.

CONCLUSION

*“A drought is like watching a train wreck in slow motion. You would think slow motion would allow us to prepare.”*²⁰⁷

- Paul H. Betancourt

203. *City of Barstow*, 5 P.3d at 868-69 n. 13.

204. Sandino, *supra* note 100, at 487.

205. *Id.* (“Assembly Bill 303, the Local Groundwater Management Assistance Act of 2000, provided \$21 million in grants to local entities for groundwater studies or management activities. In 2000, the voters approved Proposition 13, the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act, which authorized \$230 million for groundwater storage facilities and conjunctive management programs ... [t]he voters approved yet another bond measure, Proposition 50, in 2002, the Water Security, Clean Drinking Water, Coastal Beach Protection Act, for which \$ 500 million is to be used for water management programs, including groundwater management and groundwater recharge projects”)

206. Div. of Local Assistance and Planning, Dep’t of Water Res., Conjunctive Management Program Update 11 (2004), *available at* http://www.groundwater.water.ca.gov/cwm/docs/CWM_Annual_Report_2004.pdf.

207. Paul H. Betancourt, Op-Ed., *Betancourt: Planning, More Storage Would Have Prevented This Year’s Water Shortages*, SACRAMENTO BEE, June 15, 2008, at 4E.

Much of California faces a future of increasing aridity. Periodic droughts, common throughout the state's history, coupled with climate change, will likely exacerbate water problems even as the state faces increasing water demands from potential population growth and more diverse interests. The time is ripe for more potent and innovative strategies to cope with anticipated future droughts;²⁰⁸ to sustain a reliable water supply during these periods, California will increasingly rely on groundwater, the world's subsurface water reservoir. Although large financial assistance programs are currently available to help local communities implement groundwater improvement programs, groundwater overdraft and deteriorating quality remain significant problems.²⁰⁹

Clearly, the most effective way to achieve broad and sustainable groundwater management, including the establishment of a strategic groundwater reserve, involves setting basic standards at the state level. These should be mandatory and broadly applicable; moreover, the standards should be interconnected with broader planning mechanisms for land, water and environmental protection, and flexible enough to account for local conditions.²¹⁰

Specifically, the state should establish policies to:

- (1) Coordinate land use activities to protect groundwater recharge areas and monitor human activities that can degrade them;²¹¹

208. Richard Seager, *Making a Bad Situation Worse: Human-Induced Climate Change and Intensifying Aridity in Southwestern North America in CALIFORNIA DROUGHT AN UPDATE 79* (Jeanine Jones ed., 2008), available at <http://www.water.ca.gov/drought/docs/DroughtReport2008.pdf>.

209. DWR recently concluded that overdraft is continuing at a rate of one million to two million acre-feet annually. Moreover, some basins in the state are showing a growing decline of groundwater levels and the DWR is concerned that other basins are at risk of over-draft in the future. Sandino, *supra* note 100, at 474.

210. Gray, *supra* note 8, at 1459-60 (arguing for "a supervening legal power to put pressure on counties, regional water agencies, and overlying land owners to use their groundwater resources - as well as available aquifer storage - for both their private advantage and the broader public welfare" in a manner consistent with the reasonable use doctrine) (emphasis added).

211. Land use activities that impact groundwater include urban development, paving, building on former agricultural land, and lining of flood control channels. Other land use changes have reduced the capacity of recharge areas to replenish groundwater, which effectively reduces the safe yield of some basins. To ensure that recharge areas continue to replenish high quality groundwater, water managers and land use planners need to work together to identify recharge areas so the public and local zoning agencies are aware of the areas requiring protection from paving and contamination. These professionals should also "[c]onsider the functions of recharge areas in land use and development decisions." BULLETIN 118, *supra* note 16, at 51.

- (2) Establish a system to collect data and monitor the size, storage area, and hydrologic balance of state aquifers, as well as trends in levels and quality;²¹²
- (3) Establish aquifer standards to prevent overdraft, pollution, degradation and loss of the aquifer;²¹³
- (4) Establish, and maintain a strategic groundwater reserve, and establish the conditions under which the reserve may be tapped.

By overdrawing aquifers, Californians have “overdrawn their account with Mother Nature,” and “[r]ather than living off the interest of natural capital ... have taken a large portion of the principal.”²¹⁴ As articulated in the *Sacramento Bee*, California can no longer ignore the consequences of a potential severe drought, and solutions must move beyond the general notions of linking water and land-use planning²¹⁵ and the reduction of water use *after* a drought is declared. In taking the first step and thinking proactively about reducing vulnerability to a drought through the establishment and maintenance of a strategic water reserve, this paper contributes to the debate over how to live sustainably in a fundamentally dry landscape.

212. Groundwater levels can provide critical information about the hydrologic relationships of recharge and discharge to storage within an aquifer, and the direction of groundwater flow. Long-term, systematic measurements of water-level data are essential to develop groundwater models and to design, implement, and monitor the effectiveness of groundwater management programs including a strategic reserve. The Groundwater Monitoring and Assessment Program of the SWRCB, a recently enacted program to assess water quality in wells throughout the state, and the Groundwater Quality Monitoring Act of 2001 (AB 599 Cal. Water Code §§10780 et seq., are a step in that direction. See STATE WATER RES. CONTROL BD., GROUND-WATER AMBIENT MONITORING AND ASSESSMENT PROGRAM 1-2 (2004), available at http://www.swrcb.ca.gov/gama/docs/usgs_gama_fact_sheet_fs2004-3088.pdf; CAL. WATER CODE §§ 10780-10782.3.

213. For example, any conjunctive management project would be required to recharge more water than it recovers to build up the water table sufficient to maintain a groundwater reserve. The state legislature could set basic standards, but implementation would be locally based and relate to specific local conditions. See, e.g. Assemb. B. 2153, 2007-08 Reg. Sess. (Cal. 2008) (requiring DWR to establish a numeric water conservation target for the state).

214. PAUL MOLYNEAUX, SWIMMING IN CIRCLES: AQUACULTURE AND THE END OF WILD OCEANS x (Thunder's Mouth Press 2007).

215. Editorial, *Slowly, Slowly Water Legislation Advances*, SACRAMENTO BEE, June 3, 2008, at 6B.

A HALF FULL CIRCLE: THE RESERVED RIGHTS DOCTRINE AND TRIBAL REACQUIRED LANDS

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INTRODUCTION

The judicially created doctrine of Congressional plenary power over Native American tribes and individuals continues to deeply affect the liberties and activities of the tribes.² Tribal sovereignty over the management of land and resources rightfully belonging to Native American tribes is oftentimes subject to Congressional monitoring and delegation to the Secretary of the Interior. The judiciary also plays a distinct hand in determining the extent of tribal sovereignty over tribal property. Water rights persist, especially in the western United States, as one of the most precious and provocative sources of dispute between American Indian tribes and individuals and non-Indian users. This article evaluates whether the proverbial glass of reserved water rights will be half full or half empty when allotted land returns full circle to its original Native American owners.

The reserved rights doctrine allocates certain quantities and types of water to certain Indian tribes based on a number of variables, including the purpose of the Indian reservation and the intent of Congress regarding the reservation. This paper specifically analyzes whether the reserved rights doctrine applies to Native American lands allotted by the United States and reacquired by an Indian tribe on the open market that the United States then takes into trust on behalf of the tribe.³ The answer is yes: the reserved rights doctrine applies to allotted lands that an Indian tribe reacquires from the open market, and that the United States subsequently takes into trust on behalf of the tribe.

Two key conclusions support this finding. First, the purpose of the reservation is not connected to the land itself, but is attached to the unique nature of tribal status and the tribal relationship with the federal government. That status and relationship remain intact even if the ownership of the land changes. Second, Congressional plenary power and policy promotes tribal self-determination and reacquisition of land, thus allowing tribes the benefits of the land that originally was theirs in accordance with Congressional intent.

This article begins with a brief recounting of federal policy regarding Indian affairs and focuses on the General Allotment Act. Then, the article explains some of the key types of land affecting Native American rights and interests. The article continues to further articulate the reserved rights doctrine generally, as well as which water rights

2. See *Stephens v. Cherokee Nation*, 174 U.S. 445, 478 (1898) (articulating an assumption that Congress "possesses plenary power of legislation in regard to [Indian tribes], subject only to the Constitution of the United States.").

3. The United States Supreme Court's decision in *Carcieri v. Salazar*, 129 S. Ct. 1058 (2009), limits the conclusions of this article and the continuum in Appendix I to tribes officially recognized by the federal government in 1934, when Congress enacted the Indian Reorganization Act.

apply to allotted land. Next follows a description of case law regarding water rights for lands previously allotted, transferred out of Indian ownership, and then returned to Indian ownership, which are known as reacquired lands. Before concluding with policy considerations and a recommendation, this article compares jurisprudence regarding the federal reacquisition policy and taxing rights over reacquired lands with the application of the reserved rights doctrine to reacquired lands. Appendix I presents a continuum of the legal likelihood, based on case law and academic work, that a certain type of reacquired land would achieve the full benefits of the reserved rights doctrine under judicial review.

I. "CONGRESSIONAL PLENARY POWER"

United States federal jurisprudence began attributing "plenary" power over Indian affairs to Congress as early as 1832.⁴ Chief Justice John Marshall described how the power to regulate and control interactions with the Cherokee Nation belonged exclusively to the United States Congress under the authority of Article I of the United States Constitution.⁵ In 1903, the Court established Congress' plenary authority as political, "not subject to be controlled by the judicial department of the government."⁶ The contemporary United States Supreme Court continues to reinforce the doctrine of Congressional plenary power consistently throughout its federal Indian law jurisprudence.⁷

Congressional exercise of plenary power implicated an extensive series of federal policies that continue to affect Native American tribes intensively. The following sections briefly describe the history of federal Indian policy and focus on the General Allotment Act, which created the predicament of land and water rights examined in this article.

4. See *Worcester v. Georgia*, 31 U.S. (6 Pet.) 515, 558 (1832) (stating that "[C]ongress assumed the management of Indian affairs; first in the name of the United Colonies; and, afterwards, in the name of the United States.").

5. *Id.* at 531; see also U.S. CONST. art. I, § 8, cl. 3 (stating Congress has the power "[t]o regulate Commerce . . . with the Indian Tribes.").

6. *Lone Wolf v. Hitchcock*, 187 U.S. 553, 565 (1903).

7. See *City of Sherrill, N.Y. v. Oneida Indian Nation of N.Y.*, 544 U.S. 197, 224 (2005); *United States v. Lara*, 541 U.S. 193, 194 (2004); *Rice v. Cayetano*, 528 U.S. 495, 529-30 (2000); *South Dakota v. Yankton Sioux Tribe*, 522 U.S. 329, 343 (1998); *Cotton Petroleum Corp. v. New Mexico*, 490 U.S. 163, 192 (1989); *Morton v. Mancari*, 417 U.S. 535, 551-52 (1974); *Winton v. Amos*, 255 U.S. 373, 391 (1921); *Cherokee Nation v. Hitchcock*, 187 U.S. 294, 306 (1902); *Talton v. Mayes*, 163 U.S. 376, 382 (1896).

A. A BRIEF HISTORY OF FEDERAL INDIAN POLICY

From the early 1800's through 1850, the United States government enforced a policy described as "removal."⁸ At that time, the United States entered into treaties with Indian tribes in the eastern part of the country, which "exchange[d]" their respective lands in the East for land in the West, making a more expansive area available to white settlement and avoiding inter-sovereign conflict between the tribal and state governments.⁹ As settlement pushed westward, the removal policy morphed into the formation of reservations for Indian tribes.¹⁰

According to a report by the Commissioner for Indian Affairs in 1858, the policy of "concentrating the Indians on small reservations of land" until they could "support themselves" initiated in California the same year.¹¹ The federal goal of restricting tribes to specified areas ensued primarily through the use of treaties, through which the tribe would cede most of its land to the United States in exchange for a small reservation exclusively for itself.¹²

Reservation policy led directly into the policies of allotment and assimilation. The General Allotment Act, also known as the Dawes Act, enforced allotment beginning in 1887.¹³ The Act took wholesale Indian property out of tribal ownership based on a per capita measurement, then disposed of all surplus lands remaining from the original reservation after individual Indian allotment through homesteading and sale, or through placement in trust of the federal government.¹⁴ This resulted in "checkerboard" ownership and highly fractionated interests in land, which still affects Indian lands today.¹⁵ The reasoning behind the allotment policy varied; some desired allotment in order to open up more Indian lands for white settlement, and some viewed allotment as a method to "Americanize" the Indian tribes and individuals.¹⁶ The following section of this article offers more thorough information about this Act and its consequences.

8. See generally COHEN'S HANDBOOK OF FEDERAL INDIAN LAW § 1.03[4][a], at 45 (Nell Jessup Newton et al. eds., 2005); William C. Canby, Jr., AMERICAN INDIAN LAW IN A NUTSHELL 14 (West, 4th ed., 2004).

9. COHEN'S, *supra* note 8, § 1.03[4][a], at 45.

10. *Id.* § 1.03[6][a], at 65.

11. *Id.* (quoting Comm'r Ind. Aff. Ann. Rep., S. EXEC. DOC. NO. 35-1, at 357 (1858)).

12. Canby, *supra* note 8, at 18-19.

13. Indian General Allotment Act of 1887, ch. 119, 24 Stat. 388 (1887) (codified as amended at 25 U.S.C. §§ 331-34, 339, 341, 342, 348, 349, 354, 381 (2007)).

14. See COHEN'S, *supra* note 8, § 3.04[2][c][iv], at 195.

15. See Indian Land Consolidation Act, Pub. L. No. 97-459, 96 Stat. 2517 (1983) (codified as amended at 25 U.S.C. §§ 2201-2221 (2007)).

16. COHEN'S, *supra* note 8, §1.04, at 77.

In 1934, Congress enacted the Indian Reorganization Act (“IRA”), or Wheeler-Howard Act.¹⁷ The IRA ended the practice of allotment¹⁸ and extended indefinitely the trust period for existing allotments.¹⁹ This Act also authorized the Secretary of the Interior to restore to tribal ownership any “surplus” lands acquired from the tribes under allotment, as long as third parties had not acquired rights to that land.²⁰

Most importantly, the IRA authorized the Secretary of the Interior to acquire lands and water rights for the tribes and to create new reservations. Within her or his discretion, the Secretary may acquire “lands, water rights, or surface rights to lands, within or without existing reservations, including trust or otherwise restricted allotments . . . for the purpose of providing land for Indians.”²¹ The intent of this provision was to encourage economic development for the tribes.²²

Interestingly, one portion of the IRA contemplated the effects of the Act on Indian holdings outside of reservations.²³ This section emphasized the IRA’s inapplicability to “Indian holdings of allotments or homesteads upon the public domain outside of the geographic boundaries of any Indian reservation.”²⁴ This provision indicates a perceived sanctity of a reservation’s borders; the reservation implicates tribal sovereignty and Indian rights at their strongest.

After Congress implemented the IRA in the 1930’s, the federal government again experimented with policies similar to allotment and assimilation, but this time referred to them as termination and relocation.²⁵ Like allotment and assimilation, termination resulted in dramatic and tragic impacts on the Native American population and its resources.²⁶ Termination policies severed the federal trust relationship over Indian lands for approximately 110 tribes and bands in eight

17. Indian Reorganization Act of 1934, ch. 576, 48 Stat. 984 (1934) (codified at 25 U.S.C. §§ 461-479 (2007)).

18. 25 U.S.C. § 461 (2007) (stating “no land of any Indian reservation, created or set apart by treaty or agreement with the Indians, Act of Congress, Executive order, purchase, or otherwise, shall be allotted in severalty to any Indian.”).

19. *Id.* § 462 (“The existing periods of trust placed upon any Indian lands and any restriction on alienation thereof are extended and continued until otherwise directed by Congress.”).

20. *Id.* § 463(a).

21. *Id.* § 465.

22. COHEN’S, *supra* note 8, §1.05, at 88.

23. 25 U.S.C. § 468 (2007).

24. *Id.*

25. Canby, *supra* note 8, at 26-27; *see also* COHEN’S, *supra* note 8, § 1.06, at 89.

26. *See* Michael C. Walch, *Terminating the Indian Termination Policy*, 35 STAN. L. REV. 1181, 1188-90 (1983).

states.²⁷ Termination greatly damaged Indian tribes due to weakened tribal sovereignty.²⁸

Through his address to Congress in 1970, former President Nixon repudiated the termination policy in calling for a resolution expressly to end termination.²⁹ President Nixon stressed the importance of the trust relationship between the federal government and the Indian tribes and urged more autonomy for tribal self-governance.³⁰ These statements inspired a new era of federal policy - the policy of self-determination that is presently in effect. In 1975, Congress enacted the Indian Self-Determination and Education Assistance Act.³¹ This Act allocated the responsibility for administering federal Indian programs to the Indian tribes themselves and instigated a series of federal laws supporting further self-determination-based policies.³²

In concordance with self-determination policy, Congress enacted the Indian Land Consolidation Act ("ILCA") as an attempt to remedy the consequences of allotment and termination.³³ ILCA intends to consolidate tribal land holdings and eliminate undivided fractional interests in allotments.³⁴ This Act also authorizes tribes to purchase any or all interest in an allotment subject to the Secretary of the Interior's approval, with the Secretary taking title to the land acquired under ILCA into trust.³⁵ Consistent with the purposes of ILCA, the Secretary of the Interior promulgated the Land-into-Trust regulations to facilitate reacquisition of tribal lands;³⁶ accordingly, tribes may petition the Secretary to take both on-reservation and off-reservation acquisitions into federal trust on behalf of the tribe.³⁷

B. A CLOSER LOOK AT THE GENERAL ALLOTMENT ACT OF 1887

The General Allotment Act of 1887, also known as the Dawes Act, represented a fundamental shift in federal Indian policy.³⁸ Essentially,

27. *Id.* at 1186.

28. *Id.* at 1190; *see also* COHEN'S, *supra* note 8, §1.06, at 96.

29. President's Message to Congress, Indian Affairs, 6 WEEKLY COMP. PRES. DOC. 894, 895 (July 13, 1970).

30. *Id.* at 895-96.

31. Indian Self-Determination and Education Assistance Act, Pub. L. No. 93-638, 88 Stat. 2203 (1975) (codified as amended at 25 U.S.C. §§450-458bbb-2 (2007)).

32. 25 U.S.C. § 450(a) (2007).

33. *See* Indian Land Consolidation Act, Pub. L. No. 97-459, §§ 201-11, 96 Stat. 2517 (1983) (codified as amended at 25 U.S.C. §§ 2201-2221 (2007)).

34. Indian Land Consolidation Act §§ 204(a)-211; *see also* Canby, *supra* note 8, at 362-63.

35. Indian Land Consolidation Act §§ 205, 210.

36. *See* 25 C.F.R. § 151.1 (2008) (enacted under the authority of 5 U.S.C. § 301, which allows for the Secretary of the Interior to issue departmental regulations).

37. 25 C.F.R. §§ 151.9-11.

38. Indian General Allotment Act, ch. 119, 24 Stat. 388 (1887) (codified as amended at 25 U.S.C. §§ 331-34, 339, 341, 342, 348, 349, 354, 381 (2007)); *see also* Judith

allotment sought to divide the tribes from units into individuals by physically splitting reserved lands into parcels for individuals for agricultural purposes.³⁹ The idea behind this policy was that allotment would assimilate the Indians into general society, eliminating the need for a special relationship with the federal government and the rights thereof.⁴⁰ The Act took wholesale Indian property out of tribal ownership based on a per capita measurement, then disposed of all surplus lands remaining from the original reservation after individual Indian allotment through homesteading and sale or through placement in trust of the federal government.⁴¹

Allotment resulted in a tremendous decline in the total amount of Indian-held land, “from 138 million acres in 1887 to 48 million in 1934.”⁴² Tribes lost this land through the “excess” mechanism of the Act, the forced sale due to the imposition of state property taxation, and sale to non-Indians.⁴³ Tribes sometimes validly conducted these sales, yet evidence indicates the exchanges were more often the result of coercive or fraudulent means.⁴⁴ Allotment resulted in the “checkerboard” jurisdiction creating highly complex tribal-state-federal jurisdictional disputes, including disputes over the regulation and administration of water rights.⁴⁵ Congress ended the allotment policy in 1934 with the Indian Reorganization Act, yet Congress never formally repealed the General Allotment Act.⁴⁶

The General Allotment Act articulates a duty of the Secretary of the Interior to prescribe rules and regulations deemed “necessary to secure a just and equal distribution thereof among the Indians” where “the use of water for irrigation is necessary to render the lands within any Indian reservation available for agricultural purposes.”⁴⁷ This is the only plain legislative language regarding water rights on allotted lands. Doctrines governing water rights related to allotment are primarily judge-made.⁴⁸ The following section sets the foundation for evaluating

V. Royster, *A Primer on Indian Water Rights: More Questions than Answers*, 30 TULSA L.J. 61, 86-87 (1994).

39. Royster, *supra* note 38, at 87.

40. See *N. Cheyenne Tribe v. Hollowbreast*, 425 U.S. 649, 650 n.1 (1976) (explaining “[t]he objects of this [allotment] policy were to end tribal land ownership and to substitute private ownership.”); see also Canby, *supra* note 8, at 20-21.

41. See COHEN’S, *supra* note 8, § 3.04[2][c][iv], at 195.

42. Canby, *supra* note 8, at 22.

43. *Id.*

44. *Id.*

45. Steven J. Shupe, *Water in Indian Country: From Paper Rights to a Managed Resource*, 57 U. COLO. L. REV. 561, 577-78 (1986).

46. Indian Reorganization Act of 1934, ch. 576, 48 Stat. 984 (1934) (codified at 25 U.S.C. §§ 461-479 (2007)); Royster, *supra* note 38, at 87.

47. 25 U.S.C. § 381.

48. See generally *United States v. Powers*, 305 U.S. 527, 533 (1939); *United States v. Anderson*, 736 F.2d 1358, 1363 (9th Cir. 1984); *United States v. Adair*, 723 F.2d 1394,

water rights concurrent with certain categories of land by describing those types of land affecting Indian interests and rights.

II. TYPES OF LAND AFFECTING INDIAN INTERESTS AND RIGHTS

Pursuant to the property clause of the United States Constitution, the federal government may withdraw land from the public domain and reserve it for a federal purpose.⁴⁹ Other than reservations, purposes include the creation of wilderness areas, wildlife refuges, national forests and parks, and military bases.⁵⁰ For this evaluation, most important in the realm of federally reserved land is the land both Congress and the executive branch have reserved with and for Indian tribes, through treaties, executive orders, and congressional acts.⁵¹

The United States Supreme Court distinguished public lands from reservations in *Federal Power Commission v. Oregon* in 1955.⁵² Public lands include lands and interests in lands that the United States owns, which are subject to private appropriation and disposal under public land laws.⁵³ Reservations include "national forests, tribal lands embraced within Indian reservations, military reservations, and other lands and interests in lands owned by the United States, and withdrawn, reserved, or withheld from private appropriation and disposal under public lands laws."⁵⁴

The complexity of defining "Indian Country" originated from treaties establishing distinct boundaries between tribal territory and areas open to non-Indian settlement.⁵⁵ Aboriginal title, meaning tribal ownership rights predating treaty agreement-established rights, provides another basis for asserting tribal ownership of land.⁵⁶ Territorial integrity provided the foundation from which the sovereign Indian tribes

1417 (9th Cir. 1983); *Colville Confederated Tribes v. Walton*, 647 F.2d 42, 52-53 (9th Cir. 1981); *United States v. Hibner*, 27 F.2d 909, 912 (D. Idaho 1928); *In re Gen. Adjudication of All Rights to Use Water in the Big Horn River Sys. (Big Horn IV)*, 899 P.2d 848, 854 (Wyo. 1995).

49. U.S. CONST. art. IV, § 3, cl. 2; *Fed. Power Comm'n v. Oregon*, 349 U.S. 435, 435 (1955). See *Cappaert v. United States*, 426 U.S. 128, 138 (1976); *United States v. Dist. Court for Eagle County*, 401 U.S. 520, 522-23 (1971); *Arizona v. California*, 373 U.S. 546, 601 (1963); *Winters v. United States*, 207 U.S. 564, 564 (1908); see, e.g., *Colo. River Water Conservation Dist. v. United States*, 424 U.S. 800, 805 (1976); *United States v. Powers*, 305 U.S. 527, 528 (1939).

50. DAVID H. GETCHES, *WATER LAW IN A NUTSHELL* 311 (3d ed. 1997); see also *Colo. River*, 424 U.S. at 805.

51. See generally COHEN'S, *supra* note 8, § 3.04 (providing a brief history of federally reserved land for Indian tribes).

52. *Fed. Power Comm'n v. Oregon*, 349 U.S. 435, 443-44 (1954).

53. *Id.*

54. *Id.* at 444 n.10.

55. See COHEN'S, *supra* note 8, § 3.04(2)(a), at 183-84.

56. Canby, *supra* note 8, at 344-48.

and the United States interacted. Congress codified a definition of Indian Country in 1948, based on Supreme Court jurisprudence.⁵⁷ This definition includes reservations, “dependent Indian communities,” and allotments.⁵⁸ In 1993, the Court noted, “the intent of Congress . . . was to designate as Indian country all lands set aside by whatever means for the residence of tribal Indians under federal protection, together with trust and restricted Indian allotments.”⁵⁹

The Land-into-Trust regulations promulgated by the Secretary of the Interior define reservation land, trust land, restricted land, and tribal consolidation area.⁶⁰ Reservation land established by treaty, executive order, or Congressional act includes “that area of land over which the tribe is recognized by the United States as having governmental jurisdiction.”⁶¹ Additionally, because of allotment, land owned by non-Indians in fee and out of trust on reservation land also exists.

Trust land is “land the title to which is held in trust by the United States for an individual Indian or a tribe.”⁶² The National Congress of American Indians (“NCAI”) summarizes the trust relationship as including land most often within the boundaries of a reservation.⁶³ According to NCAI, “[t]rust status means that the land falls under tribal government authority and is generally not subject to state laws. Trust status also creates limitations on the use of the land and requires federal approval for most actions.”⁶⁴ Trust land may further be considered restricted because of limitations either within the conveyance instrument, or because of a federal law imposing restrictions.⁶⁵

Under the modern federal policy of reacquiring land for tribes, tribal consolidation areas constitute another category of lands affecting Indian interests. A tribal consolidation area is “a specific area of land with respect to which the tribe has prepared, and the Secretary has approved, a plan for the acquisition of land in trust status for the

57. 18 U.S.C. § 1151 (2007); COHEN’S, *supra* note 8, § 3.04(2)(c), at 188.

58. 18 U.S.C. § 1151. (stating: “Except as otherwise provided in sections 1154 and 1156 of this title, the term ‘Indian country’, as used in this chapter, means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.”).

59. *Okla. Tax Comm’n v. Sac & Fox Nation*, 508 U.S. 114, 125 (1993) (citing F. Cohen, *HANDBOOK OF FEDERAL INDIAN LAW* 34 (1982 ed.)).

60. 25 C.F.R. § 151.2(d)-(f), (h) (2008).

61. *Id.* § 151.2(f).

62. *Id.* § 151.2(d).

63. National Congress of American Indians, Land-Into-Trust, <http://www.ncai.org/Land-Into-Trust.57.0.html> (last visited Mar. 13, 2009).

64. *Id.*

65. 25 C.F.R. § 151.2(e).

tribe."⁶⁶ Land may be reacquired from former allotments owned by non-Indians, or from surplus lands either homesteaded or opened for homesteading, yet never claimed under the allotment policy.⁶⁷ NCAI describes policy implications of reacquiring land, noting, "[t]he purpose of the Secretary of Interior's land-into-trust authority is to restore Indian land bases, to rehabilitate Indian economic life and to foster recovery from centuries of oppression."⁶⁸

An act of Congress may unilaterally abrogate the status of Indian Country.⁶⁹ Congress has removed, allotted, assimilated, reorganized, terminated, relocated, and reinstated American Indian peoples since colonial times.⁷⁰ The current federal policy promotes Indian self-determination.⁷¹ However, the allotment and assimilation policies of the late nineteenth and early twentieth centuries continue to impact the prosperity and general condition of Indian tribes in the United States today. As a result of modernized policies combined with more access to resources, tribes increasingly dictate their own steps for recovery from the damaging federal policies of the past, including through the reacquisition of reservation land. The following section provides a basis for evaluating water rights of reacquired lands by examining the tenets of the reserved rights doctrine.

III. BASIC RULES ABOUT WATER FOR INDIAN LANDS: THE RESERVED RIGHTS DOCTRINE

Many constitutive sources for the types of land affecting Indian interests and rights do not expressly include a reservation of water. Under the commerce clause, the federal government retains the right to regulate navigable waters of the United States.⁷² The judiciary created the reserved rights doctrine to ensure federally reserved lands set aside for a particular purpose would have adequate water to fulfill that purpose.⁷³ Federal, not state, law governs these reserved rights.⁷⁴

In 1905, the Supreme Court first articulated the reserved rights doctrine in *United States v. Winans*.⁷⁵ In that case, the United States

66. *Id.* § 151.2(h).

67. See discussion *infra* Parts VI, VII.

68. National Congress of American Indians, *supra* note 63.

69. *Rosebud Sioux Tribe v. Kneip*, 430 U.S. 584, 588 (1977); see also COHEN, *supra* note 8, § 3.04(3), at 196.

70. See Canby, *supra* note 8, at 10-28 (providing a historical overview of federal Indian law and policy).

71. See *infra* text accompanying notes 25-33.

72. U.S. CONST. art. I § 8, cl. 3; see *Gibbons v. Ogden*, 22 U.S. 1, 197 (1824).

73. See *Winters v. United States*, 207 U.S. 564, 577 (1908); *United States v. Winans*, 198 U.S. 371, 383-84 (1905).

74. *Oneida Indian Nation v. County of Oneida*, 414 U.S. 661, 667, 670 (1974); see also *Johnson v. M'Intosh*, 21 U.S. 543, 584-86 (1823).

75. *Winans*, 198 U.S. at 381. See also *Winters*, 207 U.S. at 576-77.

brought suit against a private individual, on behalf of the Yakima Indian Tribe, to remove an obstruction that individual created to the fishing rights reserved by the Tribe.⁷⁶ A treaty between the Yakima Tribe and United States established the Tribe's right to fish.⁷⁷ The Court stated the treaty was a grant of rights from the Tribe, not to the Tribe, therefore the Tribe reserved the rights it did not grant.⁷⁸ The non-Indian individual in this case had no rights to obstruct the Tribe's ability to fish because the Tribe reserved, rather than granted, the right to fish.⁷⁹

Winters v. United States took the *Winans* analysis further by establishing implied reserved water rights for Indian reservations.⁸⁰ Like *Winans*, the *Winters* case also involved a dispute over water use between a tribe and private individual; however, unlike the treaty in *Winans*, the treaty in *Winters* did not explicitly mention water use.⁸¹ The *Winters* Court held that even though the treaty did not explicitly reserve water rights, treaty interpretation consistent with the canons of construction would tip in favor of the tribes retaining implied water rights to fulfill the purposes of the reservation.⁸² The Court based its decision on the fact that the reservation in this case was established from a larger tract of land in order to fulfill the government policy of transforming the Indian tribal culture from a "nomadic" to an "agrarian" lifestyle, and such transformation could only occur if the tribal lands were severely reduced in size, making them more amenable to agricultural pursuits.⁸³ Since the lands were judged arid, they would remain "practically valueless" without an adequate supply of water for irrigation.⁸⁴ The *Winters* Court thus concluded that the "United States . . . intended the reservation of land and other resources to be sufficient for the Indians to make a successful life."⁸⁵

Later, the Supreme Court applied the reserved rights doctrine established by *Winans* and *Winters* to federally reserved land in *Federal*

76. *Id.* at 377.

77. *Id.*

78. *Id.* at 381.

79. *Id.* at 384. See also DAVID E. WILKINS & K. TSIANINA LOMAWAIMA, UNEVEN GROUND: AMERICAN INDIAN SOVEREIGNTY AND FEDERAL LAW 129-30 (2001).

80. *Winters*, 207 U.S. at 576-77.

81. Compare *Winters*, 207 U.S. at 576-77 (holding that Tribe's reservation of land implicitly reserved with it the associated waters to ensure that such land was not a "barren waste"), with *Winans*, 198 U.S. at 381 (finding that the terms of the reserving treaty specifically provided an access to fish the waters in question).

82. *Winters*, 207 U.S. at 576-77.

83. *Id.* at 576.

84. WILKINS & LOMAWAIMA, *supra* note 79, at 130.

85. JOHN SHURTS, INDIAN RESERVED WATER RIGHTS: THE WINTERS DOCTRINE IN ITS SOCIAL AND LEGAL CONTEXT, 1880S-1930S 124 (Univ. of Okla. Press 2000).

Power Commission v. Oregon in 1955 and *Arizona v. California* in 1963.⁸⁶ In *Federal Power Commission*, the Court determined that a reservation of federal land for a particular purpose removed water sources on that land from appropriation by other non-federal users.⁸⁷ Then, in *Arizona v. California*, the Court announced that the *Winters* reserved rights doctrine applies to federal lands.⁸⁸

Four elements assist in the evaluation of reserved water rights: intent, purpose, scope, and quantification.⁸⁹ First, intent reflects the intent of Congress in establishing the reservation.⁹⁰ Second, the purpose of the reservation may include primary and secondary purposes depending on the jurisdiction.⁹¹ Third, scope refers to whether the reserved rights apply to surface or ground water,⁹² as well as applicability to in-stream flows. Fourth, quantification also varies based on jurisdiction and may be determined by the practically irrigable acreage standard,⁹³ homeland standard,⁹⁴ or historically irrigated standard.⁹⁵

The *Winters* decision introduced “the basic themes of tribal water rights,” in that the “creation of an Indian reservation impliedly reserves water rights” to the reservation’s tribe.⁹⁶ Those *Winters* rights carry a priority date that attaches to the establishment of the reservation and to the purpose thereof.⁹⁷ Since *Winters*, the Court has “repeatedly recognized that the Government, when it created each Indian reservation,

86. *Fed. Power Comm’n v. Oregon*, 349 U.S. 435, 443-44 (1954); *Arizona v. California*, 373 U.S. 546, 601 (1962).

87. *Fed. Power Comm’n*, 349 U.S. at 444.

88. *Arizona v. California*, 373 U.S. at 597-98; see also *Western States Water Laws, Federal Reserved Water Rights*, <http://www.blm.gov/nstc/WaterLaws/fedreservedwater.html> (last visited Mar. 28, 2009).

89. Professors Jerilyn DeCoteau and Sarah Klahn, *Indian Water Law*, University of Denver Sturm College of Law (Sept. 6, 2007).

90. See *Arizona v. California*, 373 U.S. at 599-600.

91. See *United States v. Adair*, 723 F.2d 1394, 1410 (9th Cir. 1984) (concluding that multiple purposes determine reserved water rights, including hunting, fishing and agriculture); *In re Gen. Adjudication of the Big Horn River Sys.*, 753 P.2d 76, 96 (Wyo. 1988) [hereinafter *Big Horn I*] (holding that reserved water rights attach to agricultural purposes only.).

92. See *Cappaert v. United States*, 426 U.S. 128, 143 (1976) (holding that the United States can protect its waters from the subsequent diversion of either surface or groundwater); *New Mexico v. Aamodt*, 618 F. Supp. 993, 1010 (D.N.M. 1985) (holding that Pueblo water rights include not only surface water but also groundwater “interrelated to the surface water as an integral part of the hydrologic cycle”); *Big Horn I*, 753 P.2d at 100 (holding that the reserved water doctrine does not extend to groundwater).

93. See *Arizona v. California*, 373 U.S. at 601.

94. See *In re General Adjudication of the Gila River Sys. and Source*, 35 P.3d 68, 80 (Ariz. 2001) [hereinafter *Gila II*].

95. See *Aamodt*, 618 F. Supp. at 1009.

96. Royster, *supra* note 38, at 66.

97. *Id.*

'intended to deal fairly with the Indians by reserving for them the waters without which their lands would have been useless.'⁹⁸ However, along with the shifting federal policy regarding Indian tribes and their resources, the dynamic status of reservation land and the accompanying reserved water rights continues to keep water users guessing.⁹⁹ The following section describes water rights specifically for land divided during allotment.

IV. THE BEGINNING OF WATER RIGHTS FOR ALLOTTED LAND

The United States Supreme Court first addressed water rights of Indian allottees in 1939, in *United States v. Powers*.¹⁰⁰ The issue in *Powers* centered on non-Indian successors to Indian allottees' water use in relation to a downstream federal irrigation project. The Court found that the water rights reserved with the reservation's establishment continued to exist through the allotment, and the water originally belonging to the tribe still belonged to the tribe.¹⁰¹ The individual allottee enjoyed a usufructuary right from the tribe to use a "just and equal distribution" of water as stated in the General Allotment Act.¹⁰² The Court determined this holding consistent with the federal policy behind allotment – the policy to make the Indians into farmers.¹⁰³

In 1981, the Ninth Circuit further analyzed Indian allottees, non-Indian successors, and the water rights afforded to each.¹⁰⁴ *Colville Confederated Tribes v. Walton* interpreted the General Allotment Act as conveying a transferable water right to the Indian allottee, so that upon transfer of the allotment, an Indian allottee may sell the usufructuary right to the reserved water.¹⁰⁵ Because allottees' water rights derive from tribal rights, the Ninth Circuit found that the priority date for allottees is the date the reservation was created, and Indian allottees' rights are not lost through non-use.¹⁰⁶

Non-Indians can acquire reservation land either by purchasing allotment parcels from allottees who received fee patents to their land,

98. *Arizona v. San Carlos Apache Tribe*, 463 U.S. 545, 573-74 (1983) (citing *Arizona v. California*, 373 U.S. 546, 600 (1963)).

99. See *Carcieri*, 128 S. Ct. 1058 (demonstrating a substantial re-interpretation of federal Indian policy impacting the ability of the Secretary of the Interior to take Indian lands into trust).

100. *Powers*, 305 U.S. at 527; see also *United States v. Hibner*, 27 F.2d 909 (D. Idaho 1928).

101. *Powers*, 305 U.S. at 532.

102. *Id.* at 533; Royster, *supra* note 38, at 88-89.

103. Royster, *supra* note 38, at 88 ("Because the allottees' rights are tied to the agrarian purposes of the allotment policy, allottees have no rights to trial water reserved for other than irrigation purposes.").

104. *Colville Confederated Tribes v. Walton*, 647 F.2d 42, 43 (9th Cir. 1981).

105. *Id.* at 50.

106. *Id.* at 51; see also *Adair*, 478 F. Supp. at 348-49; *Hibner*, 27 F.2d at 912.

or by homesteading the "surplus" land of the originally allotted reservation.¹⁰⁷ The *Walton* Court defined three governing principles regarding an allottee's right to use reserved waters and the effects of that right on a non-Indian purchaser.¹⁰⁸ First, the General Allotment Act provision for an "equal and just distribution" of water requires that the number of irrigable acres limit the extent of the right owned. Second, the Indian allottee's right contains a date-of-reservation priority date, which also applies to the non-Indian purchaser's subsequently acquired right. Third, although the Indian allottee does not lose the right for non-use, a non-Indian successor is subject to the use it or lose it rule.¹⁰⁹ In sum, *Walton* dictates:

The non-Indian successor acquires a right to water being appropriated by the Indian allottee at the time title passes. The non-Indian also acquires a right, with a date-of-reservation priority date, to water that he or she appropriates with reasonable diligence after the passage of title. If the full measure of the Indian's reserved water right is not acquired by this means and maintained by continued use, it is lost to the non-Indian successor.¹¹⁰

The *Walton* Court recognized that allowing the water right to transfer with the land commands an economic benefit for the Indian allottee, ensuring adherence to the Congressional policy of benefiting Indian allottees and fulfilling trust and treaty obligations.¹¹¹ Rights acquired in this manner by a non-Indian are *Walton* rights.¹¹²

Non-Indians who acquire land through homesteading do not retain any *Winters* rights that previously attached to the reservation.¹¹³ Severing surplus lands from the allotted reservation and opening such lands to homesteading terminates the reserved water rights because they are no longer necessary to fulfill the reservation's purposes.¹¹⁴ No court has addressed water rights for surplus lands opened for sale but not severed from the reservation.¹¹⁵

Trust or other restricted status indicates continuing federal policy of either fulfilling the purpose of the original reservation or ensuring

107. COHEN'S, *supra* note 8, at § 19.03[8][b].

108. *Walton I*, 647 F.2d at 51.

109. *Id.*

110. *Id.*

111. *Id.* at 47; *see also* Getches, *supra* note 50, at 329.

112. COHEN'S, *supra* note 8, at § 19.03[8][b].

113. *See* United States v. Anderson, 736 F.2d 1358, 1363 (9th Cir. 1984); *Adair*, 723 F.2d at 1417; *Walton I*, 647 F.2d at 51; *Hibner*, 27 F.2d at 912; *Big Horn I*, 753 P.2d at 113-14.

114. *Anderson*, 736 F.2d at 1363; *Big Horn IV*, 899 P.2d at 854; *see also* COHEN'S, *supra* note 8, at § 19.03[8][b].

115. COHEN'S, *supra* note 8, at § 19.03[8][b]; *see also* Royster, *supra* note 38, at 90.

the marketable benefit of the land to the tribes.¹¹⁶ What happens to the reserved rights when land, having left Indian ownership, returns to Indian ownership? The following section addresses the present state of the law governing whether land reacquired by Indian tribes enjoys reserved water rights, as well as how to calculate the priority date of such lands.

V. CASE LAW GOVERNING REACQUIRED LAND AND RESERVED RIGHTS

Tribes reacquire at least three types of lands, including lands owned by individual Indians in trust or in fee, former allotments owned by non-Indians, and surplus lands.¹¹⁷ Individual Indians owning current or former allotments retain their full *Winters* rights; therefore, the rights revert back to the tribe in full when reacquired.¹¹⁸ The rights accorded to the other two varieties of reacquired lands are not as straightforward.

The United States Supreme Court has not yet addressed whether tribes retain reserved water rights for reacquired allotted land that non-Indians owned in fee or for reacquired surplus land. Only two courts addressed these complicated scenarios, and they reached contradictory results. The Wyoming Supreme Court evaluated the status of these rights in the case *In re General Adjudication of All Rights to Use Water in the Big Horn River System*, a case not yet fully resolved.¹¹⁹ The Ninth Circuit analyzed these rights as well, in the 1984 case *United States v. Anderson*.¹²⁰

Both the Ninth Circuit and the Wyoming Supreme Court agree that the water rights the tribe obtained when it reacquired former allotments owned in fee by non-Indians carry a date-of-reservation priority date.¹²¹ However, the two courts split when calculating the quantity of reacquired water. The Ninth Circuit held that tribes reacquire only the portion of reserved rights that the non-Indian users did not lose through non-use.¹²² To the contrary, the Wyoming Supreme Court indicated that tribes regain the full reserved rights originally appurtenant to the allotted lands.¹²³

The Ninth Circuit and the Wyoming Supreme Court split on both the priority date and on the quantity of reserved rights concerning

116. See *Anderson*, 736 F.2d at 1361; see Discussion *infra* Part III.

117. *Anderson*, 736 F.2d at 1361; COHEN'S, *supra* note 8, at § 19.03[8][c].

118. *Powers*, 305 U.S. at 532; see also *Royster*, *supra* note 38, at 91.

119. *Big Horn IV*, 899 P.2d at 848; *Big Horn I*, 753 P.2d at 76.

120. *Anderson*, 736 F.2d at 1358.

121. *Anderson*, 736 F.2d at 1362; *Big Horn IV*, 899 P.2d at 855; *Big Horn I*, 753 P.2d at 114.

122. *Anderson*, 736 F.2d at 1362.

123. *Big Horn I*, 753 P.2d at 114.

reacquired surplus lands. The Wyoming Supreme Court utilized a broad application of the date-of-reservation priority date, finding that date applies to all reacquired lands.¹²⁴ The Ninth Circuit reached a different outcome, concluding that surplus lands do not carry reserved water rights upon severance from the original reservation.¹²⁵ The Ninth Circuit held that these lands constitute a new reservation, with the priority date being the date of reacquisition.¹²⁶ The Wyoming Supreme Court's holding in *Big Horn* is much more favorable to the Tribes reacquiring land in concord with the federal self-determination policy, because the court did not make Native Americans' reserved rights dependent on a non-Indian's due diligence and use. The Ninth Circuit, on the other hand, made reacquired rights from surplus lands virtually worthless to a tribe without the reserved right status.

A. *UNITED STATES. V. ANDERSON*

The Ninth Circuit decided *United States v. Anderson* in 1984. This case evaluated the on- and off-reservation effects of the water adjudication in Chamokane Basin.¹²⁷ The court held that *Winters* rights appurtenant to allotted lands purchased by a non-Indian pass with title when the tribe reacquires the lands, and those rights retain their original priority date.¹²⁸ However, where the homesteader lost his or her perfected water rights, or never had them originally, no rights exist for the tribe to regain upon reacquisition.¹²⁹

The Ninth Circuit relied on the sensitivity doctrine to junior users in its evaluation, intending to protect rights acquired in good faith by third parties. To accommodate those third parties, the court determined that rights gained upon reacquisition from surplus lands constitute a "newly created federal reservation."¹³⁰ However, the court's determination is inconsistent with federal self-determination policy; therefore, the decision also potentially violates the plenary power doctrine.¹³¹

In *Anderson*, the Ninth Circuit indicated that the doctrine of reserved rights attaches those rights to the status of the land, not to the unique status of the tribes as they exist in relation to the federal government. However, as previously described in Part IV of this article, the reserved rights doctrine emerged from sovereignty-based interactions between the United States and the tribes, in that a sovereign-to-

124. *Big Horn IV*, 888 P.2d at 855.

125. *Anderson*, 736 F.2d at 1363.

126. *Id.*

127. *Id.* at 1361.

128. *Id.*

129. *Id.* at 1363.

130. *Id.*

131. See discussion *infra* Part II.

sovereign relationship created the reservations. Reserved rights, although specific to reservations, do not exist by virtue of the physical land, but rather because of Congress's intent in setting aside the land and Congress's specific purposes for that land. That intent and purpose resumes when the tribe reacquires part of the original reservation, and the current federal policy of self-determination and legislated priorities of land reacquisition for tribes especially reaffirms this in an attempt to remedy the destructive consequences of allotment.

B. IN RE THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN
THE BIG HORN RIVER SYSTEM AND ALL OTHER SOURCES

The Wyoming Supreme Court addressed water rights for reacquired lands in both *Big Horn I* and *Big Horn IV*. In *Big Horn I*, the court applied the same reasoning for why a non-Indian successor should succeed to the treaty priority date enjoyed by the Indian allottee, and to whether an Indian or tribal re-purchaser should reacquire that same priority.¹³² Instead of applying the reserved rights doctrine only to the reserved land itself, the court recognized a more accurate and broad construction of the doctrine applying to the intent and purpose for that reserved land. *Big Horn I* did not distinguish between reservation lands Indians continuously held and reservation land Indians reacquired, recognizing that all reacquired lands as part of the original reservation were reservation land entitled to the same reserved water rights.¹³³

Big Horn IV relied on the court's analysis in *Big Horn I*.¹³⁴ The court recognized the reserved rights appurtenant to the land as in fact appurtenant to the unique status of the tribe as well.¹³⁵ The court concluded, "the priority date for the reserved water rights was extended to the diminished portion of the reservation; restored, retroceded, undisposed of, and reacquired lands owned by the tribes; fee lands held by Indian allottees; and lands held by Indian and non-Indian successors to allottees."¹³⁶ This holding concurs with federal policy, distinguishing it from the Ninth Circuit in *Anderson*, because of its recognition of the reserved rights doctrine as inseparable from tribal possession of original reservation land. Maintaining the full benefit of reservation land for the tribes fulfills the intent of the reserved rights doctrine.

132. *Big Horn I*, 753 P.2d at 114.

133. *Id.*

134. *Big Horn IV*, 888 P.2d at 853.

135. *Id.* at 855.

136. *Id.*

VI. WATER RIGHTS AFTER *ANDERSON* AND *BIG HORN*

This section summarizes the current status of water rights, as well as the types of land affecting Indian interests and rights based on the analysis contained in the previous sections. If reservation land stays in trust or Indian ownership, it maintains the benefits of the reserved rights doctrine, including a date-of-reservation priority date. Furthermore, use it or lose it, abandonment, and forfeiture of water rights do not apply. Similarly, allotted land continuously in trust or Indian ownership maintains its *Winters* rights, applying to allottees as necessary for full market benefit or to fulfill the reservation's purpose.¹³⁷

In the instance of a non-Indian purchase of allotted land, the non-Indian acquires *Walton* rights to assure the Indian allottee the full economic benefit of the allotment.¹³⁸ The use it or lose it doctrine applies because the purpose of the reservation no longer exists when non-Indians own the land.¹³⁹ The purpose is appurtenant to the unique relationship between the tribe and the United States, not between a non-Indian and the United States.¹⁴⁰

Surplus allotment land opened for homesteading includes two categories: (1) land ceded to the government, severed from the reservation, and returned to the public domain; and (2) land not severed but remaining part of the reservation and opened for sale to non-Indians. According to the Ninth Circuit, non-Indian settlement of any surplus land open for homesteading lacks any reserved water rights because the purpose relevant to Indian ownership has been lost.¹⁴¹

The three primary types of land a tribe potentially reacquires include varied reserved water rights. When a tribe reacquires land previously owned by an Indian in trust or in fee, the individual Indian retained full *Winters* rights that subsequently transfer to the tribe.¹⁴² Former allotment land reacquired from a non-Indian successor retains its date-of-reservation priority date according to both the Ninth Circuit and the Wyoming Supreme Court, but, as previously described, the quantity differs between the two jurisdictions.¹⁴³

Potentially reacquired surplus land includes four sub-categories: (1) opened, severed, and claimed; (2) opened, severed, and not claimed; (3) opened, not severed, and claimed; and (4) opened, not severed, and not claimed. In *Big Horn*, the Wyoming Supreme Court concluded that all original reservation land that the tribe reacquired carries a date-of-reservation priority date regardless of its surplus

137. See discussion *infra* Part V.

138. *Id.*

139. *Id.*

140. *Id.*

141. *Anderson*, 736 F.2d at 1365.

142. *Powers*, 305 U.S. at 532.

143. See Discussion *infra* Part VI.

status.¹⁴⁴ The Ninth Circuit, in the *Anderson* case, held specifically with regard to surplus land opened, severed from the reservation, and not claimed. The *Anderson* Court concluded that land severed from the reservation returned to the public domain and therefore did not retain reserved water rights. The court reasoned that *Winters* rights are intended to assist in accomplishing the needs of the reservation, so if the land is removed from tribal possession the purposes for which the *Winters* rights are implied are thereby eliminated.¹⁴⁵ Courts have not yet ruled on water rights for surplus lands that are opened, not severed, and either claimed or unclaimed.

The following section evaluates the current federal policy of self-determination and the federal goals of increasing the tribal land base. Analogies to cases regarding acquisition of land under the Indian Reorganization Act and the tax status of tribal reacquired land provides a benchmark from which to determine whether reacquired land taken into trust should retain full reserved water right benefits under any circumstance.

VII. CURRENT FEDERAL POLICY OF INDIAN SELF-DETERMINATION AND REACQUIRED LANDS

As described in Part II(A) of this analysis, Congress attempted to reverse the destructive consequences of allotment through the Indian Reorganization Act in 1934 and the Indian Land Consolidation Act, recently amended in 2007. Both Acts recognize a federal policy of increasing tribal land holdings through purchase of lands part of the original reservation and lost through allotment, and also through purchase of off-reservation land, as identified in the Land-into-Trust regulations.¹⁴⁶ Acquisition of land under the IRA has been challenged and judicially upheld. The following sections summarize and analogize IRA cases and tax status of reacquired land cases to water rights for reacquired lands.

A. IRA ACQUISITION

Two federal district court cases explicitly uphold the federal government's authority to take land into trust that the tribe reacquired on the open market.¹⁴⁷ In *Nevada v. United States*, Nevada challenged the validity of the Fallon Paiute Shoshone Indian Tribes Water Rights Set-

144. See Discussion *infra* Part VI(B).

145. See Discussion *infra* Part VI(A).

146. See Discussion *infra* Part II(A).

147. See *Carcieri*, 128 S. Ct. 1058. The Supreme Court's holding in *Carcieri* recently limited the ability of the Secretary of the Interior to do so only for tribes federally recognized in 1934.

tlement Act of 1990.¹⁴⁸ The *Nevada* court held that the acquisition provision under the Indian Reorganization Act did not represent an unconstitutional delegation of legislative authority.¹⁴⁹ Furthermore, the court held that Congress could acquire land for an Indian reservation and impose federal regulations on that land without the consent of the state.¹⁵⁰

In *South Dakota v. Department of the Interior*, the district court recognized the IRA intent “to safeguard Indian lands against alienation from Indian ownership and against physical deterioration.”¹⁵¹ The district court upheld the Department of the Interior’s rational basis for its decision to take land into trust because the IRA granted legitimate authority to acquire land to be held in trust for Indian tribes.¹⁵² These cases reinforce the federal policy of tribal land acquisition and further reinforce the validity of applying federal regulations and standards to land taken into trust.

B. TAX AND REACQUIRED LANDS

The United States Supreme Court evaluated tax jurisdiction over reacquired land in 1998 and 2005. In *Cass County, Minnesota v. Leech Lake Band of Chippewa Indians*, the Court held that state and local governments may tax reservation land made alienable by Congress, sold to non-Indians, and later repurchased by the tribe because Congress manifested an “unmistakably clear” intent to allow such taxation.¹⁵³ In *Cass County*, the Leech Lake Band sought to re-establish its land base by “purchasing back parcels of reservation land that were allotted to individual Indians or sold to non-Indians during the allotment period.”¹⁵⁴ The Court concluded that Congress clearly intended to authorize state taxation because it made lands freely alienable under allotment, thus withdrawing federal protection.¹⁵⁵ Without the Leech Lake Band engaging the land-into-trust procedure set forth in § 465 of the IRA, the federal protection of state tax exemption would not apply to reacquired lands.¹⁵⁶

148. *Nevada v. United States*, 221 F. Supp. 2d 1241 (D. Nev. 2002).

149. *Id.* at 1250.

150. *Id.* at 1251.

151. *South Dakota v. United States Dep’t of Interior* [hereinafter *South Dakota v. DOI*], 314 F. Supp. 2d 935, 943 (D. S.D. 2004) (citing H.R. 7902, 73rd Cong., tit. III, § 1 (1934)).

152. *South Dakota v. DOI*, 314 F. Supp. 2d at 942.

153. *Cass County, Minn. v. Leech Lake Band of Chippewa Indians*, 524 U.S. 103, 106 (1998).

154. *Id.* at 108.

155. *Id.* at 111.

156. *Id.* at 114.

The United States Supreme Court reached a similar conclusion in *City of Sherrill, New York v. Oneida Indian Nation*.¹⁵⁷ *Sherrill* concerned tax authority over land that the Tribe last possessed in 1805.¹⁵⁸ Due to federal treaties ceding land, federal removal policies, and state purchase of land, the Oneida Nation's land ownership decreased from over six million acres to 17,000 acres in what is now central New York.¹⁵⁹ In *City of Sherrill*, the Oneidas argued that their "acquisition of fee title to . . . parcels of historic reservation land revived the Oneidas' ancient sovereignty piecemeal over each parcel;" therefore, regulatory authority over those parcels belonged to the Tribe and not to the City of Sherrill.¹⁶⁰ Because the parcels existed within the boundaries of the reservation that the Oneidas originally occupied, the tribe maintained that the properties were exempt from taxation and thus refused to pay the city's assessed property taxes.¹⁶¹ The Court held the tribes may not assert sovereignty unilaterally without the explicit consent of Congress; in addition, equitable considerations barred such a unilateral assertion of sovereignty.¹⁶² The Court referenced its earlier holding in *Cass County*, noting that without engaging the trust protection in IRA section 465, the Tribe may not enjoy tax benefits without going through the land-to-trust mechanism.¹⁶³ *Cass County* and *Sherrill* emphasize the importance of the trust relationship between the Native American tribes and the federal government.

C. HOW THE TAX AND IRA CASES MAY AFFECT WATER RIGHTS FOR RE-ACQUIRED LANDS

Both the IRA and tax jurisdiction cases reinforce the importance of the trust relationship to tribal sovereign rights and interests trumping non-Indian assertions of rights. These cases indicate the judiciary's predisposition to find a trust relationship in order to uphold the unique rights of Native American tribes. On the basis of these cases, as combined with the stated policies in the IRA and ILCA, reacquired land taken into trust lawfully should receive the full benefit of reserved water rights. Congressional intent clearly authorizes the trust relationship, and the judiciary must defer to that "plenary power."

157. *City of Sherrill v. Oneida Indian Nation*, 544 U.S. 197 (2005).

158. *Id.* at 198.

159. *Id.* at 203, 211.

160. *Id.* at 202.

161. *Id.* at 211.

162. *Id.* at 220-21 (explaining that such equitable considerations include "the purposes for which the land will be used; the impact on the State and its political subdivisions resulting from the removal of the land from the tax rolls; and jurisdictional problems and potential conflicts of land use which may arise.").

163. *Id.* at 220.

CONCLUSION AND RECOMMENDATION

Although the law remains unsettled as to whether Native American tribes retain full reserved water rights when a tribe reacquires land from non-Indian ownership outside of the *Big Horn* adjudications, Congress and the courts should ensure that any land belonging to an original tribal reservation retains reserved rights if an Indian tribe reacquires the land. The policy behind the doctrine remains intact: namely, the benefit of water for the tribe. Such assurance further supports the policy foundations of reserved rights if the reacquired lands are subsequently taken into trust, as demonstrated analogously by the IRA and tax jurisdiction cases. Congressional intent, evidenced by the unique federal status and protections afforded to Indian tribes, could hardly be clearer than the trust relationship.

Congress should not abandon the tribes in their reacquisition efforts and should dictate, in conjunction with tribal lawmakers, that former allotment land reacquired and taken into trust retains its original reserved water rights. By virtue of the Supreme Court's precedent, the United States judiciary is bound to uphold Congressional plenary power. The reserved rights doctrine should attach to reacquired lands because the underlying premise of the doctrine itself lies within fulfilling the purpose of the reservation. By virtue of the *Winters* doctrine, the very existence of a reservation exemplifies Congress's intent to reserve water rights in order to make the reservation functionally practicable. This intent is inextricably linked to federal policy purposed to benefit Indian tribes and to satisfy treaty obligations through the reservation of land. Limiting the reserved water rights of reacquired reservation land contradicts this well-settled policy. Trust status further confirms Congress's intent to maintain the reacquired land as fully-benefited reservation land. Therefore, the reserved rights doctrine should apply to reacquired land held in trust, allowing the proverbial glass of reserved water rights to return full, in a complete circle to its original and rightful owners.

APPENDIX I: CONTINUUM OF LEGAL LIKELIHOOD TO REGAIN RESERVED RIGHTS

LAND MOST LIKELY TO RETAIN ALL ORIGINAL RESERVED WATER RIGHTS UPON REACQUISITION BY THE TRIBE

- Reservation land continuously held in trust
 - Including allotted land
- Reservation land continuously held in Indian ownership
 - Including allotted land
- Allotment land approved for trust status from a non-Indian purchaser who put all Walton rights to beneficial use

- Allotment land from a non-Indian purchaser who put all Walton rights to beneficial use
- Allotment land approved for trust status from a non-Indian purchaser with no regard to use it or lose it
- Allotment land from a non-Indian purchaser with no regard to use it or lose it
- Surplus land ceded, not severed, and unclaimed
- Surplus land ceded, not severed, and settled by non-Indians
- Surplus land ceded, severed, and unclaimed
- Surplus land ceded, severed, and settled by non-Indians

**LAND LEAST LIKELY TO RETAIN ALL ORIGINAL RESERVED
WATER RIGHTS UPON REACQUISITION BY THE TRIBE**

- Factors evaluated include trust status of land, whether land was allotted or surplus, and if it was surplus whether the land was severed or claimed, and whether the rights were put to beneficial use by a non-Indian owner.

THE OKLAHOMA WATER SALE MORATORIUM: HOW FEAR AND MISUNDERSTANDING LED TO AN UNCONSTITUTIONAL LAW

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INTRODUCTION

Water is one of the most basic elements for human survival and development. Beyond the obvious need for human consumption, water serves various roles in industry and commerce that make it a highly sought-after commodity.² Experts have called water the new century's "next oil,"³ and it is understandable that areas with an abundance of

1. Oklahoma City University School of Law, J.D. 2009. The author would like to thank his father, Bruce Willingham, and his friend and colleague, Andrew Harrell, for their valuable comments, corrections, and suggestions. He would also like to thank Professor Stephen Clowney, currently of the University of Kentucky College of Law, whose enthusiasm and support ultimately made this article possible.

2. OKLA. WATER RES. BD., CONSERVING OKLAHOMA'S WATER 16, 20 http://www.owrb.ok.gov/news/publications/pdf_pub/consweb.pdf. (illustrating that it takes 1,800 gallons of water to create one pair of jeans made from cotton and 32,000 gallons to make one ton of finished steel for an automobile).

3. Rohini Nilekani, *Is Water the Next Oil?*, YALE GLOBAL ONLINE, May 31, 2007, <http://yaleglobal.yale.edu/display.article?id=9243>.

water want to ensure they continue to have a surplus. However, when states like Oklahoma have an abundance of water and have no reason to believe the supply will decrease or the demand will increase beyond statewide availability,⁴ otherwise understandable conservation can become irrational hoarding.

Such is the case in Oklahoma, where legislators have enacted a moratorium on the sale or exportation of surface or ground water outside the state.⁵ The legislators created this moratorium based on a misunderstanding of the facts of a proposed water sale with Texas, as well as a reliance on a nonexistent legal concept known as “downstream dependency.”⁶ The moratorium was the product of misunderstanding and fear; however, in a legal sense, the statute does not pass constitutional muster and the Federal District Court for the Western District of Oklahoma will likely strike it down in a pending law suit.⁷ This article offers an explanation of the events that led to the creation of the moratorium and the constitutional troubles that lie in its future. It also discusses the relevant statutes, compacts, case law, and other background information that led to the formation of, and sometimes run contrary to, the moratorium.

I. BACKGROUND

A. OKLAHOMA/TEXAS WATER USE

Oklahoma has an abundance of freshwater resources. With lakes and rivers scattered across the state, Oklahoma’s quantity of water greatly exceeds its need especially in eastern Oklahoma where the Ozark Mountains create lakes that are as deep as 180 feet.⁸ According to the Oklahoma Water Resources Board (“OWRB”), the state uses 2.6

4. See OKLA. WATER RES. BD., STATUS REPORT TO THE OFFICE OF THE GOVERNOR, JOINT STATE/TRIBAL WATER COMPACT & WATER MARKETING PROPOSALS 2 (2002) [hereinafter STATUS REPORT], available at http://www.owrb.state.ok.us/studies/legislative/southeast/se_plan.php#status.

5. OKLA. STAT. tit. 74, § 1221.A (2008).

6. See *id.* tit. 82, § 1086.1(A)(3); Ray Carter, *State-Tribal Water Compact Draft Unveiled*, J. REC. (Okla. City, Okla.), Nov. 15, 2001, available at 2001 WLNR 4918173 (“In the past . . . courts have forced sellers to continue providing water to buyers who have become dependent on that source even during times of drought.”); see also discussion *infra* Part III.(b).

7. See generally Complaint at 2, Tarrant Reg’l Water Dist. v. Herrmann, No. 5:07CV0045-HE, (W.D. Okla. 2007) [hereinafter Tarrant Complaint] (plaintiffs brief arguing that the moratorium on water supplied to Texas communities is a violation of the Commerce Clause).

8. See, e.g., OKLA. WATER RES. BD., BROKEN BOW LAKE 1, <http://www.tulsaadubon.org/guides/broken-bow-lake-map-owrb.pdf> (Broken Bow Lake, in the Red River Basin, has a maximum depth of 179.5 feet).

million acre-feet⁹ per year, which is only 7.6% of the 34 million acre-feet of unused water flowing out of the state each year.¹⁰ The bulk of this unused water exists in the channels and tributaries of the Arkansas River and the Red River.¹¹

In comparison, Texas will soon see a shortage of water, due mainly to the growth of the Dallas/Fort Worth (“DFW”) area. According to the Tarrant Regional Water District (“TRWD”), the population of the DFW area will double by 2060.¹² Furthermore, based on census and local planning jurisdiction databases, the area will also suffer a water deficiency of roughly 400,000 acre-feet per year.¹³ The TRWD claims that after studying the feasibility of potential sources of water, Oklahoma’s southeastern watersheds are the most practical source to meet the majority of the future water demands of the DFW metropolitan area.¹⁴ The most abundant river basins in Oklahoma are the Muddy Boggy Creek Basin, the Kiamichi River Basin, the Little River Basin, and the Mountain Fork River Basin.¹⁵

B. THE RED RIVER COMPACT

The Red River Compact (“The Compact”) is an agreement between Arkansas, Louisiana, Oklahoma, and Texas governing the waters of the Red River and its tributaries.¹⁶ Congress approved the Compact in 1980, thereby giving it effect over state law pursuant to Article 1, Section 10, Clause 3 of the United States Constitution.¹⁷ The Compact governs which states own water rights in various sections of the Red River and its tributaries.¹⁸

The Compact divides the river into five ‘reaches’ starting on the western border of the Texas panhandle all the way to the Mississippi River.¹⁹ Reach II covers southeastern Oklahoma and northeastern

9. An *acre-foot* is a unit of volume of water in irrigation: the amount covering one acre to a depth of one foot, equal to 43,560 cubic feet. RANDOM HOUSE WEBSTER’S UNABRIDGED DICTIONARY 18 (2d ed. 1998).

10. Tarrant Complaint, *supra* note 7, at 4.

11. See generally Map of Arkansas and Red River Basins, http://www.owrb.ok.gov/maps/pdf_map/sw.pdf (illustrating the Arkansas and Red River Basins and the rivers’ major tributaries).

12. Tarrant Complaint, *supra* note 7, at 2, 5.

13. *Id.* at 5.

14. *Id.*

15. See STATUS REPORT, *supra* note 4, at 2.

16. Red River Compact Act, Pub. L. No. 96-564, 94 Stat. 3305 (1980) [hereinafter Red River Compact].

17. U.S. CONST. art 1, § 10, cl. 3; Red River Compact, *supra* note 16§1.

18. See Red River Compact, *supra* note 16, § 1.01 (a)-(b).

19. *Id.* § 2.12; See also Oklahoma Water Resources Board, http://www.owrb.ok.gov/rccommission/graphics/reach_2_5.jpg (map representing the Red River Compact’s five reaches).

Texas and contains five topographic subbasins.²⁰ Subbasins one and three govern water in Oklahoma from below Denison Dam to Millwood Dam in Arkansas.²¹ The Compact's provisions allow unrestricted use of the water in Oklahoma above the lowest dam sites on Red River tributary basins,²² except for the Little River basin, from which the Compact requires 40 percent of the total annual runoff below the dam sites to flow to Arkansas.²³ The Compact, however, governs the rights of signatory states to all water below the lowest dam sites of Red River tributaries in Reach III.²⁴ In Oklahoma, state law and tribal compacts govern the water rights above the Red River tributaries' lowest dam sites.²⁵

C. OKLAHOMA STATE/TRIBAL WATER COMPACT²⁶

In 1975, the Army Corps of Engineers began construction on Sardis Lake, located on a tributary of the Kiamichi River.²⁷ The construction cost to the federal government still has an outstanding balance of approximately \$38 million,²⁸ and if Oklahoma pays it back the state may use the lake as a reservoir for part of its water supply.²⁹ In order to make payments to the federal government, the state began to explore the possibility of water sales and other water development programs.³⁰

When the Chickasaw and Choctaw Nations learned Oklahoma was investigating the possibility of selling water to the North Texas Municipal Water District in 1992, they laid claim to the waters the state had proposed to sell.³¹ This claim was based on the 1830 Treaty of Dancing Rabbit Creek and a similar treaty signed by the Chickasaws in 1832, by which the federal government gave them land and water rights in

20. Red River Compact, *supra* note 16, art. V.

21. *Id.* §§ 5.01, 5.03.

22. *Id.* § 5.01.

23. *Id.* § 5.03(b).

24. *Id.* § 5.05.

25. *Id.* §§ 2.10(a), 5.01; *see also* Jennifer E. Pelphrey, *Oklahoma's State/Tribal Water Compact: Three Cheers for Compromise*, 29 *Am. Indian L. Rev.* 127, 133 (2004-2005).

26. The author would like to thank Jennifer E. Pelphrey for her article *Oklahoma's State/Tribal Water Compact: Three Cheers for Compromise*, 29 *AMINDLR* 127, which is an excellent analysis of the compact relationship between Oklahoma and the Indian Tribes. Ms. Pelphrey's research contributed greatly to this section of the article and the author recommends it to anyone interested in interstate water law and how it applies to the various tribal nations of Oklahoma.

27. STATUS REPORT, *supra* note 4, at 2.

28. *Id.* at 43.

29. *Id.* at 3.

30. *Id.* at 1.

31. *Id.* at 12.

southeastern Oklahoma.³² State advisors studied the treaty and reported that the tribal nations had a potentially non-frivolous claim to the waters and recommended that the state of Oklahoma pursue a compact to save the time and cost of settling the matter in court.³³ Additionally, the Supreme Court's preference for settling water rights issues out of court supported Oklahoma's decision to pursue a compact with the Chickasaws and Choctaws.³⁴ For these reasons, the state began negotiating with the tribal nations to form a water rights compact under which the state could sell the contested water. As a result of these efforts, in November of 2001 the parties created the State/Tribal Draft Water Compact.³⁵

The State/Tribal Draft Water Compact covers twenty-two southern Oklahoma counties including six major river basins.³⁶ Among its purposes are to "resolve mutually exclusive state-tribal claims to water rights," and to "provide the framework for . . . economic development in southeast Oklahoma."³⁷ Under the State/Tribal Water Draft Compact, the state and the tribal nations would split the net revenue of a water sale, with 50 percent going to Oklahoma, 37.5 percent going to the Choctaw Nation, and 12.5 percent going to the Chickasaw Nation.³⁸ Oklahoma would spend all of its revenues on improvements located in southeastern Oklahoma, primarily on water infrastructure and other economic development.³⁹ Furthermore, appointed citizens of southeastern communities would be trustees of funds and would become responsible for distributing the funds properly.⁴⁰ Once the State/Tribal Draft Compact addressed the issue of water rights among the parties, the state was free to begin receiving proposals from outside parties for the sale of water.

32. *Id.*; see also Treaty with the Chickasaws, U.S.-Chickasaw Nation, art. IV, Oct. 20, 1832, 7 Stat. 381; Treaty of Perpetual Friendship, Cession and Limits, U.S.-Choctaw Nation, art. II, Sept. 27, 1830, 7 Stat. 333.

33. STATUS REPORT, *supra* note 4, at 14-15.

34. See *Colorado v. Kansas*, 320 U.S. 383, 392 (1943) (articulating the Supreme Court's the preference for states to negotiate disputes concerning water rights instead adjudication).

35. See STATUS REPORT, *supra* note 4, at 6.

36. *Id.* at 2, 16.

37. OKLA. WATER RES. BD., DRAFT STATE/TRIBAL WATER COMPACT & WATER MARKETING PROPOSALS, PUBLIC DISCUSSION DRAFT, art. 1, § 1.1 (2001), available at http://www.owrb.state.ok.us/studies/legislative/southeast/se_plan.php#status [hereinafter DRAFT WATER COMPACT].

38. *Id.* art. 5, § 5.3(b).

39. *Id.* § 5.3(c).

40. See Ray Carter, *State-Tribal Water Compact Draft Unveiled*, J. REC. (Okla. City, Okla.), Nov. 15, 2001, available at 2001 WLNR 4918173.

D. THE NORTH TEXAS WATER AGENCY PROPOSAL

The North Texas Water Agency ("NTWA") sought to give Oklahoma and the tribal nations \$5.1 billion, over the 100-year term of the contract in exchange for 120,000-160,000 acre-feet/year of water from the Kiamichi River, and an additional 200,000 acre-feet/year of water from the Little River.⁴¹ In addition, the NTWA would pay for the entire water transfer infrastructure needed to complete the transfer to north Texas.⁴² Residents of the area would not feel the effect of the water sale because the sale would limit NTWA's purchase to only excess "water flowing unused out of the State of Oklahoma into the Red River."⁴³ The NTWA proposal would also conform to the terms of the Red River Compact, specifically the requirement that 40 percent of the below dam runoff of the Little River must flow to Arkansas.⁴⁴ Nevertheless, the proposed water sale with Texas drew significant attention from local citizens due to the fear that any sale would result in a lack of water to fulfill Oklahoma citizens' future water needs.⁴⁵

II. OPPOSITION TO THE WATER SALE

A. OPPOSITION AT THE LOCAL LEVEL

The proposed sale of resources from one state to another created an understandable amount of concern from the local citizens. In southeastern Oklahoma, the Southern Oklahoma Water Alliance ("SOWA") has been one of the main voices protesting the sale of Oklahoma's water. Charlette Hearne, SOWA's state chairman, is concerned that Oklahoma does not have enough water to spare for Texas, stating "[o]nce it's gone, it's gone and the only thing we will get from it is to hear the fish flapping in Sardis Lake."⁴⁶

One of the reasons the group opposes the water sale stems from the state's lack of collaboration and transparency during contract negotiations.⁴⁷ However, Duane Smith, the executive director of the OWRB, said that keeping the negotiations private was necessary to continue making progress.⁴⁸ Mr. Smith stated, "it's a very difficult process to negotiate a contract in public when it changes at virtually any meet-

41. See STATUS REPORT, *supra* note 4, at 10, 44.

42. *Id.* at 26.

43. *Id.*

44. *Id.* at 32-33.

45. See Kelly Kurt, *New Deal Brings Competing Economic Visions*, J. REC. (Okla. City, Okla.), Nov. 12, 2001, at 1, available at 2001 WLNR 4913553.

46. Tom Lindley and Mick Hinton, *Water War Spills Across State Line*, TULSA WORLD, August 25, 2008, at A1, available at <http://www.tulsaworld.com/> (search "Water War Spills Across State Line").

47. See Kurt, *supra* note 45.

48. *Id.*

ing that's done."⁴⁹ Furthermore, the State/Tribal Draft Water Compact requires that the Oklahoma legislature vote on any sale of water after the contract terms are final, creating the opportunity for public examination.⁵⁰

Another concern of SOWA was that any sale of water would result in a lack of water for Oklahomans in the future.⁵¹ Charlette Hearne opposes selling water to Texas because she feels "[i]t's not that [Texas] need[s] our water. It's not a humanitarian situation right now . . . [t]hey're just water hogs."⁵² However, in December of 2001, the Choctaw and Chickasaw tribes hired Jones & Stokes, an independent consultation group from California, to advise them on any water issues a sale might bring.⁵³ The study calculated the percentage of use and runoff of the Kiamichi River for the last seventy-five years and placed emphasis on the lowest and second-lowest runoff years.⁵⁴ The study found that even in the driest year, water runoff totaled 360,000 acre-feet.⁵⁵ The NTWA proposal requested 120,000 acre-feet of water per year from the Kiamichi River; thus, had the water sale been finalized during the lowest runoff year, the NTWA would only be using 33% of the total runoff water.⁵⁶ Furthermore, the State/Tribal Draft Compact states that any water sale contract would allow for alterations or cancellations during times of drought.⁵⁷

B. DOWNSTREAM DEPENDENCY

The biggest fear of SOWA, and other local groups opposing the sale, stems from the concept of "downstream dependency." The common understanding of the term is that once Texas becomes dependent on Oklahoma for its water, courts will force Oklahoma to continue to give water to Texas indefinitely, even if Oklahoma is experiencing a drought.⁵⁸ To determine if this concept had any legal merit, Oklahoma Governor Frank Keating asked Oklahoma College of Law professor Drew L. Kershen to write a legal opinion on the issue in November of 2001.⁵⁹

49. *Id.*

50. *See DRAFT WATER COMPACT, supra note 37, art. 5, § 5.3(a).*

51. Kurt, *supra note 45.*

52. *Id.*

53. *See STATUS REPORT, supra note 4, at 20.*

54. *Id.* at 21.

55. *Id.*

56. *See id.* at 10.

57. *See DRAFT WATER COMPACT, supra note 37, art. 5 § 5.3(a).*

58. *See Carter, supra note 40.*

59. Legal Opinion from Drew L. Kershen, Earl Sneed Centennial Professor of Law, Univ. of Okla. Coll. of Law, to Chickasaw Governor Anoatubby, Choctaw Chief Pyle, and Okla. Governor Keating (Nov. 11, 2001) (on file with author).

According to Professor Kershen, the closest legal concept to downstream dependency, as SOWA understands it, is "equitable apportionment of interstate streams between sovereigns."⁶⁰ As the phrase implies, this legal theory deals with water rights of non-navigable waterways that run between states. Professor Kershen stated that "the Supreme Court of the United States has ruled that the equitable apportionment of the interstate streams between sovereigns protects the upstream state in its water rights [even though] . . . the downstream state . . . may be adversely affected."⁶¹

This legal theory was an issue in *Nebraska v. Wyoming* when Nebraska sued Wyoming and Colorado for an equitable share of the North Platte River that had been partially diverted for irrigation purposes.⁶² Applying the rule of prior appropriation, the Court stated:

The cardinal rule of the doctrine is that priority of appropriation gives superiority of right. Each of these States applies and enforces this rule in her own territory, and it is the one to which intending appropriators naturally would turn for guidance. The principle on which it proceeds is not less applicable to interstate streams and controversies than to others.⁶³

In other words, any water in the state of Oklahoma that Texas would like to use is subject to the upstream rights of Oklahoma before a court considers the downstream rights of Texas. Furthermore, the Court stated that downstream water rights do not trump the rights of the upstream state even when the downstream use is more economical.⁶⁴ The Supreme Court's general deference to local administrative agencies in matters of appropriation of water rights reinforces the priority rule due to the complexity, and technicality of fact patterns associated with determining ownership:

There is some suggestion that if we undertake an apportionment of the waters of this interstate river, we embark upon an enterprise involving administrative functions beyond our province. We noted in *State of Colorado v. Kansas* that these controversies between States over the waters of interstate streams "involve the interests of quasi-sovereigns, present complicated and delicate questions, and, due to

60. *Id.* at 2-3.

61. *Id.* (citing *Nebraska v. Wyoming*, 325 U.S. 589 (1945); *Colorado v. Kansas*, 320 U.S. 383 (1943); *Kansas v. Colorado*, 206 U.S. 46 (1907)).

62. *Nebraska v. Wyoming*, 325 U.S. 589, 591-92 (1945).

63. *Id.* at 617 (quoting *Wyoming v. Colorado* 259 U.S. 419, 470 (1922)).

64. *Id.* at 621 ("We are satisfied that a reduction in present Colorado uses is not warranted. The fact that the same amount of water might produce more in lower sections of the river is immaterial. The established economy in Colorado's section of the river basin based on existing use of the water should be protected." (internal citations omitted)).

the possibility of future change of conditions, necessitate expert administration rather than judicial imposition of a hard and fast rule. Such controversies may appropriately be composed by negotiation and agreement, pursuant to the compact clause of the Federal Constitution.”⁶⁵

Extending the logic of this decision, if the Court applied this rule to any conflict arising out of a water sale between Oklahoma and Texas, this rule would require them defer to the water sale contract, the Compact,⁶⁶ the State/Tribal Draft Water Compact,⁶⁷ and the advisory opinion of the Oklahoma Water Resources Board⁶⁸ before appropriating water based solely on judicial discretion. Therefore, SOWA’s assertion that Texas would claim the “right” of downstream dependency has no merit.

C. OPPOSITION AT THE STATE LEVEL

Legislators at the state level have been largely sympathetic to grassroots groups such as SOWA. The primary legislator championing this cause was then-Oklahoma State House Representative, now State Senator, Jerry Ellis.⁶⁹ Ellis drafted bills and held press conferences urging the Attorney General and the public to oppose any water sale to Texas.⁷⁰ In a press conference held on April 2, 2008, Ellis stated that any sale of water would result in losses to the agricultural, hunting, fishing, and other recreational industries due to a drop in lake and stream levels.⁷¹ This, despite the fact that Texas proposed removing only a fraction of the runoff water below the water-regulation dams.⁷² Ellis has further stated that the theory of downstream dependency would result in Texas acquiring an irreversible right to Oklahoma’s water and effectively “drain Oklahoma like a backyard swimming pool.”⁷³

65. *Nebraska*, 325 U.S. at 616 (internal citations omitted) (quoting *Colorado v. Kansas*, 320 U.S. 383, 392 (1943)).

66. See Red River Compact, *supra* note 16.

67. See DRAFT WATER COMPACT, *supra* note 37.

68. A court would defer to the OWRB over any Texas water administrative agency because the source of the water sold is located within Oklahoma’s borders. STATUS REPORT, *supra* note 4, at 29.

69. See, Jeff Packham, *Statewide Water Plan Proposed for Future of Oklahoma*, J. REC. (Okla. City, Okla.), April 20, 2006, available at 2006 WLNR 10715909 (Mr. Ellis “encourag[ed] officials to take care of Oklahoma first,” stating, “[d]on’t worry about Texas or any other state.”).

70. See, e.g., audio recording: Water Moratorium Press Conference, Representative Jerry Ellis, Oklahoma State Capitol (Apr. 2, 2008) [hereinafter Ellis Press Conference] (on file with author).

71. *Id.*

72. See STATUS REPORT, *supra* note 4, at 10.

73. See Ellis Press Conference, *supra* note 70.

In addition, Ellis introduced a resolution⁷⁴ expressing confidence in the Oklahoma Attorney General in defending against the *Tarrant County* case.⁷⁵ The House Resolution states a laundry list of reasons Oklahoma should not sell water to Texas. These reasons include that “Dallas/Fort Worth . . . has indulged itself, swimming unsustainably in a dwindling supply of H₂O”; “north Texans should . . . reduce their demand through . . . xeriscaping and installation of composting toilets”; “the State of Texas has affronted the great State of Oklahoma by its audacious action in filing a lawsuit”; and that if Oklahoma sold Texas water it would sell “our children’s and grandchildren’s birthright.”⁷⁶ Ellis has frequently criticized the political nature of the *Tarrant County* case and once said that “allow[ing] this issue to be decided by the courts would gut democracy and the result would be Communism without a firing squad.”⁷⁷

The stated purpose of Ellis’ constant efforts to withhold a water sale, other than conservation, is to complete a long-term study of Oklahoma’s water needs.⁷⁸ He would like a projection for the next fifty years before the state considers a water sale.⁷⁹ The Oklahoma legislature established the Joint Committee on Water Planning in 2002 with the task of assessing Oklahoma’s future water needs.⁸⁰ Ellis relied on the notion that this committee will forecast Oklahoma’s water needs, even though the group has never met to discuss the matter.⁸¹ According to Senator Jeff Rabon, a member of the committee, the group has not determined conservation or preservation needs, nor has it organized, met, or reported any conclusions on the work directed to it by the legislature under the law establishing the group.⁸²

Under these facts, it would appear that the legislature has no genuine intention to create a comprehensive water plan. The moratorium simply acts as a ruse to appease groups like SOWA. The legislation set

74. H.R. 1031, 51st Leg., 1st Sess. (Okla. 2007).

75. See generally Order Denying Motion to Dismiss, *Tarrant Reg'l Water Dist. v. Herrmann*, No. CIV-07-0045-HE, (W.D.Okla. Oct. 29, 2007); see also discussion *infra* Part V.

76. H.R. 1031.

77. Max Baker, *Proposal to Capture Water has Oklahoma Steaming*, FORT WORTH STAR-TELEGRAM, Jan. 21, 2007, at B6, available at 2007 WLNR 1196230.

78. Eric Aasen, *Parched Texas Looks to Oklahoma for Water*, DALLAS MORNING NEWS, Aug. 5, 2007, available at <http://www.dallasnews.com/sharedcontent/dws/news/localnews/stories/080507dnmetoklawater.28025a2.html>.

79. Baker, *supra* note 77.

80. Waters and Water Rights Act of 2002, ch. 485, sec. 4 § 1C, 2002 Okla. Sess. Laws. (creating the Joint Committee on Water Planning, repealed by OKLA. STAT. tit. 82 § 1C) [hereinafter Water Rights Act].

81. Interview with Jeff Rabon, Dist. 5 Senator (D-Hugo), in Okla. City, Okla. (April 2, 2008).

82. *Id.* See also Waters and Water Rights Act of 2002, sec. 4 § 1C.

the moratorium to expire in 2004;⁸³ however, Representative Ellis, among others, extended the law's expiration until 2009, in the name of "doing a state-wide scientific water study to [determine] supply and demand."⁸⁴ This remains the lawmaker's position even though the *Tarrant County* lawsuit exposed the fact that the committee has never met.⁸⁵

D. THE WATER SALE MORATORIUM

Ultimately, local groups like SOWA, armed with a misunderstanding of the law governing water rights such as downstream dependency, pressured state legislators into passing a moratorium that prohibited any sale of water outside the state. The Oklahoma House of Representatives passed the moratorium in 2002 by a vote of 99-0.⁸⁶ Specifically, it bans any "sale or exportation of surface water and/or groundwater outside [Oklahoma] . . . for a three year period"⁸⁷ House Representative Debbie Blackburn drafted the moratorium and originally set it to expire in 2004;⁸⁸ however, as previously stated, Representative Ellis's amendment extended it until 2009.⁸⁹ The law explains those prohibited from selling water:

[N]o state agency, authority, board, commission, committee, department, trust or other instrumentality of this state or political subdivision thereof, nor elected or appointed officer, member of any governing body or other person designated to act for an agency or on behalf of the state, or a political subdivision thereof shall contract for the sale or exportation of surface water or groundwater outside the state, or sell or export surface water or groundwater outside the state without the consent of the Oklahoma Legislature specifically authorizing such sale or export of water.⁹⁰

This category includes the OWRB and prohibits it from issuing water permits to out-of-state applicants. However, the law makes no mention of conforming to the Red River Compact, which would cover waters within the state boundaries as tributaries of the Red River up to the lowest water regulation dams.⁹¹

83. OKLA. STAT. tit. 82 § 1B (2008).

84. Ellis Press Conference, *supra* note 70.

85. Tarrant Complaint, *supra* note 7, at 4.

86. *See* Leg. 48-1410, 2d Reg. Sess. (Okla. 2002).

87. OKLA. STAT. tit. 82 § 1B (2008).

88. H.B. 2895 § 1(A), 48th Leg., 2d Sess. (Okla. 2002) (amended bill codified at OKLA. STAT. tit. 82, § 1B (2008)).

89. H.B. 2440 § 1(B), 51st Leg., Reg. Sess. (Okla. 2004) (codified at OKLA. STAT. tit. 82, § 1B (2008)).

90. OKLA. STAT. tit. 82 § 1B(B) (2008).

91. Act of Dec. 22, 1980, Pub. L. No. 96-564, 94 Stat. 3305, at §§ 5.01, 5.03 (1980) (granting the consent of the United States to the Red River Compact among Arkansas, Louisiana, Oklahoma and Texas).

Another notable part of the moratorium is Section 1C, which establishes the Joint Committee on Water Planning (“Committee”).⁹² This section describes the goals of the Committee and the procedural requirements for its establishment, some of which are determining “[t]he long-term sustainability of Oklahoma’s water supply” and “[t]he methods for developing, managing, protecting and conserving water resources of the state”⁹³ It also establishes the timetable for the Committee’s work and creates a deadline for their recommendations: “[t]he work of the Committee shall be finalized no later than January 15, 2005, and any written recommendations of the Committee shall be made available to the public and delivered to each member of the Oklahoma Legislature by February 1, 2005.”⁹⁴

According to Senator Rabon, the Committee violated this section.⁹⁵ The Legislature allocated funding to the Committee; however, the Committee did not issue reports, recommendations to the public or the legislature, or hold a single meeting.⁹⁶ Therefore, the Committee arguably executed the moratorium in bad faith. Bad faith aside, the moratorium fails to adhere to the basic interstate commerce guidelines of the Constitution.

III. THE MORATORIUM’S UNCONSTITUTIONALITY

Under the Commerce Clause of the Federal Constitution, only the United States Congress may regulate commerce between the states.⁹⁷ “The Framers intended the Commerce Clause . . . to preserve economic union and suppress interstate rivalry”⁹⁸ and prevent individual states from bolstering their respective economies at the expense of other states.⁹⁹ The Framers intended that “the peoples of the several states must sink or swim together, and in that long run prosperity and salvation are in union and not division.”¹⁰⁰ The Commerce Clause grants power to Congress and does not operate as a restriction on the states.¹⁰¹ However, if Congress is the sole authority on interstate com-

92. OKLA. STAT. tit. 82 § 1C (repealed 2007).

93. *Id.*

94. *Id.*

95. Interview with Jeff Rabon, *supra* note 81.

96. Jennifer Mock, *House Speaker Calls for Ending 18 Panels: Entities Include Men’s Health Task Force that Never Met*, THE OKLAHOMAN, Jan. 23, 2007, at 4A, available at 2007 WLNR 1392885; Tony Thornton, *North Texas Water District Sues Over State Moratorium: Interstate Commerce Violation Alleged in Federal Court Action*, The Oklahoman, Jan. 12, 2007, at 13A, available at 2007 WLNR 673752.

97. U.S. CONST. art. I, § 8, cl. 3.

98. *Dennis v. Higgins*, 498 U.S. 439, 453 (1991) (Kennedy, J. dissenting).

99. *Baldwin v. G.A.F. Seelig, Inc.*, 294 U.S. 511, 527 (1935).

100. *Id.* at 523.

101. U.S. CONST. art. I, § 8, cl. 3; *see* U.S. v. Se. Underwriters Ass’n, 322 U.S. 533, 551-52 (holding that the Commerce Clause allows Congress to legislate against state com-

merce regulation, then no state may pass a law impeding that right.¹⁰² Therefore, the Supreme Court recognizes the doctrine of the “Dormant Commerce Clause,” which deems any state law unconstitutional that burdens or discriminates against interstate commerce.¹⁰³

A. DORMANT COMMERCE CLAUSE TEST

Courts evaluate a potential Dormant Commerce Clause violation under a four-prong test. First, a court determines whether any act of Congress preempts the state law in question.¹⁰⁴ If the state law directly conflicts with the Congressional act, and the court cannot sever the offending provision from the statute, then the law is unconstitutional.¹⁰⁵ A court severs a provision if the remainder after severance is operative law.¹⁰⁶ Second, if no direct conflict exists, then the court looks to the language on the face of the statute and determines whether the law discriminates against interstate commerce or is even-handed.¹⁰⁷ A law discriminates against interstate commerce if the law is “basically a protectionist measure”¹⁰⁸ Alternatively, the law is even-handed if it can “be viewed as a law directed to legitimate local concerns, with effects upon interstate commerce that are only incidental.”¹⁰⁹

If the law is even-handed, then courts employ a balancing test, known as the *Pike* test, to determine whether the burden imposed on interstate commerce is clearly excessive in relation to the putative local benefits.¹¹⁰ Therefore, the state must show the law creates a legitimate public benefit that justifies the burden imposed on interstate commerce.¹¹¹ Furthermore, the state must show that no less restrictive alternative to the challenged law will accomplish the stated public benefit, thus making the burden on interstate commerce necessary.¹¹² However, courts consider the no less restrictive alternative requirement within the whole of the test, and accordingly this determination is not

merce regulations, legislate transactions that reach across state lines affecting people of multiple states, and govern other affairs which the states cannot govern due to limited territorial jurisdiction).

102. See *Gade v. Nat'l Solid Wastes Mgmt. Ass'n*, 505 U.S. 88, 98 (1992) (Federal laws preempt conflicting state laws).

103. *Lewis v. BT Inv. Managers, Inc.*, 447 U.S. 27, 36-37 (1980); *Willson v. Black Bird Creek Marsh Co.*, 27 U.S. 245, 252 (1829).

104. *Cooley v. Bd. of Wardens*, 53 U.S. 299, 318-19 (1851).

105. *INS v. Chadha*, 462 U.S. 919, 931-32 (1983) (citing *Buckley v. Valeo*, 424 U.S. 1, 108 (1976)).

106. *Id.* at 934.

107. *C&A Carbone, Inc. v. Town of Clarkstown*, 511 U.S. 383, 389-90 (1994).

108. *City of Philadelphia v. New Jersey*, 437 U.S. 617, 624 (1978).

109. *Id.*

110. *Pike v. Bruce Church, Inc.*, 397 U.S. 137, 142 (1970).

111. *Id.*

112. *Id.*

individually dispositive of constitutionality.¹¹³ If the state fails the *Pike* balancing test, the state law is unconstitutional.

If the law is discriminatory against interstate commerce and not even-handed, then courts apply strict scrutiny review. First, courts presume the statute is unconstitutional when applying this standard of review.¹¹⁴ Strict scrutiny is the highest form of judicial scrutiny with a strong presumption against constitutionality.¹¹⁵ It shifts the burden of proof onto the state to prove the statute can pass constitutional muster.¹¹⁶ The state can overcome this presumption by proving that the law is necessary, that there is no less restrictive alternative, and that it serves a compelling governmental goal.¹¹⁷ Under strict scrutiny, however, and unlike the *Pike* balancing test, the no less restrictive alternative requirement is individually dispositive.¹¹⁸ Importantly, the Supreme Court has found a facially discriminatory (meaning the language on the face of the statute discriminates against interstate commerce) statute to survive strict scrutiny review only once,¹¹⁹ meaning any statute found to be facially discriminatory against interstate commerce is almost certainly unconstitutional.

The market participation exception is one notable deviation from the Dormant Commerce Clause test.¹²⁰ This exception protects states that enter into a market as a private entity and allows the state to choose business partners free from the constraints of the Dormant Commerce Clause.¹²¹ The exception draws a distinction between a state as a market participant versus a market regulator. The exception is permissible due to the underlying intent of the Commerce Clause, that "the Commerce Clause responds principally to state taxes and regulatory measures impeding free private trade in the national marketplace . . . [and] . . . [t]here is no indication of a constitutional plan to limit the ability of the States themselves to operate freely in the free market."¹²²

Accordingly, a state may impose the same restrictions on interstate commerce as any private business.¹²³ However, "[t]he State may not impose conditions, whether by statute, regulation, or contract, that have a substantial regulatory effect outside of that particular market."¹²⁴

113. *Id.*

114. *Wyoming v. Oklahoma*, 502 U.S. 437, 454-55 (1992).

115. *See McConnell v. Fed. Election Comm'n*, 540 U.S. 93, 137 (2003).

116. *Hughes v. Oklahoma*, 441 U.S. 322, 336 (1979) (citing *Hunt v. Wash. Apple Adver. Comm'n*, 432 U.S. 333, 353 (1977)).

117. *Dean Milk Co. v. City of Madison*, 340 U.S. 349, 354 (1951).

118. *Id.*

119. *Maine v. Taylor*, 477 U.S. 131, 151-52 (1986).

120. *Reeves, Inc. v. Stake*, 447 U.S. 429, 436-37 (1980).

121. *Id.* at 436.

122. *Id.* at 437.

123. *See id.*

124. *South-Central Timber Dev., Inc. v. Wunnicke*, 467 U.S. 82, 97 (1984).

Specifically, defining the market the state enters into is the key component of qualifying for the market participation exception.¹²⁵ The state must show that market entry does not have a regulatory effect on a separate market, even if the separate market closely relates to the market entered.¹²⁶ Courts rarely apply the market participation exception; however, when the exception applies a court starts the analysis with a high level of suspicion.¹²⁷

B. APPLYING THE TEST TO THE WATER MORATORIUM

The first part of the Dormant Commerce Clause test requires a determination of whether an Act of Congress preempts the moratorium.¹²⁸ The Red River Compact may preempt the moratorium because compacts derive power from Congress and therefore have the effect of federal law.¹²⁹ The section of the Red River Compact that may preempt the moratorium is in Article V governing Reach II.¹³⁰ In this section, Oklahoma's unrestricted right to enforce water rights ends at the last downstream dam sites before the tributaries enter the Red River.¹³¹ Therefore, Texas arguably has rights under the Red River Compact for the water between the last dam site and the Red River. This argument would directly conflict with the moratorium, which prevents the export of water from the state. Therefore, the Red River Compact may arguably preempt the moratorium.

On the other hand, if the court finds no preemption, then the next step is determining whether the statute is discriminatory or even-handed. The moratorium is likely discriminatory because a ban on selling water is a protectionist measure to keep water for Oklahoma, and protectionist measures are *per se* discriminatory against interstate commerce.¹³² However, for the sake of thoroughness, this article will assume the moratorium is even-handed. Therefore, a court would hold the moratorium "directed to legitimate local concerns, with effects upon interstate commerce that are only incidental."¹³³

As an even-handed statute, the moratorium would be subject to the *Pike* balancing test, which balances the legitimate public benefit against

125. For example, in *Wunnicke*, the "timber market" is not the same as the "timber processing" market. *Id.* at 97-98 (explaining that courts must narrowly define "market" to avoid the exception swallowing the rule).

126. *Id.* at 97.

127. *See id.* at 93, 97-98.

128. *See Merrion v. Jicarilla Apache Tribe*, 455 U.S. 130, 154 (1982).

129. *See* U.S. CONST. art. I, § 10, cl. 3.

130. Red River Compact, *supra* note 16 art. V.

131. *Id.* § 5.01 ("This subbasin includes those streams and their tributaries *above* existing . . . dam sites, wholly in Oklahoma" (emphasis added)).

132. *City of Philadelphia v. New Jersey*, 437 U.S. 617, 624 (1978).

133. *Id.*

the burden on interstate commerce.¹³⁴ The stated public benefit of the moratorium is to provide for “conservation, preservation, protection, and optimum development and utilization of . . . water . . . within Oklahoma.”¹³⁵ However, this does not specify the precise benefit provided by the moratorium. Furthermore, the Supreme Court specifically states that claims of conservation in the face of a burden on interstate commerce do not pass constitutional muster.¹³⁶ Also, the moratorium’s stated goals require the Committee to determine water use, and the Committee has not met.¹³⁷ The Committee’s bad faith¹³⁸ would certainly weigh heavily on any court decision. Considering these facts, a court may find that the moratorium has no actual benefits and certainly none justifying the restriction it places on interstate commerce, for example, restricting willing parties from buying and selling water. Therefore, the moratorium is likely unconstitutional under the *Pike* balancing test.

Alternatively, a court will more likely find the moratorium discriminatory against interstate commerce and apply strict scrutiny, which carries a strong presumption against constitutionality.¹³⁹ In order to refute this presumption, the state must show that the moratorium is necessary, with no less restrictive alternative, and serves a compelling governmental goal.¹⁴⁰ A compelling governmental goal is a higher standard than the legitimate public benefit required by the *Pike* balancing test, and the state must show the governmental goal carries a very high level of benefit to the state, thus justifying the burden on interstate commerce.¹⁴¹

As discussed above, the moratorium’s stated benefits are vague and further burdened by the Committee’s bad faith in failing to hold a meeting. Therefore, this increases the state’s difficulty in establishing that the goals of the moratorium can survive strict scrutiny review. In addition, the state must show that no less restrictive alternative exists to the moratorium that could accomplish the same legislative purpose. This poses a difficult requirement for the state to satisfy because there is little correlation between the vague notion of water conservation and

134. *Pike v. Bruce Church, Inc.*, 397 U.S. 137, 142 (1970).

135. OKLA. STAT. tit. 82 § 1B(A) (2008).

136. *West v. Kan. Natural Gas Co.*, 221 U.S. 229, 260 (1911).

137. OKLA. STAT. tit. 82 § 1C(B) (2006) (repealed 2007); Interview with Jeff Rabon, *supra* note 81.

138. “Bad faith” here means the failure of the Committee to attempt to create a plan for water conservation when conservation was the reason the statute was created. *Id.* § 1B(A) (stating the legislative purpose “to provide for the conservation . . . of surface water and groundwater within Oklahoma . . .”).

139. *McConnell v. Federal Election Comm’n*, 540 U.S. 93, 137 (2003); *Maine v. Taylor*, 477 U.S. 131, 144 (1986) (citing *Hughes v. Oklahoma*, 441 U.S. 332, 337 (1979)).

140. *Taylor*, 477 U.S. at 138 (citing *Hughes*, 441 U.S. at 336).

141. *Id.*

a complete ban of water sales. The state could allow water sales but require contract terms that encourage conservation, such as quotas or percentage of runoff requirements. It seems unnecessary to ban sales completely, and the burden that the ban places on interstate commerce certainly does not justify this action. Therefore, the moratorium would likely fail strict scrutiny, and a court would likely determine that the legislation is unconstitutional.

Finally, the state could not assert the market participation exception to an interstate commerce analysis. Here, the state is not a participant in the water sales market.¹⁴² The market participation exception views the state as a private business,¹⁴³ and in this regard, Oklahoma is not a private business. Instead, Oklahoma is merely a regulator of public property by requiring permits for the use of state water through the OWRB. Case law establishes that state ownership of water is a legal fiction that does not permit the state to distribute water as a private entity would.¹⁴⁴ If Oklahoma acted as a private business in water sales, then the state would charge its own citizens and municipalities for the use of the state's water rather than simply requiring permits and beneficial use.¹⁴⁵

C. RELEVANT CASE LAW SUPPORTING UNCONSTITUTIONALITY

Many cases support the idea that the water sale moratorium is unconstitutional. In *City of Altus v. Carr*, a southern Oklahoma city attempted to purchase groundwater from an adjoining Texas county, which prompted the Texas legislature to pass a statute prohibiting the exportation of water without the approval of the legislature.¹⁴⁶ The city sued, and the Texas Attorney General asserted that statute's purpose was conservation and groundwater was not an article of commerce.¹⁴⁷ However, the court held that, although conservation alone may not burden interstate commerce, this did not present such a case.¹⁴⁸ Furthermore, the claim that groundwater is not an article of commerce failed because "its conservation is in a sense commercial—the business welfare of the state, as coal might be, or timber."¹⁴⁹ The statute failed

142. See *S. Cent. Timber Dev. v. Wunnicke*, 467 U.S. 82, 93, 97 (1984) (discussing the market-participant doctrine).

143. *Reeves, Inc. v. Stakes*, 447 U.S. 429, 436-41 (1980) (discussing treatment of the state under the market-participant doctrine).

144. *Sporhase v. Nebraska*, 458 U.S. 941, 951 (1982).

145. See *id.* at 952.

146. *City of Altus v. Carr*, 255 F.Supp. 828, 830-32 (W.D. Tex 1966), *aff'd* 385 U.S. 35 (1966).

147. *Id.* at 838.

148. *Id.* at 839 (citing *Foster Fountain Packing Co. v. Haydel*, 278 U.S. 1, 10 (1928)) (holding that a statute's stated purpose does not bind plaintiffs because plaintiffs may show a burden on interstate commerce through a statute's practical application).

149. *Id.* (quoting *West v. Kan. Natural Gas Co.*, 221 U.S. 229, 255 (1911)).

the commerce clause analysis because the statute directly governed the interstate transfer of water:

Moreover, on the facts of this case it appears to us that [the Texas Statute] does not have for its purpose, nor does it operate to conserve water resources of the State of Texas except in the sense that it does so for her own benefit to the detriment of her sister States as in the case of *West v. Kansas Natural Gas Co.*¹⁵⁰

In *City of Altus*, note that Oklahoma claimed water was an article of commerce subject to the Dormant Commerce Clause.¹⁵¹

In another case, *Sporhase v. Nebraska*, Nebraska passed a statute granting a permit to transfer groundwater from the state only where the purchasing state agreed to a reciprocity agreement for water rights.¹⁵² The state claimed the reciprocity agreement was necessary for conservation because water, unlike other natural resources, is necessary for human survival and therefore not an article of commerce.¹⁵³ However, the court considered that over 80 percent of water use is for agricultural purposes rather than for human consumption, and thus the bulk of water usage is in a commerce sense: it is a necessary raw material of the agricultural industry.¹⁵⁴ The Framers intended federal regulation for exactly this type of commerce among the several States.¹⁵⁵ In addition, aquifers and rivers commonly traverse state lines, thereby confirming the view that a significant federal interest exists in regulation designed for conservation and fair allocation of water.¹⁵⁶

After holding water is an article of interstate commerce, the *Sporhase* court moved to the Commerce Clause analysis. The court imposed the burden of evidence on the state, because the statute operated as an explicit barrier to commerce between two states and was thus facially discriminatory against interstate commerce.¹⁵⁷ Therefore, the court required the state to show a narrowly tailored correlation between the offending statute and its asserted local purpose.¹⁵⁸ The state failed this requirement because it presented insufficient evidence.¹⁵⁹ Note this court called this requirement "strictest scrutiny," implying a heightened standard of review.¹⁶⁰ Although states manage natural resources, this right does not permit withholding resources to

150. *Id.* at 839-40.

151. *Id.* at 837.

152. *Sporhase v. Nebraska*, 458 U.S. 941, 944 (1982).

153. *Id.* at 948, 952.

154. *Id.* at 953.

155. *Id.*

156. *Id.*

157. *Id.* at 957.

158. *Id.*

159. *Id.* at 957-58.

160. *Id.* at 958 (citing *Hughes v. Oklahoma*, 441 U.S. 322, 337 (1979)).

another state's detriment.¹⁶¹ The court noted only one exception to a water ban: "[a] demonstrably arid State conceivably might be able to marshal evidence to establish a close means-end relationship between even a total ban on the exportation of water and a purpose to conserve and preserve water."¹⁶² This statement implies that if a state first shows it is arid, then it may pass strict scrutiny if the statute has a close relationship with water conservation. However, as previously stated, to date only one statute survived strict scrutiny review under the Dormant Commerce Clause.¹⁶³

In summary, both *City of Altus* and *Sporhase* held that water is an article of commerce, and courts evaluate restrictions placed on it with the highest level of judicial scrutiny. Here, the moratorium will likely meet the same fate as the Texas statute in *City of Altus* and the groundwater provisions in *Sporhase*. As in both cases, Oklahoma banned the exportation of water in the name of conservation, and the moratorium governs the interstate transfer of water. Furthermore, the only exception outlined in *Sporhase* does not apply to Oklahoma. As stated above, Oklahoma has an abundance of water and the complete ban on its sale does not hold a close relationship to conservation because less restrictive alternatives for conserving water are available to the state.¹⁶⁴ Accordingly, the moratorium is likely facially discriminatory and subject to strict scrutiny review; moreover, if the *Sporhase* and *City of Altus* cases are any indication as to the fate of facially discriminatory water statutes, then a court will find the moratorium is unconstitutional.

IV. CONCLUSIONS/CURRENT STATE OF THE MORATORIUM

The Tarrant Regional Water District filed suit in Federal Court in the Western District of Oklahoma on January 11, 2007;¹⁶⁵ in response, Oklahoma filed a motion to dismiss in March.¹⁶⁶ The state based the motion to dismiss on ripeness and Eleventh Amendment sovereign immunity.¹⁶⁷ The court denied the motion to dismiss, and the state appealed.¹⁶⁸

In October of 2008, the Tenth Circuit Court of Appeals ruled the case was ripe for trial and the OWRB did not have sovereign immunity

161. *Hughes*, 441 U.S. at 336-37 (holding that the state could not ban the exportation of natural resources without facing strict scrutiny). In *Hughes*, the resource at issue was minnows. *Id.* at 322.

162. *Sporhase*, 458 U.S. at 958.

163. *Maine v. Taylor*, 477 U.S. 131, 151-52 (1986).

164. See *supra* text accompanying notes 8-11, 137-138.

165. Tarrant Complaint, *supra* note 7.

166. Motion to Dismiss, *Tarrant Reg'l Water Dist. v. Herrmann*, No. 5:07-CV-0045-HE (W.D.Okla. Mar. 20, 2007).

167. Order Denying Motion to Dismiss, *supra* note 75, at 6-7.

168. *Tarrant Reg'l Water Dist. v. Sevenoaks*, 545 F.3d 906, 906 (10th Cir. 2008).

under the Eleventh Amendment.¹⁶⁹ The court held that Tarrant County showed an appreciable threat of injury flowing from the water sale moratorium in its inability to purchase Oklahoma's water; therefore, an actual case or controversy existed.¹⁷⁰ As to the Eleventh Amendment defense, the OWRB contended that if the court denied immunity, then the decision would allow Tarrant County to encroach on Oklahoma's ownership interest in its natural resources.¹⁷¹ However, the court held that Tarrant County's interest in Oklahoma's water is prospective because, even if the moratorium were not in place, it would simply put Tarrant County on the same footing as an instate applicant for a water appropriation permit.¹⁷² Tarrant County must still conform to the statutory and regulatory standards required for all permit applicants.¹⁷³ Furthermore, the court stated that under *Sporhase*, Oklahoma did not have an ownership interest in its water, thus extending the *Sporhase* decision to include surface water as well as groundwater.¹⁷⁴ With the procedural and jurisdictional questions addressed, Tarrant County's case can now proceed to the merits, specifically to the issue of the moratorium's constitutionality.

Some Oklahoma legislators refuse to acknowledge the law's likely end despite the Tenth Circuit decision and the forthcoming hearing on the merits, which will likely result in the moratorium's demise. In the first legislative session of 2009, Jerry Ellis, now a state senator,¹⁷⁵ proposed an extension of the moratorium to January of 2012.¹⁷⁶ Given the reasons stated above, however, the moratorium is likely unconstitutional and negotiations with Texas will resume for the purchase of Oklahoma water.

169. *Id.* at 910, 914.

170. *Id.* at 910.

171. *Id.* at 913.

172. *Id.*

173. *Id.*

174. *Id.* (citing *Sporhase v. Nebraska*, 458 U.S. 941, 950-52 (1982)).

175. Mr. Ellis won his bid for the Oklahoma Senate in the November 2008 elections, making the water sale moratorium a key theme in his campaign. See, e.g., Max B. Baker, *Legislator Wants to Talk About Water Sale*, FORT WORTH STAR-TELEGRAM, July 2, 2007, at B1, available at 2007 WLNR 12455281.

176. S.B. 55, 52nd Leg., 1st Sess. (Okla. 2009).

THE INSUFFICIENCY OF NEW HAMPSHIRE'S INSTREAM FLOW REGULATION TO ENSURE THE VIABILITY OF ITS RIVERS AS ECONOMIC, ENVIRONMENTAL, AND SOCIAL ASSETS

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INTRODUCTION

New Hampshire's population growth,² with accompanying increases in water demand,³ urban development,⁴ and impervious surfaces,⁵ poses alarming anthropogenic threats to the flow regimes and ecological integrity of New Hampshire's rivers and streams.⁶ These anthropogenic threats are concerning because "New Hampshire's rivers and streams comprise one of its most important natural resources, historically vital to New Hampshire's commerce, industry, tourism, and the quality of life of New Hampshire people."⁷ To protect its rivers and streams, the New Hampshire legislature enacted the Rivers Management and Protection Program ("RMPP") with the stated purpose of "ensur[ing] the continued viability of New Hampshire rivers as valued economic and social assets for the benefit of present and future gen-

2. RICHARD L. FORSTALL, NEW HAMPSHIRE POPULATION OF COUNTIES BY DECENNIAL CENSUS: 1900 TO 1990 (1995), <http://www.census.gov/population/cencounts/nh190090.txt>; NEW HAMPSHIRE QUICKFACTS FROM THE U.S. CENSUS BUREAU, <http://quickfacts.census.gov/qfd/states/33000.html> (last visited Jan. 31, 2009). *See also infra* Part III.B.

3. LAKES MGMT. ADVISORY COMM. AND THE RIVERS MGMT. ADVISORY COMM., THE SUSTAINABILITY OF NEW HAMPSHIRE'S SURFACE WATERS 9 (Jan. 2008) [hereinafter LAKES MGMT. ADVISORY COMM.], http://des.nh.gov/organization/divisions/water/wmb/lakes/documents/sustainability_initiative.pdf. *See also infra* Part III.B.

4. LAKES MGMT. ADVISORY COMM., *supra* note 3, at 9. *See also infra* Part III.B.

5. LAKES MGMT. ADVISORY COMM., *supra* note 3, at 2. *See also infra* Part III.B.

6. LAKES MGMT. ADVISORY COMM., *supra* note 3, at 9. *See also infra* Part III.

7. N.H. REV. STAT. ANN. § 483:1 (2008).

erations.”⁸ To sustain the viability of New Hampshire’s rivers as valued economic and social assets, the RMPP requires the promulgation of regulations that establish and enforce protected instream flows to “protect the resources for which the river or segment is designated” and to maintain water for instream public uses.⁹ Instream public uses, all of which are important components of New Hampshire’s economy, environment, and the well-being of its citizens, include the maintenance and enhancement of aquatic and fish life, as well as wildlife habitat.¹⁰

Three overarching reasons render New Hampshire’s instream flow regulation¹¹ insufficient to provide the flows necessary to maintain and enhance its streams’ aquatic life, fish life and habitat, and wildlife habitat in the face of anthropogenic threats to flows accompanying New Hampshire’s population growth. First, the administrative scheme protecting instream flows is not comprehensive, in that its regulation of all flow sources within a watershed is disjointed and limited.¹² The administrative scheme regulating flow sources is disjointed because it does not regulate ground and surface water withdrawals under a common permitting scheme.¹³ The administrative structure is limited in regulating flow sources because it does not cover small withdrawals that on aggregate remove a significant amount of water from streams; it does not have the authority to curb groundwater withdrawals more than five hundred feet from a protected river; and it completely ignores protecting baseflow through land use regulations that promote recharge and curb the expansion of impervious surfaces.¹⁴

Second, the lotic geographic scope of New Hampshire’s instream flow regulations is insufficient to maintain and enhance its streams’ aquatic and fish life, as well as its fish and wildlife habitat.¹⁵ The piecemeal protection of these regulations does not protect the ecological integrity of the tributaries or coastal sections of the streams, which serve as vital organs in a river’s ecosystem. Further, because the RMPP does not designate protection for the Androscoggin Basin, the instream flow regulation does not protect the flow regimes of the Androscoggin River.¹⁶

Third, while the extensive MesoHABSIM (MesoHabitat Simulation Model)¹⁷ method used to determine sufficient instream flows is seemingly sufficient to protect all riparian wildlife during their differing

8. *Id.*

9. N.H. REV. STAT. ANN. § 483:9-c (2008).

10. *Id.*; LAKES MGMT. ADVISORY COMM., *supra* note 3, at 1.

11. *See* N.H. CODE ADMIN. R. ANN. ENV-WS 1901.01-1908.01 (2008).

12. *See infra* Part V.B.

13. *Id.*

14. *Id.*

15. *Id.*

16. *Id.*

17. *See infra* Part V.B.

bioperiods¹⁸, determination and regulatory establishment of these protected flows takes time, and the method exposes riparian wildlife to ecologically threatening anthropogenically-induced low flow events.¹⁹

Part I of this article explains why the maintenance of natural instream flow regimes is critical to the ecological integrity of New Hampshire's riparian habitats. Part II details New Hampshire's economic interest in sufficiently protecting its rivers' natural flow regimes. Part III explains and identifies the anthropogenic threats to New Hampshire's natural flow regimes. Part IV describes why instream flow regulations, in addition to common law and statutes, are needed to adequately protect New Hampshire's rivers' flow regimes. Part V details the three inadequacies of New Hampshire's instream flow regulations in protecting the ecological integrity of its riparian habitat, including its disjointed and limited administrative structure, its limited ecological scope, and its failure to provide its streams with interim protections while the State determines and implements protected flows. Part VI concludes by offering suggestions to improve the instream flow regulations to better protect the outstanding characteristics and public uses of New Hampshire's streams.

I. ECOLOGICAL IMPORTANCE OF ESTABLISHING PROTECTIVE INSTREAM FLOWS

"Every river has a unique [natural] flow, signature [or regime] that is determined by the climate, geology, topography, vegetation, and other natural features of its watershed."²⁰ A river's natural flow regime consists of varying seasonal flows that oscillate in magnitude, duration, frequency timing, and rate of change.²¹ Extreme flows, such as floods or droughts that occur once every fifty years, are also part of a river's natural flow regime.²² The maintenance of a river's natural flow regime is of paramount importance to the protection of a stream's aquatic life for four main reasons.²³ First, flows "shape the physical

18. Piotr Parasiewicz, *Habitat Time Series Analysis to Define Flow Augmentation Strategy for the Quinebaug River, Connecticut and Massachusetts, USA*, RIVER RESEARCH AND APPLICATIONS 24: 439-452 (2008) [hereinafter Parasiewicz, *Habitat Time*] available at http://instreamhabitat.org/resources/Parasiewicz_2008_TimeSeries.pdf (last visited June 22, 2009) (noting that an organism's bioperiod is the organism's critical intra-annual seasons with specific biological functions, such as spawning or rearing and growth).

19. See *infra* Part V.B.

20. SANDRA POSTEL & BRIAN RICHTER, RIVERS FOR LIFE: MANAGING WATER FOR PEOPLE AND NATURE 18 (2003).

21. COMM. ON REVIEW OF THE USGS NAT'L STREAMFLOW INFO. PROGRAM, NAT'L RESEARCH COUNSEL, ASSESSING THE NAT'L STREAMFLOW INFO. PROGRAM 125 (2004), available at http://water.usgs.gov/nsip/nasreport/es/NRC_Report.html.

22. POSTEL & RICHTER, *supra* note 20, at 18.

23. *Id.* at 20-21.

habitats of rivers and their floodplains.”²⁴ In shaping riparian habitat, flows broaden the distribution and abundance of aquatic organisms and riparian vegetation.²⁵ Second, native aquatic species have adapted to survive in their river’s natural flow regime, and have “evolved survival and reproductive strategies that are keyed to natural flow conditions.”²⁶ Thus, different groups of aquatic organisms inhabiting a river’s ecosystem have evolved with the river to reproduce and survive according to the river’s naturally changing depth, spatial lateral expansion, velocity, temperatures, light availability, chemical composition, turbidity, and sediment distribution.²⁷ Third, natural flow regimes supply adequate water depth at critical times of the year that facilitates species movement up and downstream, as well as lateral species movement to and from floodplains.²⁸ These seasonal spatial movements to favorable habitat for feeding and breeding are critical to the growth and reproduction of aquatic organisms.²⁹ Lastly, the maintenance of natural flow regimes provides a lotic environment that resists invasive species and enhances the productivity, and thus abundance of a river’s native organisms.³⁰ When alterations in natural flow regimes reduce a species’ abundance or exterminate a species by removing the flows necessary for that species to reproduce, feed, or access dependent habitat, the reduction in abundance of that species also creates a trophic cascade that can send devastating ripples throughout a river’s food web and drastically alter its ecological composition.³¹

Within a river’s natural flow regime, the high, low, extreme, and intermediary flows provide different functions that maintain a river’s ecological integrity.³² Annual high flows, also referred to as flood flows, play an important role in enabling the reproduction of aquatic organisms.³³ Flood flows grant fish access to warm-watered floodplain habitat and are rich with nutrients and insects, which fuels rapid fish growth and enables fish to spawn and lay their eggs.³⁴ Flood flows also deposit

24. *Id.* at 20.

25. *Id.*

26. *Id.* at 20-21.

27. *Id.* at 21; NANCY GORDON ET AL., STREAM HYDROLOGY: AN INTRODUCTION FOR ECOLOGISTS 18-25 (1992); Bradford Bowman, *Instream Flow Regulation: Plugging the Holes in Maine’s Water Law*, 54 ME. L. REV. 287, 292 (2002).

28. POSTEL & RICHTER, *supra* note 20, at 21.

29. *Id.*

30. *Id.*

31. *Id.* at 6, 21, 26, 35, 36. *See generally* Tiffany M. Knight, Michael W. McCoy, Jonathan M. Chase, Krista A. McCoy & Robert D. Holt, *Trophic Cascades Across Ecosystems*, 437 NATURE 880 (2005) (“Trophic cascades arise when predators reduce prey abundance, indirectly relaxing consumption on lower trophic levels.” Refer to article for an example of a trophic cascade occurrence.).

32. POSTEL & RICHTER, *supra* note 20, at 20.

33. *Id.*

34. *Id.* at 73.

seeds in floodplains³⁵ and trigger insect life cycle phases.³⁶ Additionally, flood flows provide migration and spawning cues for fish and create suitable spawning areas for fish by depositing gravel and cobble in riverbeds.³⁷

Aside from flood flows, regularly occurring high flows provide important habitat maintenance and energy source functions for a river. At the tail end of droughts or seasonal low flows, these high flows cool the water temperature, inject high levels of critical dissolved oxygen, restore water quality, and supply nutrient-rich flows that carry organic material and insects.³⁸ High flows also restore the original character of lotic ecosystems by shaping the depth and width of river channels, and by forming pools, riffles, and runs that provide important habitats for aquatic organisms.³⁹ These channel-forming events create bank undercuts and large shallow zones, which fish use to avoid predators and feed freely.⁴⁰ Without annual channel-forming flows, fast moving, narrow, and simplified canals develop that do not provide adequate feeding or protective habitat for aquatic organisms.⁴¹ Further, high flows aerate eggs in spawning grounds,⁴² transport macroinvertebrates and fry downstream to new habitat,⁴³ and flush sand and silt from cobbles and gravel.⁴⁴ These flows create habitat for macroinvertebrates, suitable spawning ground for fish to lay eggs, and places for fry to occupy.⁴⁵

Unlike high flows with their relatively short annual duration, low flows, also called base flows,⁴⁶ persist for the majority of an annual seasonal cycle.⁴⁷ Thus, low flow levels dictate the composition of species that can survive in a given river because they determine a river's available habitat for a majority of the year.⁴⁸ Adequate seasonal low flows maintain suitable water temperatures,⁴⁹ provide enough habitat space for organisms,⁵⁰ protect aquatic organisms from capture by terrestrial

35. *Id.* at 74.

36. *Id.* at 20.

37. *Id.*

38. *Id.* at 70.

39. *Id.*

40. *Id.* at 71-72.

41. *Id.* at 72.

42. *Id.* at 20.

43. *Id.* at 22.

44. *Id.* at 71.

45. *Id.* at 70-71.

46. *Id.* at 20.

47. *Id.* at 67.

48. *Id.*

49. *Id.* at 20.

50. *Id.*

predators,⁵¹ and cue the reproduction of riparian vegetation, such as the bald cypress and water tupelo, that require their roots to dry out for germination.⁵² Additionally, adequate low flows allow groundwater tables to remain high to support floodplain vegetation,⁵³ allow for fish to move to feeding and spawning areas,⁵⁴ and prevent the aggregation of fish in densely populated pools where fish have a tougher time surviving due to higher temperatures, lower oxygen, and often fiercer competition for scarce resources.⁵⁵ Adequate low flows also maintain a river's chemical integrity by preventing saline water in coastal zones from pushing inland,⁵⁶ diluting contaminants,⁵⁷ and providing sufficient amounts of dissolved oxygen.⁵⁸ Many states determine the maximum discharge of pollutants into a stream based on an historical ten-year average of the lowest natural stream flow over a seven day period ("7Q10").⁵⁹ If states do not maintain natural low flows, legally permissible pollutant discharges can have lethal consequences for aquatic life, especially if technology-based pollution control standards regulate effluent limitations. Even the natural frequency of extreme low flows is beneficial to rivers, as drought flows can purge invasive species from the river and recruit native floodplain vegetation.⁶⁰

When natural flow regimes fluctuate, the composition and abundance of fresh water organisms changes because of alterations in energy sources, habitat reductions, predator-prey relationships, reproductive limitations, and chemical and physical variations.⁶¹ A stream's naturally occurring aquatic organisms evolve to become critical components and drivers of a stream's food web, and the organisms perform

51. See *id.* at 67. See also NORTHEAST GEORGIA REGIONAL DEVELOPMENT CENTER, A GUIDEBOOK FOR LOCAL GOVERNMENT FOR DEVELOPING REGIONAL WATERSHED PROTECTION PLANS app. B-7 (2001), available at <http://www.georgiaplanning.com/watertoolkit/Documents/WatershedPlanningTools/APPENDIXB.doc> (last visited Mar. 12, 2009).

52. *Id.* at 67-68.

53. *Id.* at 68.

54. *Id.* at 22.

55. *Id.* at 23.

56. *Id.* at 12-13.

57. *Id.* at 14.

58. PAUL S. GILLER & BJORN MALMQVIST, *THE BIOLOGY OF STREAMS AND RIVERS* 31 (1998).

59. USGS: Georgia Low Flow Frequency Information, <http://ga2.er.usgs.gov/lowflow/help/lowflowstats.cfm> (last visited Mar. 11, 2009) (citing R. F. Carter & S. A. Putnam, *Low Flow Frequency of Georgia Streams*, U.S. Geological Survey Water-Resources Investigations Report 77-127 (1978)) (explaining 7Q10 and Georgia's use of 7Q10 values to regulate water withdrawals and discharges into streams). See also N.H. CODE ADMIN. R. ANN. ENV-WQ 1705.02 (2009); *id.* at 1702.44 (2009) (defining 7Q10 as "the lowest average flow which occurs for 7 consecutive days on an annual basis with a recurrence interval of once in 10 years on average, expressed in terms of volume per time period"); *id.* at ENV-WS 1903.02 (2009).

60. POSTEL & RICHTER, *supra* note 20, at 20.

61. *Id.* at 20-21, 35, 67, 70.

critical ecosystem services such as maintaining water quality, decomposing organic material, absorbing contaminants, and producing food.⁶² Thus, the elimination or reduction of algae, fungi, worms, fish, amphibians, macroinvertebrates, and other freshwater organisms can have devastating effects that ripple through trophic levels because, in complex aquatic environments, species' survival is often interconnected, and thus dependent on the survival of other organisms.⁶³ In order to maintain the ecological integrity of streams and to prevent irreversible harm from species elimination and assemblage changes, states must establish protected flow regimes to provide the necessary seasonal flows for each organism's critical bioperiods⁶⁴ and to protect flows from anthropogenic stresses.⁶⁵

II. THE ECONOMIC IMPORTANCE OF PROTECTING THE NATURAL FLOW REGIME OF NEW HAMPSHIRE'S RIVERS AND STREAMS

Protecting natural flow regimes is vital to preserving the ecological integrity of streams as well as the recreational benefits, aesthetic enjoyments, and spiritual benefits that accompany an ecologically sound river system.⁶⁶ However, protecting natural flow regimes offers more to the average New Hampshire citizen who does not necessarily appreciate or correctly value the existence of healthy lotic ecosystems and the ecosystem services⁶⁷ they provide. As this section discusses, all of New Hampshire's citizens have an important economic interest in protecting the natural flow regimes of their streams because the economic prosperity of New Hampshire is inextricably intertwined and dependent on the maintenance of natural instream flows.

New Hampshire's economy is heavily dependent on revenue from tourism and travelers, which consists of roughly 8 percent of its gross state product.⁶⁸ Fishing, boating, and swimming, all flow dependent

62. *Id.* at 35.

63. *Id.*

64. Piotr Parasiewicz, *Habitat Time Series Analysis to Define Flow Augmentation Strategy for the Quinebaug River, Connecticut and Massachusetts, USA*, RIVER RESEARCH AND APPLICATIONS 24: 439-452 (2008) [hereinafter Parasiewicz, *Habitat Time*] available at http://www.neihp.org/Documents/mesohabsim/Parasiewicz_2008_HabitatTimeSeriesAnalysis.pdf (last visited Jan. 30, 2009) (noting that an organism's bioperiod is the organism's critical intra-annual seasons with specific biological functions, such as spawning or rearing and growth).

65. See POSTEL & RICHTER, *supra* note 20, at 3-5, 20-26, 35-36, 67-74.

66. *See id.* at 7-13.

67. *Id.* at 8.

68. ANNE NORDSTROM, THE NEW HAMPSHIRE LAKES, RIVERS, STREAMS AND PONDS PARTNERSHIP, THE ECONOMIC IMPACT OF POTENTIAL DECLINE IN NEW HAMPSHIRE WATER QUALITY: THE LINK BETWEEN VISITOR PERCEPTIONS, USAGE AND SPENDING 21 (2007), <http://www.nhlakes.org/docs/Surface-Waters-PhaseIV-Final-Report.pdf>.

activities, significantly contribute to New Hampshire's tourism industry, generating "\$379 million in total annual sales, or roughly 26 percent of all summer tourism spending; about \$134 million in household income; and about 6,000 full-time and part-time jobs."⁶⁹ Visitors who come to New Hampshire to fish, boat, or swim, alone represent about 14.9 million visitor days.⁷⁰

The summer visitors who come to New Hampshire to boat, fish, or swim are sensitive to changes in its rivers' flow regimes.⁷¹ Forty-three percent of visitors would decrease their visits if they perceived that flows became less than adequate for fishing, boating, or swimming.⁷² Increasing water demands from growing urban populations and the shrinking contribution of base flow in regions experiencing increased development may lead to inadequate flows for fishing, boating, and swimming in low flow summer months if the implementation of protective measures does not occur. The fishermen, boaters, and swimmers who would leave the state due to inadequate flows, alone would lead to a loss of more than one million annual visitor days of the total 14.9 million visitor days by fishermen, boaters, and swimmers, and out of 51.4 million total visitor days in New Hampshire.⁷³ The economic loss from the 43 percent of anglers, boaters, and swimmers who would decrease their visits if they perceived less than adequate flows roughly equates to a \$29 million loss in total sales, a \$10 million loss in household income, and 460 lost jobs.⁷⁴

Additionally, overcrowding, declines in water clarity and purity, and declines in natural views and scenery, all of which can depend on sufficient seasonal flows,⁷⁵ would have additional devastating impacts on New Hampshire's economy.⁷⁶ If water clarity and purity worsened, 69 percent of visitors would decrease their visitor days, resulting in roughly a \$50 million loss in total sales, an \$18 million loss in household income, and 811 lost jobs.⁷⁷ If the natural views and scenery that rivers provide worsened, 56 percent of visitors would decrease their visitor days, resulting in roughly a \$27.6 million loss in total sales, a \$9.8 million loss in household income, and 440 lost jobs.⁷⁸ If river crowding worsened, 46 percent of visitors would decrease their visitor days, resulting in roughly a \$19 million loss in total sales, \$6.7 million

69. *Id.*

70. *Id.*

71. *Id.* at 26, 28, 30, 37.

72. *Id.* at 5.

73. *Id.* at 10, 37.

74. *Id.* at 37-38.

75. *See supra* Part I.

76. NORDSTROM, *supra* note 68, at 6-7, 9-11, 28-29, 37-38.

77. *Id.* at 28-29.

78. *Id.* at 46-47.

loss in household income, and 305 lost jobs.⁷⁹ Thus, New Hampshire's heavy economic dependence on sufficient natural flows to protect its fisheries, physical and chemical characteristics of its swimming holes, and boating opportunities, makes it clear that the protection of natural flow regimes of New Hampshire's rivers has economic implications for all the state's residents.⁸⁰

III. ANTHROPOGENIC THREATS TO THE NATURAL FLOWS REGIMES OF NEW HAMPSHIRE'S RIVERS AND STREAMS

A. ANTHROPOGENIC IMPACTS THAT THREATEN NATURAL FLOW REGIMES

The establishment of protected flow regimes is critical to protect a river's ecological integrity⁸¹ from an onslaught of anthropogenic threats to flows.⁸² Protected flow regimes are a necessary safeguard to the social,⁸³ environmental,⁸⁴ and economic⁸⁵ benefits derived from an ecologically sound river system. Anthropogenic impacts that threaten natural flow regimes can occur instream, or as water migrates to rivers via ground or surface channels in the river's watershed.⁸⁶ Significant impacts to natural instream flows include water diversions, dams, levees, and impervious surfaces and stormwater infrastructure that accompany urban development.⁸⁷ Diversions for agriculture, domestic, or industrial uses that increase in intensity with population growth and urban and rural development, and that reduce flows by removing water from streams, are especially severe threats to instream flows.⁸⁸ Diversions are especially threatening because if excessive, especially during low flows or droughts, they have the potential to cause species extinction through dewatering streams or to create severe low flow conditions that shrink available habitat, create more competition for food, and decrease water quality.⁸⁹ Dams that alter the timing and quantity of flows retain nutrients and habitat forming sediments behind their

79. *Id.* at 55-56.

80. *See id.* at 10, 28-29, 46-47, 55-56.

81. *See id.*; *see supra* Part I.

82. *See* POSTEL & RICHTER, *supra* note 20, at 13-17.

83. *See* N.H. REV. STAT. ANN. § 483:1 (2008) ("New Hampshire's rivers and streams comprise one of its most important natural resources, historically vital to New Hampshire's commerce, industry, tourism, and the quality of life of New Hampshire people."); POSTEL & RICHTER, *supra* note 20, at 7-13.

84. *See* POSTEL & RICHTER, *supra* note 20, at 7-13.

85. *See* N.H. REV. STAT. ANN. § 483:1 (2008) ("New Hampshire's rivers and streams comprise one of its most important natural resources, historically vital to New Hampshire's commerce, industry, tourism, and the quality of life of New Hampshire people."); *supra* Part II.

86. POSTEL & RICHTER, *supra* note 20, at 14-15.

87. *Id.* at 13-17.

88. *Id.*

89. *Id.*

walls, can decrease flows to dangerously low levels, may alter natural flow regimes to which a river's organisms have adapted, can block fish migration crucial for feeding and reproduction, increase water temperatures downstream, decrease downstream water quality, and, as a result, often devastate the ecological integrity of rivers and streams.⁹⁰ Other instream variables that can drastically alter natural flow regimes include consumptive, invasive water-guzzling riparian vegetation that consumes flows and the removal of vegetative canopies shading streams that keep their water cool and minimize instream evaporation rates.⁹¹

In addition to instream anthropogenic impacts, the urbanization of previously vegetated and undeveloped watersheds with impervious surfaces and stormwater networks that do not infiltrate stormwater can impact a river's natural flow regime by disrupting the timing, duration, and magnitude of flows from surface water runoff and groundwater baseflow.⁹² Impervious surfaces are mainly created by soil compacting activities such as construction, and by paving over large areas to build roads, parking lots, houses, and commercial or industrial facilities.⁹³ Deforestation also can harden top soil, reduce soil infiltration capacity, and remove roots that suck water into the ground.⁹⁴ Precipitation that falls on impervious surfaces without being infiltrated onsite, and that is directed into a stormwater drainage systems composed of curbs, gutters, storm drains and channels without groundwater infiltration components, does not infiltrate into the ground and gradually and sustainably feed rivers and streams as a sustained source of baseflow.⁹⁵ Instead, it is efficiently swept and channeled into streams, and thus causes flashy flows.⁹⁶ A river victimized by flashy flows experiences flows that rapidly rise to higher than natural levels during the precipitation event and then rescind to lower than natural levels, often for prolonged periods, once the precipitation event has terminated.⁹⁷

When watersheds become urbanized to a point where impervious cover exceeds 10 percent of drainage, the increase in the flashiness of flows and deviation from a river's natural flow regime, can devastate a stream's ecological integrity.⁹⁸ Aside from reducing the sustainable

90. *Id.*

91. *See id.* at 13, 14-15.

92. CTR. FOR WATERSHED PROTECTION, IMPACTS OF IMPERVIOUS COVER ON AQUATIC SYSTEMS 25-26 (2003), *available at* <http://www.mckenziewaterquality.org/documents/ImpactsofImperviousCover-CWPreport.pdf> (last visited Mar. 12, 2009).

93. *Id.* at 25, 27.

94. *Id.*

95. *Id.* at 34.

96. *Id.* at 91.

97. *See id.*

98. *See id.* at 6, 33, 34. The compilations of findings from over 225 research studies exploring the impact of impervious cover and other indicators of urbanization on aquatic systems conclude "that most water quality indicators decline when watershed

supply of baseflow needed for instream species' survival during dry seasons, the powerful, high magnitude, short-lived flashy flows also degrade river channel habitat.⁹⁹ Flashy flows widen stream channels through bank erosion, degrade water quality by carrying high concentrations of pollutants, and flush fine sediments into streambeds, which then clog cobble and gravel habitat for aquatic organisms.¹⁰⁰ Additionally, the lack of buffer zones surrounding river banks that provide at least 100 feet of vegetative cover accentuate the flashiness and excessive stream pollution that impervious surfaces cause when they are located close to or abutting streams. This is because vegetative buffer zones provide opportunity for groundwater recharge and filtration of physical and chemical contaminants.¹⁰¹

Aside from impervious surfaces and stormwater runoff systems creating lower than natural low flows and eliminating sustained high flows, excessive groundwater pumping can also reduce stream flows to exceedingly lower than natural levels by consistently removing water baseflow that would otherwise make its way into the stream.¹⁰² Climate change should also be considered as a force that impacts sources of flow. As human-induced global warming alters precipitation patterns, rivers may experience more frequent and permanent changes in their normal flow regimes and extreme flow events.¹⁰³

B. THE ANTHROPOGENIC IMPACTS THREATENING THE FLOW REGIMES OF NEW HAMPSHIRE'S RIVERS AND STREAMS

As the preceding sections set forth, protecting the natural flow regimes of New Hampshire's rivers and streams from anthropogenic impacts is vital to preserving their ecological integrity. Protecting natural flow regimes not only protects and enhances fish and wildlife, and benefits New Hampshire's citizens that value streams for their existence, aesthetics, or spiritual gifts, it is also vital to protecting New Hampshire's economic interests. Thus, aside from ecological reasons, New Hampshire's citizens have strong economic incentives to protect the natural flow regimes of their rivers from anthropogenic impacts.

Numerous anthropogenic impacts threaten the natural flow regimes of New Hampshire's streams. Amongst the most concerning are the increased water supply demands and the increased amounts of im-

impervious cover exceeds 10%, with severe degradation expected beyond 25% impervious cover." LAKES MGMT. ADVISORY COMM., *supra* note 2 at 2.

99. CTR. FOR WATERSHED PROTECTION, *supra* note 94, at 42; N. AM. LAKE MGMT. SOC'Y, 2 FUNDAMENTALS OF URBAN RUNOFF MGMT.: TECHNICAL AND INSTITUTIONAL ISSUES 1, 233 (2007).

100. *Id.*

101. CTR. FOR WATERSHED PROTECTION, *supra* note 94, at 12.

102. POSTEL & RICHTER, *supra* note 20, at 93.

103. *Id.* at 15.

pervious surfaces resulting from rapid population growth and urban development. From 1970 to 2006, New Hampshire's population exploded from 737,681 to 1,314,895 citizens.¹⁰⁴ Compared to New Hampshire's 78.2 percent population growth over this period, the United States population only grew 47.3 percent, from 203,211,926 to 299,398,484 people.¹⁰⁵ To put New Hampshire's population growth in a regional perspective, from 1990 to 2004, New Hampshire's population grew 17.2 percent, twice the rate of the rest of New England.¹⁰⁶ Further, between 2000 and 2025, forecasted population growth is more than 28 percent, with 80 percent of that growth occurring in four southeastern counties, which comprise roughly 33 percent of New Hampshire's land area.¹⁰⁷

Not surprisingly, aside from an increase in population, New Hampshire is also experiencing an increase in development and deforestation in its watersheds. From 1980 to 1998, 110,000 single-family homes were built, and the state's housing units grew by 55 percent.¹⁰⁸ New Hampshire's population and housing growth rates mirror its staggering deforestation rate from development and economic activities. New Hampshire is losing about 17,500 acres of forest each year.¹⁰⁹ While New Hampshire's population growth, urban development, and deforested land continue to increase, the amount of conserved land protecting watersheds from development is seemingly insufficient to protect the flow regimes of New Hampshire's rivers, especially given the rapid urban development occurring in the southern part of the state. While 27.7 percent of New Hampshire's watersheds are protected as conserved land, up from 22.3 percent in 1998, 75 percent of all conserved land is in the northern half of the state, far away from the watersheds in the southern part of the state, which some experts forecast will experience 80 percent of the State's population growth by 2025.¹¹⁰ Additionally, roughly half, or 110, of New Hampshire towns still have con-

104. U.S. Census Bureau, <http://quickfacts.census.gov/qfd/states/33000.html> (last visited Feb. 16, 2009); U.S. Census Bureau, <http://www.census.gov/population/cencounts/nh190090.txt> (last visited Feb. 16, 2009).

105. *Id.*

106. SOC'Y FOR THE PROT. OF N.H.'S FORESTS, N.H.'S CHANGING LANDSCAPE I (2005) [hereinafter SOC'Y PROT. N.H. 2005], *available at* <http://www.spnhf.org/research/papers/nhcl2005es.pdf>; LAKES MGMT. ADVISORY COMM., *supra* note 3, at 2.

107. SOC'Y PROT. N.H. 2005, *supra* note 106, at 1.

108. SOC'Y FOR THE PROT. OF N.H.'S FORESTS, NEW HAMPSHIRE'S CHANGING LANDSCAPE: POPULATION GROWTH, LAND USE CONVERSION, AND RESOURCES FRAGMENTATION IN THE GRANITE STATE 2 (1999), *available at* <http://www.spnhf.org/research/papers/NHCLsummary.pdf>.

109. SOC'Y PROT. N.H. 2005, *supra* note 106, at 5; LAKES MGMT. ADVISORY COMM., *supra* note 3, at 2.

110. SOC'Y PROT. N.H. 2005, *supra* note 106, at 1, 11.

served less than 10% of their land.¹¹¹ In 2025, seventy-two of New Hampshire's towns will be classified as rural, down from 139 towns classified as such in 1970.¹¹² Further, only 11.6 percent of the most critical lands around public water supply wells and aquifers have protections in place, which could mean that municipalities may look to rivers for domestic water supply.¹¹³

New Hampshire's increased population growth and urban development, which has increased impervious surfaces, soil-compacting construction, stormwater drainage systems, the deforestation of watersheds, and water demands, has had an apparent effect on the flow regimes of New Hampshire's rivers and streams.¹¹⁴ In January of 2008, the New Hampshire's Rivers Management Advisory Committee noted, "[a]lthough New Hampshire is typically thought of as a water-rich state, it is currently experiencing extensive demand for water as its population and economy expand."¹¹⁵ "Sixty percent of New Hampshire's residents depend on groundwater for their drinking water supplies," and flows have dropped in some New Hampshire streams due to overmining of groundwater supplies that fail to make their way into streams as baseflow.¹¹⁶ In 2003, there were 492 registered water diverters¹¹⁷ on fourteen Designated Rivers (containing seventeen designated segments) under the RMPP.¹¹⁸ In this same year, water use exceeded the General Standard criteria¹¹⁹ in eleven Designated River segments nine times in July, five times in August and September, two times in January,

111. *Id.* at 12.

112. *Id.* at 2.

113. *Id.* at 9.

114. In 2008, the Lakes Management and Rivers Management Committees acknowledged that "[c]urrent and historical data and trends indicate that water quality and quantity is changing and poorly designed and executed landscape change is the primary cause. More stormwater runoff and increasing amounts of impervious surface are negatively affecting New Hampshire's surface waters." LAKES MGMT. ADVISORY COMM., *supra* note 3, at 8.

115. *Id.* at 9.

116. *Id.*

117. All ground and surface water withdrawers that withdraw "a cumulative amount of more than 20,000 gallons of water per day, averaged over any 7-day period, or more than 600,000 gallons of water over any 30-day period, at a single real property or place of business" must be registered. N.H. REV. STAT. ANN. §§ 488:2-488:3 (2008).

118. N.H. DEPT. ENVTL. SERVS., 2003 ANNUAL REPORT OF WATER USE VERSUS STREAM FLOW ON DESIGNATED RIVERS 10-11 (2005), *available at* <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/documents/entire2003report.pdf>.

119. *Id.* at 11. "The General Standard is an assessment and illustration tool to compare basins of different sizes using normalizing criteria. It is not considered to be a protected flow for the river. Lack of compliance with the General Standard is not a violation. Monthly stream flow and water use used in these assessments may not illustrate acute impacts occurring for shorter durations. Because of the averaging affect of assessing water use and stream flows with monthly values, conditions resulting from shorter duration low flows or high intensity water use may not be observable."

February, and November, and one time for all other months when flows are generally higher.¹²⁰

The increase in water demand that removes water from streams and the reduction in baseflow contributions needed to maintain sufficient flows from urban development and deforestation have threatened and continue to threaten to further extenuate the pressures on the natural flow regimes of New Hampshire's rivers.¹²¹ Additionally, droughts and possible changes in precipitation patterns induced by climate change will only magnify the ill effects of population growth and urban expansion on the natural flow regime of New Hampshire's rivers.¹²² Heading into 2009, industry, municipalities, bottled water companies, golf courses, farmers, ski resorts, and domestic users continue to utilize New Hampshire's surface and ground waters at increasing rates to satisfy economic and domestic needs.¹²³ This increased use of New Hampshire's finite water resources threatens the ecological integrity of New Hampshire's watercourses, its fisheries, and the vitality of its economy. As the ensuing sections demonstrate, the protections that New Hampshire's common law and statutes provide inadequately protect the flows necessary to sustain the aquatic and fish life in its streams from anthropogenic threats. Thus, there is a dire need for more effective and comprehensive instream flow legislation to adequately protect the natural flow regimes of New Hampshire's rivers and streams.

IV. WHY INSTREAM FLOW REGULATIONS ARE NEEDED ON TOP OF NEW HAMPSHIRE'S COMMON LAW AND STATUTES TO PROTECT THE NATURAL FLOW REGIMES OF ITS RIVERS AND STREAMS

The maintenance of natural flow regimes is critical to protect the ecological integrity of New Hampshire's streams, its fish and wildlife, its river-based recreation, and its economy. Population growth and development have extenuated a multitude of anthropogenic impacts, threatening the natural flow regime of New Hampshire's rivers. While common law and various statutes provide some flow protections, adequate protection of the flow regimes of New Hampshire's rivers and streams require sufficient instream flow regulations.

120. *Id.*

121. LAKES MGMT. ADVISORY COMM., *supra* note 3 at 8-10.

122. *Id.*

123. N.H. DEPT. OF ENVTL. SERVS., ENVIRONMENTAL FACT SHEET – WATER USE REGISTRATION AND REPORTING IN NEW HAMPSHIRE 1 (2007), *available at* <http://des.nh.gov/organization/commissioner/pip/factsheets/geo/documents/geo-4.pdf>.

A. THE INTERPLAY BETWEEN RIPARIAN RIGHTS AND THE PUBLIC TRUST DOCTRINE

As discussed below, New Hampshire's common law doctrine of riparian water rights fails to protect natural flow regimes, while its common law public trust doctrine provides the complimentary overriding legal foundation to protect natural flow regimes. Historically, the riparian common law doctrine has been the legal doctrine applied by the courts to determine the allocation of private instream surface water rights, diffuse surface water rights, and groundwater rights in New Hampshire.¹²⁴ Riparian rights are usufructuary rights, and thus a riparian does not possess ownership rights in the water itself, but has a property right in the use of the water.¹²⁵ Landowners whose parcels are contiguous to or abut watercourses obtain riparian rights to use water resources.¹²⁶ New Hampshire defines watercourses as "water flowing in a definite direction or course in a bed with banks . . . [with] a substantial degree of continuity or permanence."¹²⁷ Thus, aside from perennial streams, intermittent streams that run dry annually during summer months, diffuse surface water, and groundwater can carry riparian rights if they have a "well-defined existence with a flow that is frequent and regular" during some times of the year.¹²⁸ While riparians possess usufructuary rights by the nature of their land in relation to water sources, their usufructuary rights to surface waters, diffuse water sources, and groundwater are not protective of natural flow regimes because, as described below, the only limitation to their usufructuary rights is a reasonable use requirement.

1. Riparian Rights and Surface Waters

Under New Hampshire common law, all riparians have a right to beneficially use water from a river or stream that passes through or that runs adjacent to their land.¹²⁹ Under the traditional riparian rights doctrine, a riparian "may divert water from its channel for any lawful use, so long as he returns it to the channel above the land of the next downstream riparian owner in substantially the same condition as when it reached the upstream riparian owner's land."¹³⁰ To satisfy the requirement that all riparians beneficially use water to maintain their riparian right, the riparian's water use must be reasonable, and thus

124. Alexander J. Kalinski & Robert H. Forste, *A Survey of New Hampshire Water Law*, 13 N.H.B.J. 3, 4-5 (1970).

125. *Id.*

126. JOSEPH L. SAX, ET AL., *LEGAL CONTROL OF WATER RESOURCES* 21 (3d ed. 1991).

127. Kalinski, *supra* note 135, at 3, 5.

128. *Id.*

129. *Wisniewski v. Gemmill*, 465 A.2d 875, 877 (N.H. 1983) (citing *Poire v. Serra*, 106 A.2d 391, 392 (N.H. 1954)).

130. *Id.* (citing *Roberts v. Claremont Ry. & Light Co.*, 66 A. 485, 485 (N.H. 1907)).

the quality and quantity of water the riparian may take and return from a stream depends on a court's determination of reasonable use.¹³¹

While the reasonable use requirement protects riparians from other riparians' unreasonable use, it has not evolved to adequately value the flows necessary to protect the ecological integrity of streams.¹³² Because judicial determinations define the concept of reasonable water use, it changes with time according to society's values and needs. The Restatement (Second) of Torts states the reasonableness of a use depends on considerations of the interests of the riparian putting the water to use, the interests of a harmed riparian, and society's interest.¹³³ The Restatement sets out the following factors that courts use to determine reasonableness:

[t]he purpose of the use; the suitability of the use to the watershed or lake; the economic value of the use; the social value of the use; the extent and amount of harm it causes; the practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other; the practicality of adjusting the quantity of water used by each proprietor, the protection of existing values of water uses, land, investments, and enterprises; and the justice of requiring the user causing harm to bear the loss.¹³⁴

Absent compelling public interests, riparians can pollute waters or withdraw quantities of water that are damaging to a water body's ecological integrity if their water use is reasonable in accordance with the court's reasonableness balancing test.¹³⁵ Further, when rivers do not have scientifically credible data that details their natural flow regimes, courts are not able to gauge how much flow is necessary to protect a stream's ecological integrity. The court's inability to make such a determination in the absence of historical undisturbed baseline natural flow regime data allows riparian water users to have adverse impacts a stream's ecology.

Allowance of off-tract uses exemplifies how the riparian rights doctrine inadequately protects a stream's natural flow regime. The ripar-

131. *Wisniewski*, 465 A.2d at 877; *See also* *Taggart v. Town of Jaffrey*, 76 A. 123, 125 (N.H. 1910) (holding that riparians have "[a] right to the natural flow of the brook, not unreasonably diminished or polluted."); *Gillis v. Chase*, 67 N.H. 161, 162 (N.H. 1891) (holding "it is only for an unreasonable and unauthorized diversion that the law will imply damage to him, because each riparian proprietor ha[s] the right to a just and reasonable use of the water as it passes through and along his land . . . [a]nd as the reasonableness of the use is, to a considerable extent, a question of degree, and largely dependent on the circumstances of each case.")

132. *See generally* SAX ET AL., *supra* note 137, at 45.

133. RESTATEMENT (SECOND) OF TORTS: REASONABLENESS OF THE USE OF WATER § 850A (1979).

134. *Id.*

135. *See id.*

ian doctrine allows off-tract uses when a court considers it reasonable and the off-tract use does not harm other riparians.¹³⁶ Off-tract uses include bulk water transfers, which allow a non-riparian, with the permission of a riparian, to pull tanker trucks up to a water body and pump out water for purposes such as filling swimming pools, hydroseeding, spraying for dust control, roadbed compaction, construction, and other economic activities.¹³⁷ Thus, bulk water transfers exemplify how the riparian rights doctrine governing surface waters is problematic, especially in times of low flow conditions, because it fails to protect instream flows from non-riparian water users.

2. Riparian Rights and Diffuse Surface Waters

New Hampshire's riparian rights doctrine also allows for the reasonable use of diffuse surface waters, which are uncollected waters flowing on the surface of the land from falling rain, melting snow, and rising from springs.¹³⁸ The reasonableness standard courts use to determine if a riparian permissibly utilizes diffuse surface water is the same reasonableness standard that is applied to use of surface waters.¹³⁹ Thus, a land owner may obstruct or divert diffuse surface waters for appropriations that are necessary for reasonable use of his or her land.¹⁴⁰

3. Riparian Rights and Groundwater Withdrawals

In addition to governing surface and diffuse surface waters, New Hampshire's riparian doctrine, with a prohibition against unreasonable use, governs the use of groundwater that flows in a known course or direction or from natural springs.¹⁴¹ However, New Hampshire common law regards percolating water that moves through the ground

136. *Gillis*, 67 N.H. at 162 (holding that it is a question of fact as to whether the selling of water for an off-tract use or for a riparian landowner's own purposes is considered reasonable).

137. See N.H. DEPT. OF ENVTL. SERVS., ENVIRONMENTAL FACT SHEET – WATER WITHDRAWALS FROM SURFACE WATERS FOR BULK TRANSPORT AND DELIVERY 1 (2008), available at <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-1-17.pdf>.

138. See Alexander J. Kalinski & Robert H. Forste, *A Survey of New Hampshire Water Law*, 13 N.H.B.J. 3, 14 (1970); See also *Swett v. Cutts*, 50 N.H. 439, 446 (1870).

139. *Swett*, 50 N.H. at 446.

140. *Id.* at 446, 448.

141. See *Bassett v. Salisbury Mfg. Co.*, 43 N.H. 569, 573-578 (1862) (treating groundwater from natural springs and water naturally draining underground in a known direction as subject to the riparian reasonable use doctrine); *Jones v. Portsmouth Aqueduct*, 62 N.H. 488, 490 (1883) (subjecting the excavation of land to collect water from underground springs for domestic uses to a reasonable use test when weighed against another riparian's use of the springs that fed into a brook to feed cattle).

and that cannot be proven to flow in a definite course “as being part of the land in which it is found.”¹⁴² Because the overlying land owner has an absolute right to use percolating ground water, regardless of the effect on other landowners, the riparian rights doctrine does not protect groundwater resources that do connect to surface water unless studies prove a hydrological connection.¹⁴³ This distinction between percolating waters and flowing ground water defies the basic hydrological principle that all water within a watershed that overlies an impervious aquifer eventually flows into the watershed’s streams as base-flow. Thus, groundwater contributions to natural flow regimes under New Hampshire common law are not only vulnerable to the riparian reasonable use doctrine’s ability to protect flows, but are also vulnerable to landowners’ absolute right to withdraw percolating groundwater.

4. The Public Trust Doctrine

In light of the failings of the riparian rights system to protect natural flow regimes, the public trust doctrine provides a legal foundation to protect instream flows from riparian surface and groundwater users. Under the public trust doctrine, New Hampshire holds title to public waters, in trust for the benefit of the public, in the beds of water bodies that are navigable in fact, tidal waters, and all natural water bodies of ten acres or more up to the natural mean high water level.¹⁴⁴ New Hampshire’s common law defines “navigable streams” or “navigable waters,” as does New Hampshire’s statutes, as bodies of water that:

are used, or are susceptible of being used in their ordinary condition, as highways for commerce, over which trade or travel is or may be conducted in the present customary modes of trade or travel on water, and such term shall not apply to streams or waters which are used merely as public highways for floating logs.¹⁴⁵

In addition, New Hampshire has historically defined navigable waters as waters that are susceptible “of use as a common highway for the public.”¹⁴⁶ Thus, the state holds any river in which one can float a kayak or canoe under ordinary conditions for a portion of the year in trust for the benefit of the public, because kayaking and canoeing are

142. Kalinski, *supra* note 135, at 19-20.

143. *Id.*

144. *St. Regis Paper Co. v. N.H. Water Res. Board*, 26 A.2d 832, 838 (N.H. 1942); *Concord Mfg. Co. v. Robertson*, 25 A. 718, 720, 730-31 (N.H. 1890).

145. N.H. REV. STAT. ANN. § 271:9 (2008). See *Concord Mfg. Co. v. Robertson*, 25 A. 718, 720, 731 (N.H. 1890).

146. *State v. Gilmanton*, 14 N.H. 467, 479 (1843).

customary modes of travel within the statutory definition of navigability.¹⁴⁷

New Hampshire protects waters held in trust for the use and benefit of the public by mandating that these waters serve public purposes. That is, under the public trust doctrine, New Hampshire protects public purposes such as water quality and public health, water storage, navigation, travel, swimming, bathing, fishing, skating, fowling, cutting ice, and aesthetics.¹⁴⁸ Because adequate flows are necessary to protect these public purposes, the public trust doctrine can help to protect natural flow regimes and, by extension, both groundwater and surface water contributions to those flow regimes.¹⁴⁹ The public trust doctrine protects against alienation of waters held for public trust purposes, unless the legislature conveys those waters in furtherance of public trust purposes or riparians reasonably use such waters or littorals below the natural mean water line without impacting public trust related resources.¹⁵⁰

The public trust doctrine can restrain a riparian's beneficial use of surface water and groundwater either through legislation or via litigation that seeks common law injunctions or remedial remedies to protect public trust resources. In a litigation context, the protection of public trust resources should trump a riparian's right to use water. The courts have consistently held that while riparian water users "adjacent to lands held in public trust have common law rights which are 'more extensive than those of the public generally,'" riparian water users can reasonably use public trust waters subject only to the paramount right of the state to reasonably protect those waters for public trust purposes.¹⁵¹ However, in a litigation context, the public trust doctrine really only can serve to protect the ecological integrity of streams after the harm to their ecology has occurred, and it only protects streams on a case-by-case analysis of the facts, which has a limited policy reach in terms of effecting a broad range of riparian behavior on a threatened stream. Further, legal action against a riparian to curb its water use may not hold much weight in the face of a judicially-

147. See N.H. REV. STAT. ANN. §§ 271:9, 210:11 (2008).

148. *Sundell v. Town of New London*, 409 A.2d 1315, 1319 (N.H. 1979); *State v. George C. Stafford & Sons*, 105 A.2d 569, 572 (N.H. 1954); *Hartford v. Gilmanton*, 146 A.2d 851, 853 (N.H. 1958); *State v. Sunapee Dam Co.*, 50 A. 108, 108 (N.H. 1900); *Concord Mfg. Co. v. Robertson*, 25 A. 718, 720-21 (N.H. 1890).

149. *Nat'l Audubon Soc'y v. Superior Ct.*, 658 P.2d 709, 719 (Cal. 1983), *cert. denied*, 464 U.S. 977 (1983); *Sibson v. State*, 336 A.2d 239, 242 (N.H. 1975); *Concord Mfg. Co. v. Robertson*, 25 A. 718, 718, 728, (N.H. 1890).

150. *Whitcher v. State*, 181 A. 549, 554 (N.H. 1935); *St. Regis Paper Co. v. N.H. Water Res. Board*, 26 A.2d 832, 837 (N.H. 1942); *Concord Mfg. Co. v. Robertson*, 25 A. 718, 728 (N.H. 1890).

151. *Opinion of the Justices*, 649 A.2d 604, 609 (N.H. 1994) (citing *Sundell v. Town of New London*, 409 A.2d 1315, 1317 (N.H. 1979)); *Sibson v. State*, 259 A.2d 397, 400 (N.H. 1969).

determined reasonable use of water without a sufficient determination of the instream flows needed to protect resources such as fisheries under the public trust.

While it is challenging to secure judicial remedies that adequately protect the ecological integrity of streams in litigation concerning the public trust doctrine, the doctrine does serve as an effective tool for enacting protective regulations. New Hampshire has codified its right to statutorily manage surface waters and groundwater for the benefit of present and future generations in the state's statutes in order to clarify its common law public trust protection of surface and ground water.¹⁵² The New Hampshire legislature can curtail riparian water use under the public trust doctrine without providing riparians with just compensation because riparian water users "are burdened with a servitude in favor of the State which comes into operation when the State properly exercises its power to control, regulate, and utilize" waters protected under the public trust.¹⁵³ Thus, under the public trust doctrine, the New Hampshire legislature can enact instream flow and groundwater legislation to protect the ecological integrity of New Hampshire's surface water resources without legally taking a property interest and without providing riparians with just compensation.¹⁵⁴

B. STATUTORY PROTECTION OF INSTREAM FLOWS ABSENT INSTREAM FLOW LEGISLATION

Adequate instream flow legislation is necessary to protect the natural flow regimes of New Hampshire's rivers because not only is the common law insufficient to protect flows, but so also is New Hampshire's statutory framework. First and foremost, absent instream flow legislation, New Hampshire does not have regulations that limit a riparian landowner's withdrawals so as to protect the flows of New Hampshire's rivers and streams. In addition, there are no state-wide policies limiting the percentage of impervious surfaces in developments to less than 10 percent or mandating the infiltration of stormwa-

152. N.H. REV. STAT. ANN. §481:1 (2008) (entitled State Dams, Reservoirs, and Other Water Conservation Projects; stating in part: "The general court declares and determines that the water of New Hampshire whether located above or below ground constitutes a limited and, therefore, precious and invaluable public resource which should be protected, conserved and managed in the interest of present and future generations. The state as trustee of this resource for the public benefit declares that it has the authority and responsibility to provide careful stewardship over all the waters lying within its boundaries. The maximum public benefit shall be sought, including the assurance of health and safety, the enhancement of ecological and aesthetic values, and the overall economic, recreational and social well-being of the people of the state").

153. Opinion of the Justices, 649 A.2d 604, 609 (N.H. 1994) (citing *Sibson v. State*, 259 A.2d 397, 400 (N.H. 1969)).

154. *Id.*

ter flows from these impervious watersheds. Thus, there is no regulation to prevent the reductions in sustainable baseflow contributions to streams that impervious surfaces cause by sweeping precipitation directly into streams and preventing precipitation from percolating into the ground.

Therefore, absent instream flow legislation, New Hampshire's only statutory tools to protect instream flows are groundwater regulations, and protective flow conditions in wetland dredge and fill permits and pollutant discharge permits. New Hampshire could place protective flow conditions on permit holders under the state water quality certification provisions of section 401 of the Clean Water Act ("CWA").¹⁵⁵ As discussed below, however, New Hampshire's natural flow regimes receive inadequate protections under its groundwater regulations, and through conditions in dredge and fill permits and pollutant discharge permits.

1. The Groundwater Protection Act

The Groundwater Protection Act,¹⁵⁶ and its accompanying agency regulations, recognizes the interconnectedness between groundwater and surface water, and attempts to protect surface water flows from groundwater pumping. As the Groundwater Protection Act regulations specify, all those who withdraw large volumes of groundwater - that is, at least 57,600 gallons over a twenty four hour period¹⁵⁷ - must obtain a minor or major large groundwater permit from the New Hampshire Department of Environmental Services ("NHDES").¹⁵⁸ The regulations governing issuance of large groundwater withdrawal per-

155. 33 U.S.C. § 1341 (2008).

156. N.H. REV. STAT. ANN. § 485-C, *et seq.* (2008).

157. N.H. REV. STAT. ANN. § 485-C:2 (IX-a) (2008) (stating that a "[l]arge groundwater withdrawal means any withdrawal from groundwater of 57,600 gallons or more of water in any 24-hour period at a single property or place of business"); N.H. CODE ADMIN. R. ANN. ENV-Ws 388.02(l), 387.02(k) (2009) (both stating that "[l]arge withdrawal means any year-round or seasonal withdrawal of groundwater from a wellhead installed after July 1998, not associated with a temporary short-term use such as contaminated site remediation or construction de-watering, and where the maximum 24-hour withdrawal is 57,600 gallons or more.").

158. N.H. CODE ADMIN. R. ANN. ENV-Ws 387.03(c) (2009) (requiring a minor groundwater withdrawal permit for all large withdrawals for which: "(1) The maximum 24-hour withdrawal is at least 57,600 gallons; (2) The maximum average-day withdrawal in a 30 day period is less than 144,000 gallons per day; (3) Available information indicates that the withdrawal does not result in adverse impacts as defined in Env-Ws 388 to water resources and other water users identified in Env-Ws 387.07"); N.H. CODE ADMIN. R. ANN. ENV-Ws 388.03 (2009) (requiring a major groundwater withdrawal permit for all large withdrawals when: (a) The maximum average day withdrawal in a 30 day period is 144,000 gallons per day or more; and (b) The maximum, 24-hour withdrawal is 57,600 gallons per day or more, but the maximum average day withdrawal in a 30 day period is less than 144,000 gallons per day and the department has denied, suspended, or revoked minor withdrawal designation under Env-Ws 387.").

mits aim to protect surface water resources from groundwater withdrawals.¹⁵⁹ If an “adverse impact” is likely to result from a large withdrawal, the applicant must either reduce the withdrawal or mitigate the adverse impact to obtain a permit.¹⁶⁰ The NHDES defines an “adverse impact” in part as a “[r]eduction in surface water levels or flows that will, or does cause a violation of surface water quality regulations set forth in Env-Ws 1700” and “[a] reduction of river flows below acceptable levels established pursuant to [the River Management and Protection Act].”¹⁶¹ Thus, the NHDES can refuse to issue groundwater withdrawal permits or condition their issuance on decreased groundwater pumping or other mitigation measures if pumping will adversely impact surface water flows.¹⁶² While the permits are valid for ten years, the NHDES can modify or revoke them.¹⁶³ Additional surface water protections include permit application requirements that mandate preparation of “a water conservation management plan and description of need to demonstrate the efficient use of, and need for, the proposed withdrawal.”¹⁶⁴

159. N.H. REV. STAT. ANN. § 485-C:21 (V-c(f), (h)(i)) (2008) (stating that “[i]n order to preserve the public trust, no large groundwater withdrawal shall cause an unmitigated impact as determined by . . . [r]educing surface water levels or flows that will, or do, cause a violation of surface water quality rules adopted by the department . . . [or] reducing river flows below acceptable levels established pursuant to RSA 483.”).

160. N.H. CODE ADMIN. R. ANN. ENV-Ws 388.04(c)(15) (2001) (“When an adverse impact as identified in Env-Ws 388.18 is anticipated to occur as a result of the withdrawal, the applicant or permittee shall complete the following: a. Reduce the proposed production volume of the withdrawal in accordance with Env-Ws 388.14(b) to a level where no adverse impacts are anticipated; or b. Design and implement mitigation measures in accordance with Env-Ws 388.21”); N.H. CODE ADMIN. R. ANN. ENV-Ws 387.19 (2009) (The requirements for minor large withdrawals for mitigating the adverse impact are: “(a) An adverse impact that results from a minor large withdrawal shall be managed in accordance with Env-Ws 388. (b) The department shall, when requested in writing, review hydrologic data and make a determination on the validity of a claim of adverse impact. (c) The permittee shall conduct impact mitigation for all large withdrawals where adverse impacts have been identified pursuant to Env-Ws 388. (d) Where an adverse impact occurs, the department shall revoke the minor large withdrawal designation in accordance with Env-Ws 387.15.”).

161. N.H. CODE ADMIN. R. ANN. ENV-Ws 388.18(c)(6), (9)(2008) (Adverse Impact Criteria) *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>; *id.* at ENV-Ws 388.23 (Procedure and Criteria to Issue, Deny, or Suspend a Major Withdrawal Permit); *id.* at ENV-Ws 387.12 (Procedures and Criteria to Approve, Deny, or Revoke a Minor Withdrawal Designation).

162. N.H. CODE ADMIN. R. ANN. ENV-Ws 388.04(c)(15) (2008), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>; *id.* at ENV-Ws 387.19.

163. N.H. CODE ADMIN. R. ANN. ENV-Ws 388.23 (Procedure and Criteria to Issue, Deny, or Suspend a Major Withdrawal Permit); *id.* at ENV-Ws 387.12 (2008) (Procedures and Criteria to Approve, Deny, or Revoke a Minor Withdrawal Designation), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>.

164. N.H. CODE ADMIN. R. ANN. ENV-Ws 387.05 (2008) (Conservation Management Plan and Description of Need) (2008) *available at*

Surface water flow protections in the Groundwater Protection Act are insufficient for three reasons. First, any withdrawal less than 57,600 gallons over a twenty-four hour period does not require notice to the local municipality, nor a large groundwater withdrawal permit.¹⁶⁵ Thus, the Act does not protect designated river flow regimes from withdrawals less than 57,600 gallons over a twenty-four hour period. This leaves the flow regimes of New Hampshire's rivers vulnerable to withdrawals less than 57,600 gallons per day that, in the aggregate within a watershed, can significantly deprive a river of its base flow. Second, only withdrawals greater than 144,000 gallons per day require major permits with more intensive hydrologic analysis and testing to determine withdrawal effects on surface waters.¹⁶⁶ Thus, new withdrawals between 57,600 and 144,000 gallons per day, in the aggregate, may have an adverse impact on a river's flow, but because the NHDES does not ascertain such impacts, permittees do not have to mitigate them. Finally, even if the Act could restrict all groundwater withdrawals, it is not sufficiently interconnected with other federal permit schemes to protect flow regimes, such as those limiting surface water withdrawals or imposing conditions in wetlands dredge and fill permits or in pollution discharge permits; in this way, it does not include enforcement and coordination mechanisms sufficient to protect flow regimes.

2. Water Quality Certifications in § 404 Dredge and Fill Permits and § 402 NPDES Permits

Aside from Groundwater Protection Act restrictions to protect surface water flows from groundwater withdrawals, the NHDES can also protect natural flow regimes using other regulatory tools;¹⁶⁷ that is, the NHDES can require federal wetland dredge and fill permits (CWA § 404)¹⁶⁸ and federal pollutant discharge permits (CWA § 402, National Pollution Discharge Elimination System ("NPDES") permits)¹⁶⁹ to in-

<http://des.nh.gov/organization/commissioner/legal/index.htm>; *Id.* at ENV-Ws 388.05 (Conservation Management Plan and Description of Need).

165. See N.H. REV. STAT. ANN. § 485-C:14-a (2008) (Notification of Large Groundwater Withdrawal Required); see also N.H. CODE ADMIN. R. ANN. ENV-Ws 387.03(d) (2008) (Minor Withdrawal Designation), available at

<http://des.nh.gov/organization/commissioner/legal/index.htm>.

166. N.H. CODE ADMIN. R. ANN. ENV-Ws 388.04, 388.06 (2008) (Requirements for Major Withdrawals; Conceptual Hydrologic Model of the Withdrawal), available at <http://des.nh.gov/organization/commissioner/legal/index.htm>.

167. Water Quality Certification Regulations, N.H. ADMIN. R. ANN., N.H. Dept. of Envtl. Serv., Env 451.02 (Applicability) (1995), Env 452.02 (Discharge) (1995), available at <http://des.nh.gov/organization/commissioner/legal/rules/index.htm>.

168. 33 U.S.C. § 1344 (2007).

169. 33 U.S.C. § 1342 (2007).

clude conditions to protect flows.¹⁷⁰ CWA § 401 requires that an applicant for a federal permit or license who proposes any activity that may result in discharge into navigable waters first receive a state water quality certification that the applicant's discharge complies with state water quality standards.¹⁷¹ Therefore, under CWA § 401, the NHDES can require conditions for § 404 permits,¹⁷² which regulate the discharge of dredge or fill materials into navigable waters, or § 402 permits,¹⁷³ which regulate point source discharge into navigable waters, to prevent the discharge from violating New Hampshire's surface water quality standards.¹⁷⁴ New Hampshire's surface water quality standards require a maintenance of water quality that both protects a surface water's designated classification¹⁷⁵ and its "chemical, physical, and biological integrity . . . for the propagation of fish, shellfish, wildlife and recreation."¹⁷⁶ Therefore, because Env-Ws 1703.01(d) recognizes water flows as a component of water quality and requires that the permittee maintain surface flows at "levels adequate to protect existing and designated uses," the NHDES can condition CWA § 404 and § 402 permits to protect flow regimes.¹⁷⁷

Flow conditions in CWA § 404(a)¹⁷⁸ dredge and fill permits under CWA § 401¹⁷⁹ water quality certifications apply to physical alternations of stream banks for water diversion because the alteration discharges

170. Water Quality Certification Regulations, N.H. ADMIN. R. ANN., N.H. Dept of Evtl. Serv., Env 451.02 (Applicability) (1995), Env 452.02 (Discharge) (1995), *available at* <http://des.nh.gov/organization/commissioner/legal/rules/index.htm>.

171. 33 U.S.C. § 1341 (2008).

172. *Id.*; 33 U.S.C. § 1344 (2008); N.H. CODE ADMIN. R. ANN. ENV-Ws 451.02 (Applicability) (1995) *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>.

173. 33 U.S.C. § 1342 (2008).

174. 33 U.S.C. § 1341 (2008); Water Quality Certification Regulations, N.H. CODE ADMIN. R. ANN. ENV-Ws 452.02 (Discharge) (1995), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>.

175. N.H. CODE ADMIN. R. ANN. ENV-WQ 1703.01(a) (2008) (dividing all state surface waters into Class A or B under RSA 485-A:8 and requiring that the class of surface waters identifies its most sensitive use in need of protection), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>. The DES determines whether a classification of A or B is best for the "interest of the public giving consideration to the health, industrial, economic, geographical and social factors involved"; N.H. REV. STAT. ANN. § 485-A:9 (2008) (Classification Procedure).

176. N.H. CODE ADMIN. R. ANN. ENV-WQ 1703.01(b), (c) (2008) (Water Use Classifications), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm> ("All surface waters shall be restored to meet the water quality criteria for their designated classification including existing and designated uses, and to maintain the chemical, physical, and biological integrity of surface waters.").

177. *Id.* at ENV-Ws 1703.01(d) (Protection of Water Quantity); 33 U.S.C. § 1341 (2008).

178. 33 U.S.C. § 1344 (2008).

179. 33 U.S.C. § 1341 (2008).

dredged sediment into the stream.¹⁸⁰ Since state water quality standards explicitly protect flows, the NHDES can use CWA § 401¹⁸¹ water quality certifications to refuse or condition dredge and fill permits to protect flows.¹⁸² While § 401 water quality certifications apply to new water users on all of New Hampshire's surface waters¹⁸³ who physically alter stream banks to divert water, they offer inadequate guarantees of instream flow protection to support a stream's ecological integrity.¹⁸⁴ For instance, if a new water user uses a pump and hose to withdraw water from streams, the user need not obtain a § 404(a) permit with conditions that are protective of natural flow regimes.¹⁸⁵ Further, diverters who dug diversion channels before they needed to obtain water quality certifications do not have permits with conditions that allow the NHDES to protect flows. Additionally, without statutory protection of scientifically determined instream flows needed to protect the ecological integrity of New Hampshire's rivers, the NHDES only can limit the withdrawals of § 404(a) permit holders using only the ABF method¹⁸⁶ or Draft November 2000 method¹⁸⁷ of flow protection. As discussed in Section iii below, the use of the ABF method or the Draft November 2000 method to protect instream flows are inadequate policy tools to protect the natural flow regimes, the ecological integrity, and the designated uses of New Hampshire's streams.

In addition to conditions included in CWA § 404(a)¹⁸⁸ dredge and fill permits to protect instream flows, the NHDES can protect flows from surface water withdrawers by using CWA § 401¹⁸⁹ water quality certifications to impose conditions in CWA § 402¹⁹⁰ National Pollution Discharge Elimination System (NPDES) permits regulating the discharge of pollutants into navigable surface waters.¹⁹¹ Water quality cer-

180. N.H. CODE ADMIN. R. ANN. ENV-Ws 451.02 (1995) (Applicability); *id.* at ENV-Ws 452.02 (Discharge) (1995), *available at* <http://des.nh.gov/organization/commissioner/legal/index.htm>.

181. 33 U.S.C. § 1341 (2008).

182. N.H. CODE ADMIN. R. ANN. ENV-Ws 453.01 (1995) (Certification Required); *id.* at ENV-Ws 451.02 (Applicability); N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits); *Id.* § 485-A:3 (Water Pollution and Waste Disposal Policies).

183. N.H. CODE ADMIN. R. ANN. ENV-Ws 451.02 (1995) (Applicability); *id.* at ENV-Ws 452.09 (“Surface waters of the state” means ‘surface waters of the state’ as defined in N.H. REV. STAT. ANN. § 485-A:2, XIV, namely ‘streams lakes, ponds, and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses, and other bodies of water, natural or artificial.’); N.H. REV. STAT. ANN. § 485-A:2 (XIV) (2008) (Surface Waters Defined).

184. *See* N.H. CODE ADMIN. R. ANN. ENV-Ws 451.02 (1995) (Applicability).

185. *See id.*

186. *See infra* Part IV.B.iii.

187. *See infra* Part IV.B.iii.

188. 33 U.S.C. § 1344 (2008).

189. 33 U.S.C. § 1341 (2008).

190. 33 U.S.C. § 1342 (2008).

191. N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits).

tifications protecting flows can apply to dischargers of pollutants who withdraw surface waters because a discharge of pollutants qualifies as a discharge that requires a CWA § 401 state water quality certification.¹⁹² Since state water quality standards explicitly protect flows, the NHDES can use CWA § 401¹⁹³ water quality certifications to condition CWA § 402 pollutant discharge permits to protect flows by curtailing withdrawals by water users who discharge pollutants into navigable waters.¹⁹⁴ Upon a finding of just cause to ensure flow water quality standards, the DES can also revise, modify, suspend, or terminate the CWA § 402 NPDES permits.¹⁹⁵ Additionally, the NHDES can condition discharge permits to limit diversions by requiring the same amount of flow to be returned to the stream that was withdrawn or by limiting consumptive diversions.¹⁹⁶

However, like the CWA § 404(a) dredge and fill permits, which can also contain conditions allowing the NHDES to limit withdrawals to protect flows, the conditions included in § 402 NPDES permits fail to effectively protect natural flow regimes. Section 402 NPDES permits fail to encompass water withdrawals that do not pollute or discharge into surface waters or that do not return withdrawals back into a surface waters.¹⁹⁷ Additionally, the NHDES's use of either the ABF method¹⁹⁸ or the Draft November 2000 method¹⁹⁹ to protect flows by limiting NPDES permit holder's withdrawals are inadequate to protect the natural flow regimes, ecological integrity, and designated uses of New Hampshire's streams.

3. The ABF and Draft November 2000 Method of Protecting Flows

NHDES's protection of flows via conditions in § 404(a) and § 402 permits are also inadequate because the ABF method²⁰⁰ and the Draft November 2000 method²⁰¹ fail to adequately protect the natural flow regimes of New Hampshire's rivers. Using its best professional judg-

192. 33 U.S.C. §§ 1341, 1362 (2008).

193. 33 U.S.C. § 1341 (2008).

194. See N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits); see also 33 U.S.C. §§ 1341-42 (2008).

195. N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits).

196. See N.H. CODE ADMIN. R. ANN. ENV-WQ 1703.01(d) (2008) (Water Use Classifications) (Protection of water quantity), available at <http://des.nh.gov/organization/commissioner/legal/index.htm>; see also N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits); see also 33 U.S.C. §§ 1341-42 (2008).

197. N.H. REV. STAT. ANN. § 485-A:13 (2008) (Water Discharge Permits); 33 U.S.C. § 1342 (2008).

198. See *infra* pp. 36-37 and note 201.

199. See *infra* pp. 37-38 and note 205.

200. See *infra* pp. 36-37 and note 201.

201. See *infra* pp. 37-38 and note 205.

ment, the NHDES can utilize either the ABF method, the Draft November 2000 method, or the Instream Flow Incremental Method ("IFIM") to protect flows via conditions that allow them to curtail water use in § 404(a) dredge and fill permits and § 402 NPDES permits.²⁰² Under the ABF method,²⁰³ the NHDES maintains flow above the median flow of the lowest flow month of the year for basins that are larger than fifty square miles.²⁰⁴ In smaller watersheds, ABF only requires minimum flows of 0.5 cubic feet per second.²⁰⁵ Thus, unlike the instream flow regulations that mimic natural flow regimes, flow protections under the ABF method do not preserve the natural varying seasonal flows and high flows that maintain the ecological integrity of streams.

An alternative to using the ABF method that is more protective of the high flows and seasonal varying flows of a stream, but can be less protective of low flows, is the NHDES draft November 14, 2000, instream flow rules.²⁰⁶ These rules protect streams from consumptive uses²⁰⁷ by curtailing these uses with increasing intensity as flow conditions drop below median monthly flows.²⁰⁸ Under this policy, the commissioner calculates the historic monthly median flow for a stream and uses it as a benchmark relative to current flow conditions to determine when withdrawal limitations on CWA § 404(a) or § 402

202. See VERNON LANG, U.S. FISH & WILDLIFE SERV., QUESTIONS AND ANSWERS ON THE NEW ENGLAND FLOW POLICY (1999), available at http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/documents/lang_policy.pdf; N.H. DEP'T OF ENVTL. SERVS., WORKING DRAFT RULES FOR THE PROTECTION OF INSTREAM FLOW IN DESIGNATED RIVERS, ENV-Ws 1900 (2000), available at <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/documents/11142kifr.pdf>. See also 33 U.S.C. §§ 1342, 1344(a).

203. LANG, *supra* note 202, at 1 (defining ABF as "a set of chemical, physical and biological conditions that represent limiting conditions for aquatic life and wildlife in stream environments. In hydrological terms, it means median August flows").

204. *Id.* at 4.

205. See *id.* at 2 (describing how the median August default compares to optimal flow). See also *id.* at A-2 ("The ABF criterion of 0.5 cfs and the spawning and incubation flow criteria of 1.0 and 4.0 cfs were derived from studies of 48 USGS gaging stations on basically unregulated rivers throughout New England. Each gaging station had a drainage area of at least 50 square miles, negligible effects from regulation, and a minimum of 25 years of good to excellent flow records. On the basis of 2,245 years of record, 0.5 cfs was determined to be the average median August monthly flow.").

206. See N.H. DEP'T OF ENVTL. SERVS., WORKING DRAFT RULES FOR THE PROTECTION OF INSTREAM FLOW IN DESIGNATED RIVERS (2000), available at <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/documents/11142kifr.pdf>.

207. *Id.* ENV-Ws 1903.01 (defining consumptive use as "the difference between the measured withdrawal flow and the measured return flow credited to the withdrawal, on an instantaneous basis").

208. See *id.* ENV-Ws 1901.02, 1905.03.

NPDES permit holders should be activated.²⁰⁹ Q60 is the assigned value when the median monthly flow is equal to or greater than the mean seasonal flow 60 percent of the day.²¹⁰ When flows fall below the Q60 value for four consecutive days, the regulations limit aggregate consumptive use 4 percent of the total flows for all CWA § 404(a) or § 402 NPDES permit holders.²¹¹ When flows fall below the Q80 value for four consecutive days, aggregate consumptive use is limited to 2% of the total flows for all CWA § 404(a) or § 402 NPDES permit holders.²¹² When flows fall below the Q90 value for four consecutive days, the regulations prohibit withdrawals by CWA § 404(a) or § 402 NPDES permit holders.²¹³ Thus, the November 14, 2000, method still permits withdrawals when a stream's flow reaches a point where the minimum flows are exceeded 80% of the time. During the summer months, allowing a withdrawal at Q80 can allow stream flow to drop significantly below the floor that the ABF method establishes. However, unlike the ABF method, the November 14, 2000, method protects flows according to the season of withdrawal, and thus is more protective of high flows.²¹⁴ Additionally, the November 14, 2000, method protects flows based on median seasonal flows, which are imprecise indicators of the varying flows that require protection to maintain the natural flow regimes vital to their organisms' survival and reproduction.²¹⁵

An alternative to the ABF method and the November 14, 2000 method exists in the Instream Flow Incremental Method ("IFIM"), which is available when the water user agrees to fund site-specific habitat and natural flow regime studies, similar to those conducted under the current instream flow regulations for designated rivers, to determine the instream flows necessary to protect the aquatic wildlife on a given river segment.²¹⁶ However, because the expenditures and time to complete instream flow studies for all rivers are burdensome absent specific instream flow legislation or funding from water withdrawers, it

209. See *id.* ENV-Ws 1905.02, 1905.03(a)-(d), (i), 1905.05. Note that the draft rules apply to all consumptive users, not just the permit holders mentioned.

210. *Id.* ENV-Ws 1907.03(a)(1).

211. *Id.* ENV-Ws 1905.03(b), 1905.05(a), 1907.03(a)(1). Note that the actual consumptive use limitation is the lesser of "(1) The user's proportion of the total normal withdrawal by all affected water users in the basin multiplied by 4% of the basin phase I trigger flow; or (2) Estimated phase I flow at the user's withdrawal point, less upstream withdrawals at the allowed rate, multiplied by 4%."

212. *Id.* ENV-Ws 1905.03(c), 1905.05(b), 1907.03(a)(2). Note that the actual consumptive use limitation is the lesser of "(1) The user's proportion of the total normal withdrawal by all affected water users in the basin multiplied by 2% of the basin phase II trigger flow; or (2) Estimated phase I flow at the user's withdrawal point, less upstream withdrawals at the allowed rate, multiplied by 2%."

213. *Id.* ENV-Ws 1905.03(d), 1905.05(c), 1907.03(a)(3).

214. *Id.* ENV-Ws 1905.5.

215. *Id.* ENV-Ws 1907.03(a) (Proposed Trigger Flows and Minimum Releases).

216. LANC, *supra* note 202, at 5.

is seemingly more probable that the NHDES would use the ABF method or its draft November 14, 2000, rules to protect instream flows, both of which fall short of protecting a stream's natural flow regime and ecological integrity. Even if the ABF method or the November 14, 2000, rules adequately protected instream flows, the inability of CWA § 401-conditioned § 402 and § 404 permits and the rest of New Hampshire's regulations to regulate all surface water and groundwater withdrawers within a watershed would render the ABF method and November 2000 rules ineffective in protecting the natural flow regimes of New Hampshire's rivers absent adequate and comprehensive instream flow regulations.

C. SUMMARY: THE INSUFFICIENCY OF NEW HAMPSHIRE'S COMMON LAW AND STATUTES TO PROTECT THE NATURAL FLOW REGIMES OF ITS RIVERS AND STREAMS ABSENT ADEQUATE INSTREAM FLOW REGULATIONS

As demonstrated in the preceding sections, New Hampshire needs regulations, in addition to common law and statutes, to adequately protect New Hampshire's natural flow regimes. Without studies that credibly establish instream flows necessary to protect natural flow regimes, the public trust doctrine, the Groundwater Protection Act, and conditions in CWA § 402 NPDES permits and § 404(a) dredge and fill permits cannot effectively curtail surface and groundwater withdrawals that disturb the natural flow regime. Even if flows that sufficiently mimic New Hampshire's rivers' natural flow regime, and thereby protect the ecological integrity of New Hampshire's rivers, are established, the inability of the Groundwater Protection Act, the CWA § 402 NPDES and § 404(a) permits to reach, control, and coordinate all water users that affect instream flows requires the promulgation of additional regulations to protect these flows.

V. NEW HAMPSHIRE'S INSTREAM FLOW REGULATION AND ITS THREE INADEQUACIES

A. NEW HAMPSHIRE'S INSTREAM FLOW REGULATION

New Hampshire's regulatory answer to sufficiently protect the flow regimes of its rivers and streams is its promulgation of instream flow legislation under the statutory authority of the Rivers Management and Protection Program ("RMPP").²¹⁷ Enacted in 2003, New Hampshire's pilot instream flow legislation, Env-Ws 1900 *et seq.*, specifies how protected instream flows shall be established and enforced for its designated rivers.²¹⁸ The pilot legislation applies to two of New Hampshire's

217. N.H. REV. STAT. ANN. § 483:1 (2008).

218. N.H. CODE ADMIN. R. ANN. ENV-Ws 1901.01 (2008).

fifteen rivers that the RMPP designated for protection, and sets procedures for the adoption and implementation of the instream flow regulations.²¹⁹ Under the instream flow legislation, after the regulations undergo a year long test run following the determination of protected flows and the regulation's implementation, the NHDES is charged with submitting a report²²⁰ to the state legislature to aid in its determination of whether to enact similar protected instream flow regulations for all of the rivers the RMPP designates for protection.²²¹ For purposes of analyzing the sufficiency of New Hampshire's instream flow regulations in protecting the ecological integrity of its surface waters, the assumption will be made that the pilot instream rules will apply to the remaining designated rivers under the RMPP, as currently promulgated under Env-Ws 1900.²²²

The instream flow legislation provides detailed procedures for the establishment of protected flows sufficient to safeguard the designated river's outstanding characteristics, the designated resources of the river, and its instream public uses.²²³ It requires the NHDES to conduct a protected instream flow study that identifies and catalogues the designated river's outstanding characteristics, the resources for which the river is designated, and the instream public uses by compiling relevant reports²²⁴ and stream surveys.²²⁵ The instream flow study identifies and documents methods for establishing the protected instream flow standards and recommends scientifically-based instream flows that conserve and protect the river's instream public uses, designated uses, the

219. 2002 N.H. Laws, ch. 278:2(I) (HB 1449-A) (establishing a pilot program in the department of environmental services to study and establish protected instream flows and water management plans for the Lamprey River and the Souhegan River). *See also* N.H. CODE ADMIN. R. ANN. ENV-Ws 1901.01; N.H. REV. STAT. ANN. § 483:9-c (Establishment of Protected Instream Flows); *Id.* § 483:15 (Rivers Designated for Protection).

220. 2002 N.H. Laws, ch. 278:3(III) (HB 1449-A) (Instream Flow Technical Review Committees; Establishment; Duties). This report details the results of the pilot program including "the projected impacts of the protected instream flows and water management plans to be implemented on water users, wildlife, recreation, and other interests along the rivers and any recommendations for proposed legislation." The report shall also include a summary of public comments received and the completed instream flow studies and the adopted protected instream flow levels and water management plans.

221. *Id.*

222. *See* N.H. CODE ADMIN. R. ANN. ENV-Ws 1900, *et seq.*

223. *Id.* ENV-Ws 1905.02 (2008) (Protected Instream Flow Study); N.H. REV. STAT. ANN. § 483:9-c (2008) (Instream public uses include "navigation; recreation; fishing; storage; conservation; maintenance and enhancement of aquatic and fish life; fish and wildlife habitat; wildlife; the protection of water quality and public health; pollution abatement; aesthetic beauty; and hydroelectric energy production.").

224. *Id.* ENV-Ws 1905.02. These reports and documents include, but are not limited to, designated river nomination reports, river corridor management plans enacted by the NHDES under the RMPP, water quality studies, national heritage inventories, fishery and aquatic resource studies, and environment assessments and impact statements.

225. *Id.*

aquatic life, resources and uses identified from the on-stream survey, and outstanding characteristics.²²⁶

Once a protected flow regime is in place for different times of the year that is sufficient to protect the flow dependent entities, the protected flow regime becomes part of the “water quality criteria for the purpose of administration of water quality standards” under the CWA.²²⁷ To ensure that the protected flow regime is maintained, the instream flow regulations mandate the use of water management plans that the NHDES develops.²²⁸ Water management plans include conservation plans, water use plans, and dam management plans.²²⁹ Water management plans apply to affected water users, who must comply with the management plan’s provisions.²³⁰ Affected water users are ground and surface water withdrawers who are required by law to register²³¹ and who also withdraw surface water or ground water within five hundred feet of a designated river or its tributary, and dam owners with impoundments of more than ten acres in the watershed of a designated river.²³² When a withdrawer must curtail its withdrawal or alter its flow releases as the Water Management Plan requires, failure to comply with the Plan results in a violation of water quality flow standards, and triggers liability under the Clean Water Act.²³³

The first step in the water management plan is the development of conservation plans for all registered water users in the planning area.²³⁴ The conservation plan identifies and reports the amount of water that affected water users withdraw and return to the river, the timing intervals and patterns of the water user’s withdrawals and returns, the affected water user’s needs, and the potential for conservation.²³⁵ After detailing the water user’s water usage, the conservation plan identifies conservation measures and best management practices applicable to each type of affected user, while considering the economic effects on the user.²³⁶ The last step of the conservation plan is to establish an implementation schedule that contains quantitative water use reduction

226. *Id.*

227. *Id.* ENV-Ws 1907.02 (Protected Instream Flows and Water Quality Criteria).

228. *Id.* ENV-Ws 1906.01 (Procedures for the Adoption of Water Management Plans).

229. *Id.*

230. *Id.* ENV-Ws 1906.1(c) (1), 1907.01.

231. N.H. REV. STAT. ANN. § 488:3 (2008) (stating that water users required to register their water uses are all ground or surface water withdrawer that withdraw “a cumulative amount of more than 20,000 gallons of water per day, averaged over any 7-day period, or more than 600,000 gallons of water over any 30-day period, at a single real property or place of business”).

232. N.H. CODE ADMIN. R. ANN. ENV-Ws 1902.02, 1902.03.

233. *Id.* ENV-Ws 1907.01, 1907.02.

234. *Id.* ENV-Ws 1906.02 (a).

235. *Id.* ENV-Ws 1906.02 (b)(3).

236. *Id.* ENV-Ws 1906.02 (b)(2), (b)(3)(f).

targets.²³⁷ The implementation schedule is a product of the results of the findings, meetings, economic assessment and discussions with the water user.²³⁸ Thus, the conservation plan is a compromise between the water users and NHDES that sets forth a plan to achieve the protected instream flow over a reasonable period.

Used along with conservation plans, NHDES water use plans that define the allowable withdrawals of registered water users, and dam management plans, coordinate the water use and flow release of all affected water users and dam owners to maintain adequate instream flows.²³⁹ NHDES water use plans, guided by conservation plans, define the allowable withdrawals for each registered water user within the water management planning area, which encompasses surface water users in designated rivers and their tributaries.²⁴⁰ The net effect of implementing the water use plans and the dam management plans aims to maintain the protected instream flow levels for each river segment of the designated river.²⁴¹ The plans also include implementation schedules for affected water users to meet the water use plan, describe potential for water use modification and sharing, include an economic assessment of the implementation costs of individual plans, and assigns the NHDES the responsibility to coordinate negotiations among dam owner and waters users to help meet the protected instream flow requirements.²⁴²

The dam management plans include data on the potential water available for release to maintain protected instream flows, the potential for the dam management plan to help meet instream flow requirements, and the ambit of "ecological and other impacts to the impoundment and downstream river reaches which might restrict the use of such waters for augmentation flows."²⁴³ Like the water use plans, the dam management plans contain an implementation schedule, an economic assessment of the cost to implement the plan, and are coordinated so that the net effect of implementation of the dam management plans and water use plans maintain the protected instream flows for each river segment on the designated river.²⁴⁴

237. *Id.* ENV-Ws 1906.02 (b)(4).

238. *Id.* ENV-Ws 1906.02 (c), (f).

239. *Id.* ENV-Ws 1906.03 (b)(1), (4).

240. *Id.* ENV-Ws 1906.03 (b)(1), (2), 1902.03.

241. *Id.* ENV-Ws 1906.03 (b)(4).

242. *Id.* ENV-Ws 1906.03 (c)(1), (2).

243. *Id.* ENV-Ws 1906.04 (b)(2)(a)-(c).

244. *Id.* ENV-Ws 1906.04 (b)(3)(4), (d).

B. THE THREE REASONS WHY NEW HAMPSHIRE'S INSTREAM FLOW REGULATIONS ARE INSUFFICIENT TO MAINTAIN AND ENHANCE THE ECOLOGICAL INTEGRITY OF ITS RIVERS AND STREAMS

Three overarching reasons render New Hampshire's instream flow regulation insufficient to maintain and enhance its streams' aquatic, fish, and wildlife habitats. First, the administrative scheme protecting instream flows is not sufficiently comprehensive, because it is disjointed and limited in regulating all flow sources within a watershed. The administrative scheme is disjointed in regulating flow sources because it does not adequately regulate ground and surface water withdrawals within a watershed under a unified and cohesive regulatory scheme. To achieve the protected flow regime on a designated river, the instream flow regulation can only coordinate and curtail the water use of "affected water users."²⁴⁵ "Affected water users" encompass ground and surface water withdrawers who are required by law to register their water use,²⁴⁶ and who have a "withdrawal or return location within 500 feet of a designated river or within 500 feet of a river or stream in its tributary drainage area."²⁴⁷ Affected water users also consist of dam owners with impoundments "greater than 10 acres in the watershed area of a designated area."²⁴⁸ Thus, the instream flow regulation is not interconnected or coordinated with other New Hampshire laws that regulate water withdrawals more than five hundred feet from a designated river or its tributaries. Although, under the Groundwater Protection Act,²⁴⁹ the NHDES can curtail the water usage of permitted groundwater users withdrawing greater than 57,600 gallons per day to protect the ecological integrity of surface waters,²⁵⁰ the instream flow legislation imposes no legally enforceable mandate for the NHDES to

245. See *id.* Env-Ws 1901.02.

246. N.H. REV. STAT. ANN. §§ 488:2-488:3 (2006) (The water users, required by law to register their water uses, are all ground or surface water withdrawers that withdraw "a cumulative amount of more than 20,000 gallons of water per day, averaged over any 7-day period, or more than 600,000 gallons of water over any 30-day period, at a single real property or place of business.").

247. N.H. CODE ADMIN. R. ENV-Ws 1901.02(b) (2003) (applicability to "affected water users"); *id.* ENV-Ws 1902.03 (definition of "affected water user").

248. *Id.* ENV-Ws 1901.02(c) (applicability to "affected dam users"); *id.* ENV-Ws 1902.02 (definition of "affected dam user").

249. Groundwater Protection Act, N.H. REV. STAT. ANN. §§ 485-C:1 to C:22 (2006).

250. N.H. CODE ADMIN. R. ANN. ENV-Ws 301.02(b) (2007) (An applicant for a new source of water for a new small community water system with a design flow and source capacity requirement that exceed 57,600 gallons per day must comply with Env-Dw 302, Env-Ws 387, and Env-Ws 388); *Id.* ENV-Ws 388.18(a), (c)(6), (c)(9) (2001) (Adverse impacts include a "reduction in surface water levels or flows" which disrupts the surface water quality and/or reduces the river flows below acceptable levels.); *Id.* ENV-Ws 388.23 (Procedure and Criteria to Issue, Deny, or Suspend a Major Withdrawal Permit); *Id.* ENV-Ws 387.12 (2001) (Procedures and Criteria to Approve, Deny, or Revoke a Minor Withdrawal Designation).

coordinate permitted groundwater withdrawals with the “affected water users” under its instream flow legislation for the protection of flow regimes of designated rivers.²⁵¹ Thus, the lack of an administrative mechanism that coordinates the affected water users with the permitted groundwater withdrawers withdrawing farther than five hundred feet from a designated river or its tributaries fails to take advantage of a potential administrative efficiency vital to protecting flow regimes.

Aside from the disjointedness of the instream flow regulation’s administrative scheme in regulating flow sources, the limited nature of its administrative structure in regulating flow sources raises concerns regarding the ability of the regulation to protect the natural flow regimes of designated rivers. The instream flow regulation’s administrative scheme is limited in regulating flow sources in that it does not regulate ground water withdrawals beyond five hundred feet of the designated rivers and their tributaries.²⁵² Additionally, the regulations fail to manage groundwater withdrawers that withdraw greater than 57,600 gallons per day farther than five hundred feet from a designated river or its tributaries.²⁵³ Even if the instream flow regulation regulated all permitted groundwater withdrawers under the Groundwater Protection Act withdrawing further than five hundred feet from a designated river or its tributaries within the river’s watershed, the regulations would not be able to regulate groundwater users withdrawing less than 57,600 gallons per twenty-four hour period whose aggregate withdrawals can adversely impact the rivers’ flow regimes.²⁵⁴ Furthermore, the instream flow regulation does not regulate surface water withdrawers, including separate entities engaging in bulk water transfers, that divert less than 140,000 gallons of water per week or less than 600,000 gallons per month, within or beyond five hundred feet from a

251. *See id.* ENV-Ws 1901.02(b), (c) (2003) (applicability to affected water users and affected dam users); *see id.* ENV-Ws 1902.02-.03 (definitions of affected water users and affected dam users).

252. *See id.* ENV-Ws 1901.02(b) (applicability to affected water users); *see id.* ENV-Ws 1902.03 (definition of affected water users only includes users who have a “withdrawal or return location within 500 feet of a designated river or within 500 feet of a river or stream.”).

253. *See id.* ENV-Ws 1902.03 (The definition of affected water users only includes users who have a “withdrawal or return location within 500 feet of a designated river or within 500 feet of a river or stream.” Any users beyond 500 feet are not designated as affected water users.); *see generally id.* ENV-Ws 1900 *et seq.*

254. N.H. CODE ADMIN. R. ENV-Ws 387.03(c) (2001) (List of departmental requirements for designating a large withdrawal as a minor withdrawal. One requirement is that the maximum 24-hour withdrawal is at least 57,600 gallons); *see id.* ENV-Ws 387.04 (Minor Large Withdrawal Approval Process and Requirements); *see id.* ENV-Ws 388.03 (2001) (A large withdrawal constitutes a major withdrawal when the maximum 24-hour withdrawal is 57,600 gallons per day or more.); *see id.* ENV-Ws 388.04 (Requirements of Major Withdrawals); *see also* N.H. REV. STAT. ANN. § 485-C:2 (IX-a) (2006) (“Large groundwater withdrawal’ means any withdrawal from groundwater of 57,600 gallons or more of water in any 24-hour period at a single property or place of business.”).

designated river or its tributary, whose aggregate withdrawals can have adverse effects on natural flow regimes.²⁵⁵ Lastly, the instream flow regulation has limited reach because it completely ignores the protection of baseflow through land use regulations that promote recharge and that limits the percentage of impervious surfaces that can accompany urban development.²⁵⁶ As discussed in Section III, baseflow is often a substantial and sustainable year round source of flow to a stream, and thus land use activities that reduce baseflow should be treated as a water withdrawal under a regulatory regime that curbs water use to protect instream flows. Without protecting all of a stream's flow sources within its watershed, or at least closing the major loopholes that contribute to flow impairment, the instream flow regulations may very well be ineffective in protecting natural flow regimes, and will place unfair burdens on registered surface water users and groundwater withdrawers five hundred feet from rivers designated for protection under the RMPP. Thus, the failure of the instream flow legislation to coordinate and regulate all permitted and registered water users within a watershed, and its failure to regulate all important contributions to surface water flows, leaves its natural flow unprotected and the ecological integrity of its rivers and streams threatened.

The second reason why New Hampshire's instream flow regulation is insufficient to maintain and enhance its streams' ecological integrity is that the lotic geographic scope of the instream flow regulation is inadequate. The piecemeal protection of New Hampshire's streams does not preserve the ecological integrity of tributaries or coastal sections of its streams, which serve as vital organs in a river ecosystem. While the instream flow regulations protect designated river segments on the designated rivers, these regulations are not concerned with protecting the undesignated segments, such as the RMPP-designated rivers' tributaries and coastal reaches. The tributary flows are protected in the sense that a tributary's flows must adequately contribute sufficient flows to maintain a designated reach's ecological integrity.²⁵⁷

255. See generally N.H. CODE ADMIN. R. ENV-WS 387.01 (2001); *id.* ENV-WS 388.01 (2001); *id.* ENV-WS 1900 *et seq.* (2003) (These regulations do not regulate surface water withdrawers, but rather regulate ground water withdrawals.); *id.* ENV-WS 1901.02(b); *id.* ENV-WS 1902.03.

256. See generally N.H. CODE ADMIN. R. ENV-WS 387.01 (2001); *id.* ENV-WS 388.01 (2001); *id.* ENV-WS 1900 *et seq.* (2003) (These regulations do not protect baseflow through land use regulations.).

257. See N.H. CODE ADMIN. R. ENV-WS 1901.02(a) (2003) (Requirements set forth in Env-WS 1900 apply to designated segments "on the Lamprey and Souhegan Rivers and their tributary drainage areas."); *id.* ENV-WS 1902.03 ("Affected water users" are users who have a "withdrawal or return location within 500 feet of a designated river or within 500 feet of a river or stream in its tributary drainage area."); *id.* ENV-WS 1903.02 (a)-(c) (The department must report the aggregate water use and streamflow of each designated river with or without established protected instream flows. There are four

However, the regulations protect only the total tributary outflows, which allows a registered surface water diverter to dewater segments of tributaries by returning their withdrawals downstream from their points of diversion.²⁵⁸ Similarly, coastal reaches of designated rivers are not protected from dewatering from differing points of diversions and return flows, nor are they protected from consumptive uses that do not return flows to the designated river.²⁵⁹ The dewatering of river segments and the accompanying ecological destruction of biota and wildlife can disturb a river's food chain, creating a trophic cascade with disastrous rippling effects throughout a designated river's system.²⁶⁰ Thus, the instream flow regulations are not protecting the designated river system as a whole or the ecological integrity of a river's vital habitat for reproduction and fish migration, thereby effectively threatening the designated river's public uses under the RMPP and instream flow regulations. Furthermore, because the RMPP does not designate the Androscoggin Basin for protection, the instream flow regulation does not protect the flow regime of the one hundred seventy-mile long Androscoggin River, whose headwaters begin in New Hampshire before entering into Maine.²⁶¹

The third reason why New Hampshire's instream flow regulations are insufficient to maintain and enhance its streams' ecological integrity is that it fails to provide its streams with interim flow protections while it develops and establishes the protected flows. The extensive MesoHabitat Simulation Model ("MesoHABSIM")²⁶² method, which determines sufficient protected instream flows, is seemingly adequate to determine the necessary flows to protect all riparian wildlife during their differing bioperiods²⁶³ in all of their habitats such as riffle, pools,

occasions when designated rivers with protected instream flows are not in compliance with the general standard.).

258. See generally *id.* ENV-WS 1900 *et seq.* (ENV-WS 1900 *et seq.* fails to regulate (or prohibit) a water user who returns withdrawals downstream after diverting segments of a tributary upstream.).

259. See generally *id.* (ENV-WS 1900 *et seq.* fails to protect coastal reaches from diversions and consumptive uses.).

260. See generally Tiffany M. Knight, Michael W. McCoy, Jonathan M. Chase, Krista A. McCoy & Robert D. Holt, *Trophic Cascades Across Ecosystems*, 437 NATURE 880 (2005) ("Trophic cascades arise when predators reduce prey abundance, indirectly relaxing consumption on lower trophic levels." Refer to article for an example of a trophic cascade occurrence.).

261. N.H. REV. STAT. ANN. § 483:15 (2006) (Rivers Designated for Protection); Androscoggin River Watershed Council, *Androscoggin River Watershed Council*, <http://www.avcnet.org/arwc/intro.html> (last visited Oct. 30, 2008).

262. See Northeast Instream Habitat Program, MesoHABSIM, <http://www.mesohabsim.org/mesohabsim/index.htm> (last visited Feb. 04, 2009), for an explanation of the MesoHABSIM method.

263. Parasiewicz, *Habitat Time*, *supra* note 62 at 441 (explaining that an organism's bioperiod is that organism's critical intra-annual seasons with specific biological functions, such as certain flows existing during certain season to enable biological functions

and runs with different geomorphology, land cover, and hydrological characteristics in varying times of the year. The MesoHABSIM method maps mesohabitats²⁶⁴ under a range of flow conditions at extensive sites along a large spatial segment of a river.²⁶⁵ The method includes data collection from fish and fish habitat surveys in randomly distributed mesohabitats along the large selected spatial segment of the river.²⁶⁶ This allows modeling of available fish habitats at a range of flows, “creat[ing] the framework for integrative analyses of many aspects of the [river] ecosystem . . . [and] allow[ing] managers to recreate reference conditions and evaluate possible instream and watershed restoration measures or alterations, such as dam removals or changes in water withdrawals.”²⁶⁷ Proponents of the MesoHABSIM method believe that “habitat and fish measurements at larger spatial units are more practical, more relevant to river management, and more conducive to habitat modeling” than methods that base the determination of flows necessary to protect critical river organisms’ bioperiods on habitat and fish data within distinct macrohabitats on a limited reach of a river.²⁶⁸

While the MesoHABSIM method used to determine sufficient instream flows is seemingly sufficient to protect all riparian wildlife during different their differing bioperiods, the determination and regulatory establishment of protected flows under the MesoHABSIM method takes time, exposing riparian wildlife to anthropogenically-induced, ecologically-threatening low flow events and disturbances in natural flow regimes.²⁶⁹ Regulators enacted the pilot instream flow regulation

such as spawning or rearing and growth); see NEW HAMPSHIRE DEP’T OF ENVTL. SERV’S, INSTREAM PROTECTED FLOWS FOR THE SEGMENTS OF THE SOUHEGAN RIVER DESIGNATED AS PROTECTED PURSUANT TO RSA 483:15, XIII (2008), available at http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/souhegan/documents/pisf_table1.pdf for an example of a protected bioperiod: May 1 – Jun 14 for Shad spawning.

264. Piotr Parasiewicz, *MesoHABSIM: A Concept for Application of Instream Flow Models in River Restoration Planning*, 26 FISHERIES 6, 7 (2001), available at http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/souhegan/documents/mar2204_meso_habsim.pdf (Mesohabitat types are defined by their hydro-morphological units (HMUs), such as pools and rapids, geomorphology, land cover and other hydrological characteristics. The mesohabitats mapped along long spatial reaches of a river multiple times generally include all riffles, rapids, cascades, glides, runs, fast runs, pools, plunge pools, backwaters, and side arms within the spatial reach sampled.).

265. Northeast Instream Habitat Program, MesoHABSIM, <http://www.mesohabsim.org/mesohabsim/index.htm> (last visited Feb. 04, 2009).

266. *Id.*

267. *Id.*

268. *Id.*

269. See THOMAS BURACK, NEW HAMPSHIRE DEP’T OF ENVTL. SVC.S, DECLARATION OF THE ESTABLISHMENT OF PROTECTED INSTREAM FLOWS FOR THE SOUHEGAN DESIGNATED RIVER 4 (2008), available at http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/souhegan/documents/pisf_signed.pdf.

mandating the determination of protected flows on two of New Hampshire's fifteen rivers designated for protection under the RMPP in 2002.²⁷⁰ The use of the MesoHABSIM method has taken more than three years to determine protected instream flows on all the designated river segments on these two rivers.²⁷¹ Given limited economic resources and the time necessary to determine an adequate protected flow regime for a designated river, the instream flow regulation should demand that interim instream flow protections are established that can at least sustain a streams ecological integrity until protected flow regimes exist on the remaining thirteen designated rivers. Additionally, the RMPP has designated only fifteen rivers for protection.²⁷² While these fifteen rivers encompass 822 miles of rivers and streams, the 822 miles of protected designated river segments account for less than 1 percent of New Hampshire's river and stream miles, leaving the natural flow regimes of these watercourses unprotected until the RMPP or other legislation sets forth regulations that require protection of their instream flows.²⁷³

VI. CONCLUSION

New Hampshire's instream flow regulations are insufficient to maintain, restore, and enhance its streams' ecological integrity from the ambit of increasingly severe anthropogenic impacts²⁷⁴ to flows that are accompanying its population growth and urban developments.²⁷⁵ New Hampshire's citizens are diverting more and more water from streams for consumptive, non-returnable uses.²⁷⁶ They are pumping water from the ground in increasing quantities, lowering water tables, and thus reducing or eliminating baseflow contributions to streams in many watersheds.²⁷⁷ Compounding the effects of groundwater pumping on baseflow contribution, the water that percolates into the ground during precipitation events that sustainably feeds a river on a year

270. *Id.* at 2.

271. *Id.* at 10; see Des.nh.gov, Souhegan River, <http://des.nh.gov/organization/divisions/water/wmb/rivers/instream/souhegan/pisf.htm> (last visited Feb. 02, 2009) (stating that the Souhegan Protected Instream Flow report, describing "the scientific methods and results of the study to define protected flows on the Souhegan Designated River," was completed February 26, 2008).

272. See N.H. REV. STAT. ANN. § 483:15 (2008).

273. LAKES MGMT. ADVISORY COMM. AND THE RIVERS MGMT. ADVISORY COMM., NEW HAMPSHIRE DEP'T OF ENVTL. SVC'S, THE SUSTAINABILITY OF NEW HAMPSHIRE'S SURFACE WATERS 4 (2008), available at http://des.nh.gov/organization/divisions/water/wmb/lakes/documents/sustainability_initiative.pdf.

274. See *supra* Part III.

275. *Id.*

276. See *supra* Part III.B.

277. See *supra* Part III.

round basis via baseflow is increasingly being swept away over impervious surfaces into stormwater runoff systems that empty directly into streams.²⁷⁸ The natural flow regimes of New Hampshire's rivers are in need of policy and legal protections that protect and provide flows.²⁷⁹ These protective flows at least need to mimic the natural flow regimes of rivers so that all of their fish and wildlife have enough water for their critical bioperiods and to sustain their year round existence.²⁸⁰ Not only do the threatened and healthy populations of native fish and wildlife that thrive in New Hampshire's rivers and streams need adequate flows, but so do New Hampshire's citizens also. Whether New Hampshire's residents value nature and species, the aesthetic value of rivers, the ecological integrity of rivers and streams, flow dependent recreational activities on rivers, spiritual values provided by ecologically sound rivers, or the statewide economic benefits from ecologically healthy rivers and streams, all residents have an interest in ensuring that New Hampshire's rivers have enough water flowing through them to support their ecological integrity.²⁸¹ Implementing water conservation, water efficiency, and groundwater recharge and infiltration measures at the household, municipal, agricultural, and industrial levels sufficient to maintain natural flow regimes without government command and control would be ideal. However, these measures do not happen absent regulatory intervention because of societal free riding problems, the rush to divert and use a limited open access resource under a riparian rights system, and people's differing valuations of the worth of a stream's ecological integrity.

New Hampshire's instream flow regulations attempt to protect natural flow regimes.²⁸² Although, the MesoHASBIM method of determining sufficient flows appears to be an adequate method to determine the annual varying flows that require protection for each species' critical bioperiods in a given stream system,²⁸³ the administrative scheme in the instream flow regulation is seemingly insufficient to protect the natural flow regimes once they are established.²⁸⁴ As discussed in section V.B. above, the administrative scheme is disjointed in regulating all of a river's flow sources because it does not regulate ground and surface water withdrawals under a common permitting scheme.²⁸⁵ The administrative structure is also limited in protecting all of a river's flow sources in that it does not cover small withdrawals that on an aggregate remove a significant amount of water from streams, it does not

278. *See supra* Part III.A.

279. *See supra* Part III.B.

280. *See supra* Part III.

281. *See supra* Part I-III.

282. *See supra* notes 217-218 and accompanying text.

283. *See* Parasiewicz, *Habitat Time*, *supra* note 62.

284. *See supra* Part V.B.

285. *Id.*

have the authority to curb groundwater withdrawals more than five hundred feet from a protected river, and it completely ignores protecting baseflow through land use regulations that promote recharge and curb the expansion of impervious surfaces.²⁸⁶ Additionally, the piecemeal protection of New Hampshire's streams does not protect the ecological integrity of tributaries or coastal sections of its streams, which serve as vital organs in a river ecosystem, and omits protection of the Androscoggin River basin that originates in New Hampshire.²⁸⁷ Lastly, the determination of adequate flows using the MesoHASBIM method takes about three years per stream, and water management plans protecting flows are not implemented until the protected flows are determined and established in an instream flow regulation.²⁸⁸ The NHDES does not have an adequate interim protective flow policy in place to protect the thirteen more rivers designated for protection under the RMPP that are awaiting the determination of their protected flows via the MesoHASBIM method. The absence of an interim protective flow policy leaves riparian wildlife on these rivers exposed to anthropogenically induced low flow events that are ecologically threatening.²⁸⁹

One can cure the deficiencies in New Hampshire's instream flow regulations with statutory fixes, and a combination of sufficiently stringent interim flow protections and increased funding. An increase in funding could speed up the determination of protected flow regimes and could allow the NHDES to hire more staff to monitor and regulate all water users in a watershed. Including the seemingly easy fix of bringing all registered surface and ground water users under one administrative scheme to protect flows, many of the statutory fixes would require seemingly politically unpopular policy choices. These politically unpopular policy choices would also include limiting the amounts of water users can withdraw, imposing mandatory water conservation and efficiency measures, and imposing impervious cover restrictions and groundwater recharge requirements on developers and municipalities. However, these policy choices become more politically acceptable when citizens become informed about the economic importance of ensuring the protection of natural flow regimes in their rivers. They also become more politically feasible when citizens become educated about the importance of baseflow contributions to streams, and about how all water users and entities effecting natural flow regimes should share the burden of maintaining their river's the natural flow regimes, instead of just the ground and surface water withdrawers that withdraw their water fifty feet from a river and its tributaries.

286. See *supra* notes 252-256 and accompanying text.

287. See *supra* notes 258-261 and accompanying text.

288. See *supra* notes 268-273 and accompanying text.

289. *Id.*

Aside from amending the instream flow legislation to ensure adequate comprehensiveness in regulating all entities effecting flow and to plug the administrative inefficiencies and gaps, and aside from increasing spending to develop protective flows and implement the legislation, there are additional and complementary legal and policy avenues that can be utilized to protect flows. The public trust doctrine can be a litigation tool or legislative tool to adequately protect natural flow regimes because it protects New Hampshire's rivers "for the use and benefit of all [of New Hampshire's public], for all useful purposes," including the protection of water quality and public health, water storage, navigation, travel, swimming and other forms of recreation, bathing, fishing, skating, fowling, cutting ice, and aesthetics.²⁹⁰ The paramount right of New Hampshire to reasonably protect its rivers for public trust public purposes, extends to the protection of groundwater and surface water contributions, because protected natural flow regimes are critical components of water quality, fishing, recreation, and current and future public needs such as economic welfare.²⁹¹

As demonstrated by New Hampshire's ability to use the public trust doctrine to enact its instream flow and groundwater legislation without legally taking a property interest or having to justly compensate water users,²⁹² the state could, and should attempt to use the public trust doctrine to impose statewide impervious surface regulations on new and existing urban developments, and to impose statewide recharge and infiltration regulations on municipality stormwater systems and urban areas. Theoretically, under a watershed approach to protecting natural flow regimes, both water users and municipalities with impervious surface cover are water users in that their behavior and activities impact natural flow regimes. Thus, the state could and should regulate both via the public trust doctrine to adequately reduce their impacts on the flows necessary to protect public trust resources. Although one could make legal arguments to impose these impervious surface restrictions and recharge requirements on municipalities under the public trust doctrine, litigation would seemingly be a last resort due to a number of factors including: political pressures on the courts; the case by case costs of hydrological models and studies to demonstrate baseflow contributions to streams from urban areas before and after impervious surface and recharge zone requirements; and the fact that protected flows do not exist for thirteen rivers.

290. *Concord Mfg. Co. v. Robertson*, 25 A. 718, 721 (N.H. 1890). *See also* *Sundell v. Town of New London*, 409 A.2d 1315, 1319 (1979); *Hartford v. Town of Gilmanton*, 146 A.2d 851, 853 (1958); *State v. George C. Stafford & Sons, Inc.*, 105 A.2d 569, 572 (1954); *State v. Sunapee Dam Co.*, 50 A. 108, 108 (N.H. 1901).

291. *Stafford & Sons*, 105 A.2d at 573. *See also* *In re Town of Nottingham*, 904 A.2d 582, 589 (2006).

292. N.H. REV. STAT. ANN. §481:1 (2008); *Opinion of the Justices*, 649 A.2d 604, 609 (1994)..

Other policy options exist in addition to using the public trust doctrine to fix the current gaps in New Hampshire's instream flow regulations and to help maintain flow regimes through restoring baseflow contributions stolen by impervious urban development. The state should explore the use of CWA NPDES permits for municipalities and industrial stormwater discharge as a means to promote baseflow recharge through best management practices ("BMPs") in developments.²⁹³ Some of these BMPs include designing urban developments to limit impervious surfaces, using grassy swales in place of curbs, and constructing stormwater retention ponds and groundwater recharge zones.²⁹⁴ Another possible avenue to force municipalities to restore baseflow contributions from groundwater, would be for the NHDES to establish and incorporate a total maximum daily load ("TMDL")²⁹⁵ for stormwater runoff from urban areas in basin plans under the CWA, which could it could incorporate into CWA § 402 NPDES stormwater permits.²⁹⁶ The TMDL would limit the storm water flow that could enter streams, and the basin plans designed to achieve the TMDL would leave it up to municipalities to find creative and cost efficient BMPs to curb stormwater runoff and promote groundwater recharge.

Whether the state adequately addresses administrative deficiencies in the instream flow regulations or uses additional legal or policy tools to protect the natural flow regimes, one or the other, or a combination of both are necessary to protect the ecological integrity of New Hampshire's rivers and streams. Not only is New Hampshire's wildlife, fishermen, citizens who recreate on the rivers, and its naturalists relying on the establishment of flow regulations that are protective of the natural flow regimes necessary to sustain a river's organisms during their critical bioperiods, but all of New Hampshire's citizens have a significant economic stake in ensuring that its rivers receive flows to maintain its stream's ecological integrity. The standalone fact that a significant part of New Hampshire's economy relies on the ecosystem services that healthy and functioning river ecosystems provide²⁹⁷ should provide the New Hampshire legislature with strong enough policy considerations and political support to plug the holes in its instream flow regulations, or to take other measures that sufficiently protect and restore the natural flow regimes of its rivers.

293. See 33 U.S.C. § 1342(p) (2008). See also 33 U.S.C. § 1314(e) (2000).

294. See generally UNITED STATES ENVTL. PROT. AGENCY, REDUCING STORMWATER COSTS THROUGH LOW IMPACT DEVELOPMENT (LID) STRATEGIES AND PRACTICES 2-3 (2007), available at <http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf>.

295. 33 U.S.C. § 1313(d)(1)(D) (2000).

296. *Id.* § 1342(p).

297. See *supra* Part II.

CASE NOTE

COLORADO WATER COURT'S DECISION TOWARDS THE AVAILABILITY OF UNAPPROPRIATED WATER: *BUFFALO PARK DEVELOPMENT COMPANY V. MOUNTAIN MUTUAL RESERVOIR COMPANY*

I. INTRODUCTION

According to the Colorado Constitution, water is a public resource, and the water of every natural stream is property of the public, subject to the use of the people of the state, and available for appropriation.¹ People can therefore create water rights by appropriating an available body of water. At first glance, the idea of “availability of unappropriated water” in water law appears to be an easy concept to grasp. After all, it seems simple enough that in order to “claim” a water right, there can be no pre-existing claims to those rights or injuries resulting thereof. However, there is a disagreement in how to determine “availability” in conditional water rights proceedings involving augmentation plans: should proof of availability be a requirement separate and apart from proving the absence of injury, or should courts consider augmentation plans *with* the application for water rights when determining if any such injuries could exist? At the time of this case, appellant Bear Mountain Homeowners Association had spent a considerable amount of time and money trying to find an answer to that very question.²

II. BACKGROUND

A. THE PARTIES

Buffalo Park Development Company, Colorado Mountain Properties, Inc., and Evergreen Memorial Park, Inc. are all Colorado corporations involved in the construction of new subdivisions in Jefferson County. Mountain Mutual Reservoir Company, a non-profit Colorado corporation, united with North Fork Associates, LLC, collectively as applicants-appellees. The following opposers-appellees joined the two

1. COLO. CONST. ART. XVI, § 5.

2. Answer Brief of Opposer-Appellees at 6, *Buffalo Park Dev. Co. v. Mountain Mut. Reservoir Co.*, No. 06SA373 (Colo. App. 2008).

applicant-appellees: Bear Mountain Homeowners Association, Brook Forest Water District, Colorado Water Conservation Board, City and County of Denver, acting by and through its Board of Water Commissioner, City of Englewood, Evergreen Metropolitan District, Vista Exline, Farmers Reservoir and Irrigation Company, Foothills Metropolitan Recreation and Park District, Genesee Water and Sanitation District, Jefferson County Open Space Department, Henry L. Kerschbaum, City of Lakewood, Jeremiah P. Lee, Ronald P. Lewis, Charles J. Maas, Town of Morrison, Ben Napheys, Larry J. Plume, Red Rocks Country Club, South Evergreen Water District, Theodore M. Zorich, and the Colorado Department of Water Resources, State and Division Engineers.

B. THE FACTS

Buffalo Park Development Company ("Buffalo Park") sought to acquire conditional water rights and establish an augmentation plan for 205 wells to support five new subdivisions in Jefferson County.³ The plans for the wells existed in the Turkey Creek and Bear Creek subbasins of the South Platte River Basin.⁴ Mountain Mutual Reservoir Company ("Mountain Mutual") and other small capacity well owners, including Bear Mountain Homeowners Association ("BMHOA"), opposed the application. These parties asserted that: (1) no unappropriated water was available for appropriation by means of the newly proposed subdivision wells, and (2) the proposed augmentation plan was fatally defective by failing to protect the well owners from injury to existing groundwater users in the vicinity.⁵

C. PROCEDURAL HISTORY

Buffalo Park first initiated its application for conditional water rights and establishment of the augmentation plan in 1994.⁶ The District Court for Water Division No. 1 ("water court") heard the case in three separate sections over the course of approximately three years, from July 1999 to September 2002.⁷ The water court ultimately approved the application for two of the five subdivisions, Buffalo Meadows and Homestead, and dismissed the application for the other three subdivisions, Mountain Park Homes, Bear Mountain Vista, and Cragmont.⁸ In August 2006, after a round of proposed adjustments to prior

3. *Buffalo Park Dev. Co. v. Mountain Mut. Reservoir Co.*, 195 P.3d 674, 679 (Colo. 2008).

4. *Id.*

5. *Id.* at 678.

6. *Id.*

7. *Id.*

8. *Id.* at 679.

decree drafts, the water court issued a decree approving an augmentation plan for two of the subdivisions, Buffalo Meadows and Homestead, and denied the augmentation plans for the other three subdivisions.⁹ Buffalo Park contended that the water court had erred by not granting the appropriation of water rights for all five subdivisions and by not affording an adequate opportunity for Buffalo Park to propose terms and conditions for an augmentation plan.¹⁰ Buffalo Park united with Colorado Mountain Properties, Inc., and Evergreen Memorial Park, Inc., and collectively appealed the water court's decision to the Supreme Court of Colorado.

III. BUFFALO PARK DEVELOPMENT COMPANY V. MOUNTAIN MUTUAL RESERVOIR COMPANY

A. THE SUPREME COURT OF COLORADO HOLDING

The Colorado Supreme Court upheld the water court's decision and ruled in favor of Mountain Mutual. The court determined that Buffalo Park did not meet its burden of proof because it did not show: (1) the existence of available unappropriated water for the conditional groundwater rights it claimed for the Mountain Park Homes, Bear Mountain Vista, and Cragmont subdivisions, or (2) a non-injurious augmentation plan sufficient to protect the groundwater rights of small capacity domestic well owners who divert from the aquifers.¹¹ Furthermore, the Supreme Court rejected Buffalo Park's contention that the water court did not afford it an adequate opportunity to propose terms and conditions for an augmentation plan.¹²

B. DISCUSSION

1. Requirement to Show Availability of Groundwater

Buffalo Park maintained that Colorado law did not require it to demonstrate the availability of unappropriated groundwater before the start of its operation. The company used this reasoning because Buffalo Park was pursuing the application seeking water rights *in conjunction* with its proposed augmentation plan, theoretically relieving any negative effects resulting from the well construction.¹³ More specifically, Buffalo Park bemoaned the fact that its opponents considered Buffalo Park's claim for decreed groundwater rights as the "trigger" for

9. *Id.*

10. *Id.*

11. *Id.* at 691.

12. *Id.*

13. Reply Brief of Co-Applicants-Appellants at 3, *Buffalo Park Dev. Co. v. Mountain Mut. Reservoir Co.*, No. 06SA373 (Colo. App. 2008).

requiring a finding of unappropriated groundwater. Buffalo Park maintained that it merely made these claims “to establish the priority dates for each of the wells,” and did not warrant a showing of unappropriated groundwater until a later date.¹⁴

Conversely, BMHOA, citing *Board of County Commissioners of Arapahoe v. United States*¹⁵ and *In re Water Rights of Park County Sportsmen's Ranch*,¹⁶ claimed that not only did Colorado law require the stand-alone showing of unappropriated groundwater, but also asserted that any proposed plan involving an augmentation plan that requires *post*-decree monitoring to show lack of injury could not function as a substitute.¹⁷ In its brief, BMHOA cited the “can and will” test, set forth in Colorado statutes, which states that “no claim for a conditional water right may be recognized or a decree therefore [sic] granted except to the extent that it is established that the waters can be and will be diverted, stored, or otherwise captured, possessed, and controlled. . . .”¹⁸ Cases such as *Pagosa Area Water and Sanitation District v. Trout Unlimited* have used the anti-speculative “can and will” test to ensure that petitioners’ plans and intended uses for water rights utilize reasonable, good-faith estimates for beneficial use of the water.¹⁹ Furthermore, the appellees referred to the *Southeastern Colorado Water Conservancy District v. City of Florence* case,²⁰ which overruled a finding that unappropriated water availability was “irrelevant to the award of a new conditional water right.”²¹ BMHOA also referenced *In re the Application for Water Rights of Turkey Canon Ranch*,²² which held that those who held vested water rights and were in danger of material injury concerning those rights would have standing to bring suit for that injury.

The Supreme Court ignored Buffalo Park’s rebuttals that claimed the appellees’ proffered case law did not apply due to minor differences in fact patterns. The court agreed with BMHOA concerning the

14. *Id.*

15. *See* Bd. of County Comm’rs v. United States, 891 P.2d 952 (Colo. 1995).

16. *See* City of Aurora v. Simpson, 105 P.3d 595 (Colo. 2005).

17. Answer Brief of Opposer-Appellees at 7, *Buffalo Park Dev. Co.*, No. 06SA373.

18. COLO. REV. STAT. § 37-92-305(9)(b) (2008).

19. *Pagosa Area Water & Sanitation Dist. v. Trout Unlimited*, 170 P.3d 307, 309-11 (Colo. 2007). This case involved a fisheries conservation organization that opposed a water district’s application for conditional water rights. The application included a planning period extending for over 100 years, prompting the court to stress the importance of using reasonable estimates and realistic projections of necessity when determining water rights appropriations.

20. *See* Se. Colo. Water Conservancy Dist. v. City of Florence, 688 P.2d 715 (Colo. 1984).

21. Answer Brief of Opposer-Appellees, *supra* note 2, at 8.

22. *See* Shirola v. Turkey Canon Ranch L.L.C., 937 P.2d 739 (Colo. 1997). While this case did not involve an argument that there was an absence of unappropriated water, it confirmed basic principles for establishing standing during occurrences of material injury toward water rights.

plain language of Section 37-93-305(9)(b) of Colorado Revised Statutes, prompting the court to conclude that Buffalo Park cannot use a “wait and see” approach by asserting that conditions may change and therefore increase the availability of water.²³ Essentially, Buffalo Creek had to prove that the unappropriated water was available “based upon conditions existing at the time of the application.”²⁴

2. Existence of Unappropriated Groundwater

Conversely, BMHOA’s expert witness, Bruce Kroeker, gave his opinion no unappropriated water was available for Buffalo Park’s suggested appropriations.²⁵ Specifically, Kroeker thought that the water levels were falling “because there’s no direct replacement at that location being proposed, [and] that the sources of replacement will not protect these wells from injury in this area.”²⁶ Kroeker referred to well water dates from several exhibits to support his opinion that: “(1) the available amount of recharge in the area was not sufficient to offset depletions already being made from the aquifer, (2) significantly declining water levels demonstrate a groundwater mining condition, and (3) no unappropriated water was available for the proposed new groundwater appropriations.”²⁷ Buffalo Park, on the other hand, had no expert testimony to counter this because of its timely failure to disclose its expert’s opinion during the pretrial process. Thus, the court refused to overturn the water court’s holding on the matter, and approved the water court’s exercise of discretion.

3. The Injurious Nature of the Augmentation Plans

After affirming that no unappropriated water was available for the conditional groundwater rights that Buffalo Park claimed for the three divisions, the Supreme Court then reviewed Colorado statutes regarding augmentation processes, and found three applicable rules: (1) any new augmentation plan cannot “injuriously affect the owner of or persons entitled to use water under a vested water right;”²⁸ (2) any augmentation plan must have a structure that allows the applicant to make future diversions through the proposed well without injury to the pre-existing water rights of others; and (3) the applicant bears the burden of proof to show no injury.²⁹ In essence, Buffalo Park needed to intro-

23. *Buffalo Park Dev. Co. v. Mountain Mut. Reservoir Co.*, 195 P.3d 674, 679 (Colo. 2008). 195 P.3d at 683 (citing COLO. REV. STAT. § 37-92-305(9)(b)).

24. *Id.*

25. *Id.* at 680.

26. *Id.*

27. *Id.* at 680-81.

28. COLO. REV. STAT. § 37-92-305(3)(a).

29. *Id.*

duce evidence of augmentation sufficient to demonstrate non-injury to existing well owners because Colorado statutes indicate that small capacity groundwater owners hold vested groundwater rights; the rights vest when the wells reach completion and the owners put the groundwater to beneficial use. In this case, BMHOA asserted this position and filed a statement of opposition against Buffalo Park, claiming standing via its possession of a "legally protected interest in a vested water right."³⁰ After recognizing that the proposed groundwater would have sufficient impact on BMHOA for proper standing in this case, the Supreme Court concurred that the evidence produced at the water court trial showed the proposed augmentation plan would be injurious to the members of BMHOA.³¹

4. Ample Opportunity to Propose Additional Terms and Conditions

Nonetheless, according to Colorado law, Buffalo Park maintained that the water court had to allow Buffalo Park to "propose additional or modified terms and conditions to prevent material injury."³² The Supreme Court agreed, but held that applicants must propose these additional considerations within a reasonable amount of time.³³ The judges noted that, while the water court directed Buffalo Park to "prepare, circulate to the parties, and file an amended proposed decree that would effectuate the augmentation plan for the Buffalo Meadows and Homestead subdivisions," Buffalo Park delayed for nineteen months before submitting a revised decree. Even this revised decree failed to embody the water court's findings.³⁴ Moreover, the applicants made no motion or offer of proof to introduce supplementary evidence or include additional terms and conditions in its augmentation plan, which would have sufficiently protected the vested small capacity groundwater rights of the Mountain Park Homes, Bear Mountain Vista, and Cragmont subdivision users.³⁵ The court concluded that Buffalo Park failed to propose adequate augmentation plans and conditions before the water court's final judgment, and based on this information, the Supreme Court affirmed the trial court's decision regarding the

30. *Shirola v. Turkey Canon Ranch L.L.C.*, 937 P.2d 739, 747 (Colo. 1997); *see also* Trial Order for In the Matter of the Application for Water Rights of Buffalo Park Development Company, No. 94CW290 (Colo. Dist. Ct. 1999).

31. Reply Brief of Co-Applicants-Appellants at 3, *Buffalo Park Dev. Co.*, No. 06SA373; *see also* COLO. REV. STAT. § 37-92-305(3).

32. Reply Brief of Co-Applicants-Appellants at 11, *Buffalo Park Dev. Co.*, No. 06SA373.

33. *Buffalo Park Dev. Co. v. Mountain Mut. Reservoir Co.*, 195 P.3d 674, 691 (Colo. 2008).

34. *Id.* at 682.

35. *Id.* at 680.

denial of the appropriation rights for the three subdivisions and corresponding augmentation plans.³⁶

C. THE DISSENT

Justice Coats, joined by Justice Eid, dissented from the majority's opinion and judgment. While concurring with most of the majority's holdings, Justice Coats specifically asserted that the water court erred in denying Buffalo Park's request to propose additional terms and conditions to its proposed augmentation plan, and maintained that he based his disagreement upon his difference of opinion concerning the court's understanding of the "availability requirement."³⁷ While Justice Coats was sympathetic to the opposers' feelings of exasperation after fourteen years of litigation, he contended that the court unfairly and prematurely denied Buffalo Park's opportunity to demonstrate the availability of unappropriated water.³⁸ Some previous Colorado case law involved certain courts that, while adhering to the statutory "can-and-will" test for conditional water rights, did not require that petitioners must establish availability before or apart from consideration of a proposed augmentation plan.³⁹ In lieu of this, Coats found it difficult to imagine how an application for water rights, combined with an augmentation plan, could ever be *completely* dismissible "for failure to prove the availability of unappropriated water, without first considering the applicant's augmentation plan, and if necessary, permitting the applicant to propose additional conditions that could prevent injury."⁴⁰ In essence, Justice Coats opined, "proof that the water level will be lowered by pumping additional wells does not, by itself, demonstrate that unappropriated water is currently unavailable."⁴¹

IV. CONCLUSION

In the future, all applicants for conditional water rights must demonstrate, before commencing any operations or causing outside interference, that an availability of unappropriated groundwater plainly exists. Additionally, the petitioners must also show that implementation of the augmentation plan would not result in any injury to any

36. *Id.*

37. *Id.* at 692.

38. *Id.*

39. *Id.* at 693 (citing *Mount Emmons Mining Co. v. Town of Crested Butte*, 30 P.3d 1255, 1260 (Colo. 2002) ("Typically, to satisfy the 'can and will' test, new appropriators must convince the water court that their diversion will cause no harm to senior appropriators: i.e. that water is available.")).

40. *Id.* at 694.

41. *Id.*; *see also Simpson v. Cotton Creek Circles, L.L.C.*, 181 P.3d 252,258 (Colo. 2008) (suggesting that proof of groundwater usage is taking place does *not* necessarily mean unappropriated water is no longer available).

existing water rights holder. This should help deter the hoarding of water rights, such as in *Pagosa Area Water and Sanitation District v. Trout Unlimited*, which encouraged the adoption of reasonable terms and conditions for those who appropriate water rights.⁴² This decision will hopefully make a gradual change towards benefiting “smaller” representatives, who necessarily depend on water rights, while dissuading those more powerful entities from taking advantage of the water rights system of Colorado.

Ethan Ice

42. *Pagosa Area Water & Sanitation Dist. v. Trout Unlimited*, 170 P.3d 307, 307 (Colo. 2007) (holding that establishing a reasonable planning period, substantiated population, projections, and the amount of unappropriated water that was reasonably necessary are essential factors to consider when appropriating water rights).

BOOK NOTES

Andrew C. Mertha, *China's Water Warriors: Citizen Action and Policy Change*, Cornell University Press (2008); 168 pp; \$23.96; ISBN 978-0-8014-4636-8; hard cover.

China's Water Warriors provides an in-depth analysis of the evolution of policy-making in China regarding the quest for alternative, sustainable fuel through the use of hydropower dams. Andrew Mertha, a researcher with extensive experience in Chinese policy-making and its implementation, describes the influx of new actors into the hydropower policy-making process and explains their struggle to acquire influence in a society traditionally dominated by government control. In particular, the author focuses on controversies surrounding three hydropower projects. Mertha describes how different interactions and levels of involvement between the government and grassroots activists were the most important factors affecting the decision making process in each project.

This book evaluates issues arising from the conflicting interests of the Chinese government, native inhabitants, and other affected entities. The Chinese government is currently pursuing its goal of becoming energy independent through the development of hydropower dams on a variety of China's main waterways. Mertha describes how the government cannot achieve this goal without relocating hundreds of thousands of local inhabitants, destroying cultural relics dating back thousands of years, and devastating fertile farming land. Mertha begins by introducing the reader to the current and emerging actors advocating on both sides of this issue. Mertha states how the active roles of these participants created and changed China's hydropower policy. Mertha discusses the opponents' failure to change policy at the Pubugou hydropower project, the successful change of policy at the Dujiangyan hydropower project, and the ongoing struggle to change the policy of the Nu River Project. For each of these projects, Mertha evaluates the efficiency and efficaciousness of dam opponents in impeding dam construction through the utilization of a variety of political and other policy-making strategies.

The first chapter, *China's Hydraulic Society*, begins by examining the established Chinese belief that water is under the sole control of the government. In fact, Chinese tradition has always closely connected water related incidents with the ability of leaders to govern successfully. For example, the Chinese believed that the flooding of farmlands after a particularly powerful monsoon or the bursting of a dam might foreshadow the end of the current regime's reign. However, Mertha sug-

gests that currently China is increasingly becoming a market driven economy where the control of water is no longer solely under the management of the state. Mertha asserts that “policy entrepreneurs, issue framing, and broad support for policy change” has made possible this shift from traditional views on water management to a market driven economy.

Mertha focuses on three primary types of policy entrepreneurs: disgruntled officials, nongovernmental organizations, and the media. All three have been successful in amending policy due to their ability to allocate resources towards a particular problem and positively frame issues to potential supporters. Policy entrepreneurs frame issues by organizing information as an attractive alternative to the current policy. Even if policy entrepreneurs are not successful at changing the existing policy, the policy-making process often becomes far more diverse and pluralized. Finally, policy entrepreneurs have successfully changed policy through efforts to elevate issues beyond the local level.

Chapter two, *Actors, Interests, and Issues at Stake*, provides a detailed look at the issues surrounding the creation of hydropower dams and discusses the various interests affected by dam construction. Pro-hydropower actors, both governmental and nongovernmental, advocate for dam construction to further financial, economic, and political interests. For example, the Chinese government intends to use the revenue realized from hydropower dams to modernize the extremely underdeveloped portions of western China. The government’s goal is to benefit the severely impoverished minority groups of China through the development of the region.

Anti-hydropower actors (governmental and nongovernmental) evaluate financial, economic, and political issues, which include the protection of cultural resources and the environment. For example, anti-hydropower activists note that many of the native groups will need to resettle as a result of dam construction and will not experience benefit from the hydropower projects, as the government suggests. Mertha notes that history has shown that poverty rates of resettled people actually increase as the result of dam construction. Additionally, Mertha states hydropower dam construction may cause irreparable damage to cultural relics and the environment.

The third chapter, *From Policy Conflict to Political Showdown: The Failure at Pubugou*, details the failure of dam opponents to change policy and effectively halt dam construction in Hanyuan County in 2004. Opponents of the Hanyuan County project protested through physical occupation of dam sites, confrontations with the police, and public acts of destruction. While local support at Pubugou was strong, opponents made no efforts to expand support through the use of media outlets. In addition, opponents lacked the policy entrepreneurs’ ability to gain support on a national or international level. As a result, the more politically and economically powerful pro-hydropower actors quickly

overwhelmed the opposition forces. Mertha suggests the lack of “policy entrepreneurs” and the lack of organization were the main factors that resulted in the failure to change policy. Furthermore, non-governmental organizations (NGO’s), which could have been a vital resource to the opposition’s cause, did not participate due to the lack of organization.

However, with less threatening tactics, a variety of actors, and a different political atmosphere, opponents at Dujiangyan accomplished the reversal of pro-hydropower policy, as discussed in the next chapter, *From Economic Development to Cultural Heritage: Expanding the Sphere at Dujiangyan*. Unlike Pubugou, success at Dujiangyan arose in part from the lack of protestors occupying the streets in an unorganized and menacing manner. Without immediate resistance by the state, opponents had time to broaden support by attractively framing important issues. Opponents achieved broad public support primarily as a result of media exposure. Nearly all 180 media outlets reporting on the Dujiangyan situation sympathized with the opposition.

Additionally, the growth of national support in opposition to hydropower policy grew when Dujiangyan became a World Heritage site. The Chinese completed the Dujiangyan Irrigation System over 2000 years ago and, consequently, it has become fundamental to the Chinese people and Chinese culture. With the introduction of the proposed dams, the region would likely flood and damage the historic irrigation system. Mertha argues that this issue, coupled with national exposure through the media, was invaluable to successfully reversing policy.

Chapter five, *The Nu River Project and the Middle Ground of Political Pluralization*, discusses a hydropower dam construction case as it evolves as an example in contrast to the two extremes examined in chapters three and four. Opponents of the Nu River Project (NRP) have successfully lobbied policy makers to reduce the number of proposed hydropower dams from thirteen to four. However, NRP policy is still in conflict. Mertha attributes the current status of the NRP situation to the efforts of policy entrepreneurs, Wang Yongchen and Yu Xiaogang, the continued use of issue framing through the media to gain broad national, and international support for policy change. Wang Yongchen stands out as an important policy entrepreneur because of her efforts in revealing the extent of the poverty seen in the Nu River Valley as a result of previous hydropower projects. Additionally, Yongchen revealed the natural beauty of the Nu River Valley and the poverty in this region to the nation thanks to her photo exhibitions in Beijing and her personal visits with other journalists to the Nu River Valley. Yu Xiaogang also contributed greatly to exposing the truths of the NRP. Xiaogang brought national attention to the NRP through documenting the day-to-day lives of resettled individuals. Xiaogang’s interviews finally gave a voice to the silenced and resettled individuals. Mertha

suggests that through the committed work of individuals, exposure by the media, national environmental concern, and the organized work of many governmental and nongovernmental actors, opponents of NRP have seen a steady change in policy.

The final chapter, *A Kinder, Gentler "Fragmented Authoritarianism,"* discusses the continued ability of opponents to change policy through the combined efforts of various affected, and traditionally silenced, actors. Mertha suggests that opponents' recent success in infiltrating the policy-making process and successfully changing policy is testament to the importance of gaining national support and exposure through the media.

This book gives further coverage to the issues surrounding the traditionally silenced subject of hydropower policy-making in China. Mertha exposes the difficulties faced by dam construction opponents and gives a voice to the impoverished individuals most affected by hydro-power policy. *China's Water Warriors* remains objective while illustrating the successes of grassroots actors to oppose the policy formulated by the state and big business through strategic and organized tactics. In an area of growing energy concerns, this book provides the reader with an understanding of China's struggle to achieve energy independence in a society faced with varying interests and concerns.

Drew Eddy

John M. Whiteley, Helen Ingram, and Richard Warren Perry eds., *Water, Place, & Equity*, The MIT Press, Cambridge, Mass. (2008); 318 pp; \$25.00; ISBN 978-0-262-73191-1, soft cover.

In *Water, Place, & Equity*, numerous authors present case studies that address notions of fairness, equity and justice in decisions that effect water. Water issues will dominate natural resource policies over the next century. Although there may be enough water on the planet for societies' needs, there are many issues with water availability, including the lack of water in the proper place, misallocation, waste, and pollution. The discrepancy of the availability of water in the poorest regions of the planet, which hosts over 800 million people, raises issues in political and economic equity that policy makers need to address.

The editors divided the book into two sections. The first section contains six essays presenting case studies on how varying communities address water issues, some of which have been successful through an equitable lens and others that have yet to achieve equitable results. The second section looks at civic engagement and governance of water resources by documenting successes and failures in implementing policies that contain procedural equity. The second section concludes with a look into the impact of climate change on water resources and ways to mitigate conflicts in water by employing equitable principles.

In the introduction, editors Helen Ingram, John M. Whiteley and Richard Warren Perry discuss past water policies, the emergence of equity and justice in water management, and the need for equity to be a part of future governance. The authors talk about the importance of water and its status as a basic human right as well as water policies based on an efficiency framework. Next, they discuss water in an equitable context, looking at the history of equity, considerations of varying uses of water, community perspectives, international boundaries, and equitable principles and remedying the distributional inequalities of water resources. Lastly, the authors discuss a water ethic and looking toward sustainability.

Chapter two is an essay by Thomas Clay Arnold entitled *The San Luis Valley and the Moral Economy of Water*. Arnold defines the moral economy of water as the principles that Westerners use to inform their decisions in water practices, developments, or policies. Arnold argues the moral economy helps clarify social, political, and cultural factors as communities face growing pressures to transfer water resources to urban areas. Arnold weaves the moral economy into the story of the San Luis Valley in Colorado, illustrating the success of smaller commissions and communities in preventing large-scale transfers that would negatively affect the community's stakeholders.

The next essay, by Sheldon Kamieniecki and Amy Below, entitled *Ethical Issues in Storm Water Policy Implementation: Disparities in Financial Burdens and Overall Benefits*, discusses the need to implement equitable policies that address the diffuse nature of storm water and run-off. The essay's authors discuss storm water by studying how the more affluent communities along the Southern California coast benefit from policies upland and inland communities must implement to ensure clean water enters the ocean. The result is inequitable because the lower-income communities must pay for the benefits the coastal communities reap. The authors suggest a collaborative effort and a progressive cost sharing system to ensure there are equitable policies in place to address water quality in storm water and run off.

Equity and Water in Mexico's Changing Institutional Landscape, by Margaret Wilder, scrutinizes the reforms in Mexican water law and the success and failures of the water policies Mexico implemented in 1989. Wilder argues that, although the reforms have benefited communities in terms of political equality, such beneficial gains are discordant with the negative impacts the reforms have on economic equity, especially in the marginalized sections of Mexico. Wilder first discusses the water reform program and background. Next, she dives into the equitable implications of the reforms by evaluating three facets of the reforms: urban areas, river basin councils, and irrigation districts.

In discussing urban areas, Wilder concludes that the recent decentralization of water management in urban areas has provided some gains in political equity; however, she notes that the new water man-

agement strategies have not solved many equitable issues in water due to the lack of capital to manage and operate delivery systems. As such, communities without financial resources have to look to the private sector, which will lead to higher tariffs in poorer communities.

The network of twenty-five river basin councils also brings up both positive and negative aspects of water equity in Mexico. Wilder explains that the presence of the councils presents facets of political equity. Yet, representative members of the councils do not represent the water users in proportion to the amount of water used nor do they represent the poorer communities. Thus, although the councils represent strides in political equity, the participation strategies should be modified to allow for more equitable representation of marginalized groups.

In terms of political equity, Wilder argues the transfer of water management from the federal government to irrigation districts presents the greatest strides in political equity. Still, declines in economic equity due to free trade agreements and water markets decrease economic equity of water users in Mexico, effectively offsetting any gains in political equity.

Next, Stephen P. Mumme evaluates the evolution of equity in managing water along the United States–Mexico Border in his essay *From Equitable Utilization to Sustainable Development: Advancing Equity in U.S.-Mexico Border Water Management*. Mumme argues more equity in border water management is necessary for future binational cooperation as well as sustainable development of the border region. The essay begins by discussing the history behind dividing the Rio Grande and the Colorado River between the two nations. Mumme then looks at the U.S.-Mexico water treaty of 1944, the salinity crisis of the 1960s, and sustainable development theories to illustrate how the nations evolved to include equity and cooperation when managing their shared water resources. Mumme also explores how equitable principles transitioned from utilization and quantity to a more social context, including water quality and sustainable development. However, like the emergence of the salinity crisis, the All-American Canal is demonstrative of a more asymmetrical equity, favoring water users in the U.S. over Mexican water interests.

Part One closes on the opposite side of the U.S., with Paul W. Hirt's essay *Developing a Plentiful Resource: Transboundary Rivers in the Pacific Northwest* exploring the changing social, economical, and political landscape of water management where water is plentiful. Hirt's essay centers on key sources of conflicts in two rivers of the Pacific Northwest, the Columbia and the Fraser Rivers. Evaluating the two rivers allows Hirt to discuss the variations of water management policies as well as the evolution of river development in Canada and the United States. In this essay, Hirt explores equity in terms of competing interests along the rivers, be they Native American rights to traditional fishing grounds, logging, mining, or water used for power generation.

While the two rivers appeared to be on the same path of development, with mining, logging and over-fishing depleting the salmon populations, the two Nations reacted differently to the Great Depression, resulting in varying policies and conflicts on the rivers. Hirt concludes that the river policies and development has resulted in cyclical trends in both social values and ideological perceptions of the rivers. Still, Hirt maintains there must be an equitable balance between those who have benefited from the rivers' development and those who the development has marginalized.

Part Two, *Civic Engagement and Governance*, examines how water governance has fared or is faring in terms of equity. The sections discuss the track record water governance has in procedural equity as well as privatization and rationalization schemes. Additionally, Part Two discusses the transition between traditional and modern era water governance and the impact climate change will have on water policies and equity. The section ends with a look into the equity implications of current challenges in water resources.

In *The Global Water Crisis, Privatization, and the Bolivian Water War*, Madeline Baer discusses the how an inequitable water management policy leads to social unrest and political instability by exploring the water privatization policy in Cochabamba, Bolivia. In essence, the Bolivian government, with support from the World Bank, privatized the public water supply without input from local communities. The lack of public participation and transparency led to a successful revolution by the people due to increased water tariffs without an increase in water quality. Baer explores the dynamics of policy formation, both worldwide and by the World Bank, to argue that inequitable procedures in decision-making result in social unrest.

Ismael Vaccaro next provides a brief look into how national and international water policies in a nation can shape, directly or indirectly, local communities in *Modernizing Mountain Water: State, Industry, and Territory*. Vaccaro used the Valley of Lilet in the Catalan Pyrenees as a backdrop to explore how traditional communities evolve, from agrarian, to industrial, and now to a natural environment. First, Vaccaro explores the economic transformations to set up how water policies affected the economic and social growth in the Valley of Lilet. Second, Vaccaro discusses the evolution of water policies in Spain to show how modernization of water policies, from the rush to build dams for hydro-power to modern European Union regulations that emphasize sustainability, reflect the existing and past values of water in the Valley. Third, the essay presents the local ramifications of water policies, including the loss of farms and development of local communities advanced by industry. Lastly, the essay ties all of these facets together to discuss how water policies went from privatization to nationalization and, currently, back to a process of re-privatization. Vaccaro links equity into the evolution of water policies and the Valley of Lilet by dis-

cussing how the variations in policy and transformations of the Valley did not include equity in decision-making. Instead, the policies stemmed from concerns about efficiency, productivity and the individual. Vaccaro suggests a more holistic approach in developing policies that study how water policies, economic transformations and local consequences of both shape productivity and demographics.

In *Whose Water Is It Anyway? Water Management, Knowledge, and Equity in Northeast Brazil*, Maria Carmen Lemos raises issues on the availability of technological and scientific information to stakeholders in water management decision-making processes in Brazil. In Brazil, a new system of water management has emerged creating river basin councils that have led to broader societal participation. Even so, Lemos points to issues in equity because non-elite groups still feel excluded from the decision-making process, mainly because they feel the elite groups use technical knowledge as an instrument of authority over the smaller groups. Further, they find the information is not widely available nor easily accessible or understandable. As such, the new councils still do not provide an equitable voice to all groups in the river basin regarding the management of water resources.

The book concludes with *Water and Equity in a Changing Climate* by Helen Ingram, David Feldman, and John M. Whiteley. This essay differs from the rest because it is not a case study. Instead, the authors focus on climate change and alternatives in decision-making that include implementing equitable principles. The authors raise issues in water management in climate change, not just in context of drastic swings in weather patterns, but also water challenges facing new energy technologies on the horizon to combat climate change. Additionally, the authors discuss strategies to incorporate equitable principles in decision-making processes, including (1) covenants, (2) categorical imperatives, and (3) environmental stewardship and ethics. Through these strategies, the authors suggest a means to address the current and future challenges facing water resources to ensure future management policies are equitable.

Water, Place, & Equity brings together a series of case studies that successfully illustrate the need to have equitable principles in place to ensure the future of sustainable water resources. The essays provide a rubric in not only understanding why equity must be a part of the decision-making process, but provides possible ways to bring equity to the table during the process. The case studies provide invaluable lessons for policymakers.

Elizabeth Dawson

Albert E. Chandler, *Elements of Western Water Law*, Technical Publishing Co. (photo. reprint 2008) (1913), 168 pp; \$16.99; ISBN-13: 978-0559735721; hardcover.

In 1913, the same year the last horse-drawn streetcar ended its journey down the streets of San Francisco, Albert Chandler published *Elements of Western Water Law*. Originally, the *Journal of Electricity, Power and Gas* published each chapter of *Elements* separately. The chapters represented an abbreviated portion of the course "Irrigation Institutions," a class given to advanced students in the Colleges of Agriculture and Civil Engineering at the University of California. Chandler intended the publication to be accessible by those not trained in jurisprudence. With this audience in mind, Chandler kept his publication objective, clear, and succinct, despite its heavy dose of cases and statutory law.

Although each chapter of *Elements* stands alone as its own compendium on the assigned topic, each chapter builds upon the knowledge accrued in the previous chapters. *Elements* begins by setting a historical scene - the Western mining days. Chandler then moves into legal doctrines governing water use in the West. Once these concepts are firmly in place, Chandler delves into each Western state's statutory scheme. Next, Chandler addresses the law governing specific appropriation-related situations. Nearing the end, Chandler discusses the acts and entities involved with irrigation enterprises. Chandler concludes with a chapter summarizing the prior chapters and, with each issue, includes a policy recommendation for the future.

The First Chapter discusses the long history of appropriative rights, beginning with the miners and native Indian tribes. Although early common law recognized appropriative rights, prior to the Act of 1866 miners and others were trespassers on public domain. To solve this problem, Congress passed the Act of 1866, establishing the right to use water by a priority of possession; likewise, California passed the Act of 1872, codifying the common law principles of prior appropriation.

Chapters Two through Five read like a modern day legal textbook. Each chapter begins with a legal doctrine: *Riparian Rights in the Western States*, *The Law of Underground Water*, *The Doctrine of Appropriation*, and *The Loss of Water Rights*. The case summaries, opinion excerpts, and explanations of the case holdings flesh out each chapter. Chandler expands the discussion by comparing and contrasting the Western states' treatment of each doctrine. In the chapter concerning riparian rights, Chandler details the split between the "California Rule" (modified riparian) and the "Colorado Rule" (prior appropriation). In the underground waters chapter, Chandler notes the inconsistencies of the California courts' reasoning. He points out that while California was not willing to depart from the riparian system for surface water, despite the system being unsuitable to the climate, the argument was enough to convince the court to abrogate the rule in the case of percolating

groundwater. *The Doctrine of Appropriation* and *The Loss of Water Rights* chapters set the stage for the next chapter, which compares the codification of the doctrine of appropriation in each state's water right legislation.

Chandler begins Chapter Six, *Water Right Legislation*, by pointedly emphasizing that California has made no legislative progress since the Act of 1872. He continues in detail about every other state's method for acquisition, adjudication, definition, and distribution of water rights. Following, he explains the two major regulatory differences between the states' procedures. First, states differ in what regulatory body determines water rights. In Wyoming, Nebraska, and Nevada, the state water engineer or board determines rights, and decisions are subject to review by the court on appeal. In the remaining states, save Oregon, the courts grant the rights after the state engineer assembles physical data. The Oregon statute combines these approaches and provides for immediate review of the board determination by the circuit court. Secondly, in most states, the intending appropriator must file an application with the regulatory body, and the regulatory body's approval creates a water right. Alternatively, a few states still follow the "crude" practice of posting notice.

After addressing these generalities, Chapters Seven and Eight examine the facts and law of two specific situations: interstate stream conflicts and rights-of-way. The discussion begins in the context of *Kansas v. Colorado*, in which Kansas charged Colorado with wrongful diversion of the waters of the Arkansas River. Chandler goes on to discuss several other cases and ends the chapter with five maxims summarizing interstate stream law. The second situation Chandler addresses is obtaining a right-of-way over public lands for ditches and reservoirs. In Chapter Eight, Chandler pays special attention to rights-of-way for power production purposes, and suggests several policy changes to increase security of power investors.

The topic of the class at the University of California, "Irrigation Institutions," makes up Chapters Nine through Twelve. Chandler first addresses commercial irrigation enterprises. He breaks these enterprises down into three categories: those "renting" water, those selling water rights but not interest in the irrigation system, and those selling water rights and a right in the irrigation system. Chandler concludes the chapter by emphasizing that the user is the party who owns the right to the water, not the irrigation company; thus, commercial entities cannot gain a "monopoly" on water rights. The next chapter discusses two early Acts that increased irrigation on public lands, the Desert Land Act and the Carey Act. The Desert Land Act allowed any citizen to enter and claim public desert for the purposes of cultivation. Under the Carey Act, the federal government agreed to donate public land to states if a state agreed to irrigate those lands. While the Carey Act saw significant success, the Reclamation Act, the subject of Chapter

Eleven, secured the most actual irrigation. The Reclamation Act ensured actual irrigation by providing that the users would not receive title to the water until they actually cultivated at least half of the land. Finally, Chandler discusses the creation of irrigation districts, which serve the purpose of controlling the now extensive irrigation practices.

Elements' final chapter begins by recapitulating the riparian and appropriative water rights doctrines. It then summarizes Western states' "new" legislation and congratulates these states on their efforts. Chandler ends his publication with a final plea to California to legislatively adopt a new appropriative standard of water rights.

Elements of Western Water Law is remarkably ahead of its time. It is the combination of a contemporary history, legal textbook, and policy directive. From a historical perspective, *Elements* provides a firsthand look at the development of a legal system from the ground up and a snapshot of the players involved. From a practitioner's standpoint, *Elements'* greatest attribute is its account of the evolution of the statutory frameworks. By understanding the foundation of Western water law, a practitioner can gain an increased understanding of the structure of current law. Finally, underlying Chandler's meticulous common law and statutory discussion are the author's policy values. These values include the need for regulatory uniformity across the states, "business minded" - or, in modern tongue, "economically efficient" - solutions, and laws that recognize the unique character of the American West. Policymakers will find Chandler's thorough discussion and careful reasoning applicable to today's challenges in determining the future regulation of our most precious resource.

Alyson Gould

Community-Based Water Law and Water Resource Management Reform in Developing Countries, CABI (Barbara van Koppen, Mark Giordano, and John Butterworth, eds. 2007); 304 pp; \$150.00; ISBN 978-1-84593-326-5; hard cover.

Community-Based Water Law and Water Resource Management Reform in Developing Countries is a collection of essays from experts across the globe. CABI published the collection in response to the frequent neglect in developing countries toward the preservation and support of informal and often culturally-based systems of water management at the local level. Applying case studies from Africa, Asia, North and South America, and Australia, the collection seeks to chart out the appropriate roles of public sector water resource management and its interface with community-based water arrangements. Each chapter analyzes the appropriate mix of public sector intervention on community-based water law specific to the needs of a particular place. The first chapter introduces the rationale for this collection: to contribute to a vision of emergent regulatory systems in developing countries that

recognize and incorporate the needs of informal communities' access to water and its beneficial uses. The Chapter also provides a brief overview of the subsequent chapters' contents and key messages, highlighting the attributes and the limits of community-based water law.

In Chapter Two, *Understanding Legal Pluralism in Water and Land Rights: Lessons from Africa and Asia*, Ruth Meinzen-Dick, and Leticia Nkonya use examples from Asia and Africa to set the stage of pluralistic legal framework for water management. The authors examine the implications for conflict and for water rights reform processes. Meinzen-Dick and Nkonya also discuss the distinguishing characteristics, as well as the interconnectedness, of land and water rights. To articulate the vital relationship between land and water rights, the authors explain how, in dry areas, water rights are essential to control and use of pasture. Through the examples, the chapter details how developing countries must look to their local customary institutions to identify the appropriate links between water and land use and to develop functional pluralistic frameworks for these rights.

In Chapter Three, *Community Priorities for Water Rights: Some Conjectures on Assumptions, Principles and Programmes*, Bryan Bruns focuses on community participation in water rights negotiations for the improvement of basin-scale governance. Bruns provides an analysis of the communities' perspectives on water allocation in contrast to the assumptions that support formal basin-scale governance. Bruns identifies a set of measures to support community involvement in basin water governance that can better serve the communities' priorities for negotiating water rights. These measures include legislative reform, legal empowerment, networking, advocacy, participatory planning, technical advice, and facilitation.

Chapter Four, *Dispossession at the Interface of Community-based Water Law and Permit Systems*, by Barbara van Koppen, challenges the assumption that permit systems are the best legal device to address the challenges of water scarcity. Van Koppen looks at the origins of water permitting systems in Roman water law and traces their diverging developmental paths in high-income and low-income countries. She explains that in mid- to low-income countries in Latin America and sub-Saharan Africa, States historically introduced permitting systems to divest the indigenous populations of their prior water claims. Van Koppen provides evidence that modern water law revisions, which she promotes as "Integrated Water Resources Management," run the risk of reinforcing such colonial legacies and further dispossessing the majority of informal water users.

In Chapter Five, *Issues in Reforming Informal Water Economies of Low-income Countries: Examples from India and Elsewhere*, Tushaar Shah takes a broad assessment of water institutions in India, while including examples from Mexico, China, and Africa. Shah applies the New Institutional Economics approach to an analysis of the processes that influ-

ence institutional change. The analysis helps shed light on the failures of regulatory means in formal water reform to incorporate the informal *institutional arrangements*, such as the informal rules-already-in-use that local communities establish among themselves. Shah identifies the four greatest challenges in developing functioning water economies in poorer countries as: (i) improving water infrastructure through better investment and management, (ii) promoting institutional innovations that reduce transaction costs and rationalize incentive structures, (iii) using indirect instruments to work towards public policy goals in the informal sectors of the water economy, and (iv) undertaking vigorous demand side management in formal segments of the water economy.

Chapter Six, *Legal Pluralism and the Politics of Inclusion: Recognition and Contestation of Local Water Rights in the Andes*, by Richard Boelens, Rocio Bustamante, and Hugo de Vos, explores the conflictive interface between indigenous water rights systems and formal permit systems in Andean countries. The authors document several cases that exemplify the limits of legal solutions that aim to incorporate local and indigenous rights systems as distinct sets of rules and rights within a national system. These limits underscore the problematic “politics of recognition,” or, rather, the relationships of power that are embedded in a system of how rights are recognized and by whom. The authors appeal for a critical analysis of the power relations that underpin these systems.

Chapter Seven, *Water Rights and Rules, and Management in Spate Irrigation Systems in Eritrea, Yemen and Pakistan*, by Abraham Mehari, Frank van Steenberg, and Bart Schultz, compares spate irrigation systems in Eritrea, Yemen, and Pakistan. Spate irrigation is a system of harvesting and managing floodwater. This chapter illustrates that the sound and well-enforced rules of farmer organizations have been optimally productive for centuries. The authors propose that the public sector should build upon these attributes of local flood management systems to effectively develop formal water and land rights for spate irrigation.

Chapter Eight, *Local Institutions for Wetland Management in Ethiopia: Sustainability and State Intervention*, by Alan Dixon and Adrian Wood, begins by illustrating the complex, locally developed arrangements for wetland use in western Ethiopia. The chapter continues by examining the evolution of the interconnection between these local arrangements and external institutions, such as landlords and government agencies. These local arrangements historically relied on the authority of external intervention to maintain their local legitimacy. The authors assess the risks of this dependency and propose that the sustainability of these local arrangements, and arguably wetland management itself, is dependent upon achieving the right kind and the appropriate balance of external support. In their argument, the authors recognize the value of local knowledge, local decision-making, and social capital.

Chapter Nine, *Indigenous Systems of Conflict Resolution in Ormia, Ethiopia*, by Desalegn Chemeda Dossa, Seleshi Bekele Awulachew, Regassa Enermu Namara, Mukand Singh Babel, and Ashim Das Gupta, describes the role of the *gadaa* system, which is a social, political, economic, and religious system of governance for the Boran people of South Ethiopia. The *gadaa* system also establishes the community-based water laws and practices of conflict resolution for the Boran people. The authors suggest that the State should avoid top-down imposition of formal laws that replace the customary arrangements already in place. Rather, the authors argue, the state should build upon the *gadaa* system, integrating the mechanisms of conflict resolution into a system of formal laws.

In Chapter Ten, *Kenya's New Water Law: An Analysis of the Implications of Kenya's Water Act, 2002, for the Rural Poor*, Albert Mumma argues that, to the extent the Water Act depends on a centralized State-based legal framework, the Act fails to recognize Kenya's pluralistic legal framework. Mumma provides examples of misguided government practice and details their shortcomings, such as permitting systems for community-based water systems. He explains: (i) that permits are only available to those with formal land title and, therefore, exclude the vast majority holding customary land tenure; (ii) the right to provide water services is subject to permitting requirements; and (iii) that it is necessary to formalize the community self-help water systems as businesses. Mumma concludes that the Act provides little benefit for the rural poor.

Focusing on the Nyando River basin in Kenya, Chapter Eleven, *Coping with History and Hydrology: How Kenya's Settlement and Land Tenures Patterns Shape Contemporary Water Rights and Gender Relations in Water*, by Leah Onyango, Brent Swallow, Jessica Roy, and Ruth Meinzen-Dick, reviews recent public reforms that affect the water sector in context of Kenya's history of land tenure and settlement. The chapter discusses the history of women's water rights in the context of the colonial and postcolonial land and water policies. It also documents seven different land tenure systems and their specific water rights regimes. The authors recommend that new policies, legislation, and government institutions can be more effective in meeting the needs of Kenya's rural communities.

Chapter Twelve, *Irrigation Management and Poverty Dynamics: Case Study of the Nyando Basin in Western Kenya*, by Brent Swallow, Leah Onyango, and Ruth Meinzen-Dick, follows the distinct poverty trends in three approaches of irrigation development in Kenya's Nyando basin over the past 20 years. The three approaches are a top down planning approach, a centralized service approach, and an unregulated small holder approach. The authors analyze evidence to establish: how recent state withdraw from the top-down planning scheme led to the scheme's collapse and poverty aggravation; how that poverty has in-

creased slowly in areas with unregulated irrigation; and, why poverty remained stable in areas where the centralized agency schemes served the region.

Chapter Thirteen, *If Government Failed, How Are We to Succeed? The Importance of History and Context in Present-day Irrigation Reform in Malawi*, by Anne Ferguson and Wapulumuka Mulwafu, examines the history of irrigation development in Malawi and the interface between new formal irrigation, water laws, and customary practices in two small holder irrigation schemes, which the state assigned for transfer to water user associations. The authors analyze why the formalization of the state's water laws, rather than securing small holder's rights to land and water, is opening the door for local elites to capture these resources.

In Chapter Fourteen, *A Legal-Infrastructural Framework for Catchment Apportionment*, authors Bruce Lankford and Willie Mwaruvanda propose a water management framework for Tanzania's Upper Great Ruaha catchment for upstream irrigators and downstream users that combines formal and informal water rights systems. The authors identify different technical approaches of intake structures for the purpose of developing a proportional sharing scheme that best accommodates: the hydrology; local, fair, and transparent water sharing methods; and the implementation of formal water rights.

The final chapter, *Intersections of Law Human Rights and Water Management in Zimbabwe: Implications for Rural Livelihoods*, by Bill Derman, Anne Hellum, Emmanuel Manzungu, Pinimidzai Sithole, and Rose Machiridza, compares the history of Zimbabwe's national water legislation with Zimbabwe's customary legal system for domestic and productive water uses. The chapter also explores the orientations of livelihood in customary arrangements, as compared to the priority right for "primary water uses" in the national laws. The authors expand their analysis to include a comparison of the national concept of "primary water uses" with the international community's evolving definitions of a human right to water. Evidence suggests that states' recognition of a right to water and livelihood in local water management can respond better to poverty and gender inequalities.

This book is crucial material for the development of a new vision of the role of states in water resources management. Written from an essentially African position, but including Latin American and Asian perspectives, these essays articulate the interests of rural, poor, and marginalized peoples in these regions and challenge the domineering European perspectives on water laws of developing countries. Therefore, this collection ought to be essential material for researchers, administrators, educators, and implementers alike who are concerned with the development and implementation of policy in water management of developing states.

Dean Price

Frederick D. Gordon, *Freshwater Resources and Interstate Cooperation: Strategies to Mitigate an Environmental Risk*, State University of New York, Albany (2008); 172 pp; \$60.00; ISBN 978-0-7914-7635-2; hardcover.

Frederick D. Gordon designed *Freshwater Resources and Interstate Cooperation* to act as a research tool to facilitate the study of interstate water accords and the role they play in mitigating environmental and public health catastrophes. Citing how over 3.5 billion people will lack clean drinking water in only twenty years, this book focuses on: (1) the risks of failing to establish interstate water accords; (2) the development of environmental, political, and sociological theories that govern water accords; and (3) the pitfalls and successes of specific water accords in three detailed case studies (Israeli-Palestinian, Lesotho Highlands, and the River Danube). Within the case studies, Gordon diligently applies the theories of cooperation he addressed earlier in the book, explains the methodology behind each study, and buttresses the book with appendices describing the data and conclusions he reached.

In Chapter One, Gordon begins by discussing the need for interstate water accords, citing harrowing statistics that predict devastating results if states cannot figure out how to share this invaluable and fragile resource. This chapter describes the present and potential health and environmental problems on a global scale and offers insight into the causes of water scarcity and possible avenues of mitigation. He then lays the foundation knowledge of water accords and water basin treaties, and concludes with a summary of the key concepts addressed in the chapter.

Chapter Two, *Overview of Explanatory Theories for Interpreting Interstate Water Accords*, delves into the theories that shape interstate water negotiation and compromise. Gordon addresses many different theories that play an important role in the development of water accords. Specifically, Gordon highlights two perspectives, ecological modernization and global environmentalism, that he believes play a major role in understanding water cooperation. Ecological modernization explains how private and public actors within a state increasingly emphasize a willingness to embrace environmentalism to respond to economic or environmental shortages. Gordon describes global environmentalism as the recognition that environmental risks influence domestic and international political agendas.

Chapter Two also addresses various other paradigms that influence the creation and resiliency of water accords, such as democratic peace theory, negotiation theory, the influence of third parties, the public trust doctrine, social ecology, conjunctive water management, and common pool resource theory. The chapter concludes by addressing hypotheses posed by the implementation of these perspectives. Overall the author posits nine hypotheses based on the interplay of these vari-

ous theories of water sharing, which Gordon examines and explains in the next chapter.

Chapter Three, *A Quantitative Assessment of Interstate Water Accords, 1950-1999*, provides a quantitative interpretation of sixty-eight individual water accords and addresses the hypotheses raised in chapter two. It introduces and describes the basis of the empirical data provided and then describes how the author scored individual water accords, based on scores given to treaty ratification and water distribution. Generally, the author found that bilateral accords scored higher than multi-state accords, and that states frequently ratify interstate water accords.

The chapter next examines the nine hypotheses raised in chapter two. The first three hypotheses discussed how public participation, water scarcity, and multiple party negotiations effect cooperation. Hypothesis 1 examined whether "greater level of public participation . . . [was] evidence of higher level of cooperation within interstate water accords." While conceding that this hypothesis warrants greater examination, Gordon generally found that multi-level societies help achieve environmental cooperation and that public participation facilitates accord cooperation. Hypothesis 2 asks whether "nations facing acute water scarcity shortages exhibit lower levels of cooperation." Gordon found mixed results when testing this hypothesis, which is largely based on geopolitical theory. While it seems natural that states will resort to heated conflict over limited supplies more quickly than states with plentiful supplies of freshwater, Gordon offered the India-Pakistan Indus Water Treaty and the Okavango River Basin Treaty as examples where even water-scarce nations can redistribute water equitably and without conflict. However, the author also clarifies these examples by citing the Israel-Palestinian accords (Oslo) as examples where neighboring water-scarce states ratified water accords, but failed to distribute the water equitably. Hypothesis 3 examines the negotiation process and asks whether a unilateral or a multilateral negotiation process produces a higher level of cooperation. Surprisingly, the data revealed that multilateral negotiations produce similar data to bilateral negotiations, which runs counter to preconceived notions that two parties will negotiate more fluidly than multiple parties.

The next four hypotheses analyze how domestic and international politics affect the success of a water accord. Gordon's fourth hypothesis "posits that treaty ratification is a precondition for equitable water redistribution." Again the results raised the need for greater analysis, as while treaty ratification correlated with greater water distribution, the highest level of distribution occurred over four decades ago and the data indicates that distribution levels are decreasing. Gordon believes that this results from an increasing scarcity of freshwater. Hypothesis 5 asks whether "political trust is integral to developing interstate water accord cooperation." He describes the difficulty in measur-

ing "political trust" because, while it may lead to greater cooperation between states and thus treaty ratification (because states ratify most accords), political trust must also influence water distribution and most accords do not distribute water equally. Gordon derives Hypothesis 6 from game theory and asks whether "internal support for accords reflect greater levels of cooperation than solely national support." The hypothesis rests on the contention that domestic factors drive international actions, and the data largely confirms that assumption. Internal domestic support over an accord will render it more successful than simply the support of individual leaders. Hypothesis 7 attempts to discern whether an increase in the scope of conflict between two states leads to greater room for cooperation. However, Gordon believes that this theory is too complex to analyze through quantitative measures. While an increase in water will likely lead to an increase in the power of a state, which is likely the chief motivation of most states, the data does not accurately reflect a nation's true motivations in negotiating or why the nation entered into negotiation in the first place.

The final two hypotheses examine issues that preceding seven hypotheses failed to address, but that the author expects may play an important role in the success of water accords. However, Hypothesis 8, that the need for greater environmental protection influences cooperation, garnered no empirical support. Gordon stated that this approach depends on an overly optimistic assumption that states will focus on environmental protection equally as much as economic development, even in the context of water scarcity. However, states rarely treat environmental protection as an independent consideration, and thus this theory carries no weight. Hypothesis 9 posits that "the greater the role of the managing institution, the greater the probability of accord ratification." While this final hypothesis lacks the support of quantitative data, Gordon places considerable emphasis on this hypothesis, believing that third party managing institutions can play a major role in not only treaty ratification, but also equitable water distribution. As Gordon discusses in Chapter 5 and 6, third party interveners played an important role in the creation of Lesotho Highlands water accords, as well as the creation of the River Danube Accords. Third party interveners add needed structure and objectivity to the negotiation process and facilitate equitable water distribution.

Chapter Four, *Comparative Case Study Introduction and Case Study Number One (Low Level of Cooperation)*, identifies the vital factors that influence whether or not states can agree on an accord. Namely, the chapter analyzes how political trust, history, and culture influence the level of cooperation. This chapter then provides a diachronic and synchronic analysis of those factors through the book's first case study, the Israeli-Palestinian Interim Accords, which took place from 1993-95. The case study observes the low level of cooperation that took place within these accords and tries to explain some of the reasons behind

their problems. Recognizing that water management strategies alone cannot solve the deep-seeded problems between these two parties, the author uses this accord as an example that even perpetually feuding parties can find solutions to their water scarcity issues. However, this case study reveals not only the low level of cooperation between these two parties, but the inequitable water redistribution as well. As expected, the security dilemma between these two states proved too great an obstacle to the creation of an efficient and equitable water accord.

In Chapter Five, *Case Study Number Two: Lesotho Highlands Water Accords (Medium Level of Cooperation)*, Gordon provides an examination spanning from the 1986 water accord between South Africa and Lesotho to the 1989 Lesotho Highlands Water Project ("LHWP"), which the treaty created. Grown out of intense water scarcity and exacerbated by prolonged drought, the accords eventually developed through a combination of third party interveners (such as the World Bank), coercion (through South Africa's forcing of a regime change in the Lesotho government), and sheer power (South Africa established itself as a regional hegemon long before the treaty became necessary). According to Gordon, this case study represents a classic case of geopolitics, where resource scarcity in contiguous states led to lower levels of cooperation. He attributes at least a portion of the accord's resiliency to the third party interveners that helped shape the treaty, as well as the third party agencies that the treaty created. Specifically, Gordon points to the LHWP, which provides much needed economic diversity and stability to the region.

Chapter Six, *The 1994 Convention on Cooperation for the Protection and Sustainable Use of the River Danube (High Level of Cooperation)*, illustrates how states can achieve high levels of cooperation despite widespread water scarcity and multiple interested parties; the treaty required the cooperation of thirteen separate nations. Gordon believes that the great success of this accord resulted from multiple factors. First, the presence and support of third party managing institutions, such as the European Union, helped to provide the financial and structural supports necessary for the success of an accord of this magnitude (the Danube is the second longest river in Europe). Second, high levels of political trust between the nations' governments, their citizens, and the third parties involved resulted in high levels of cooperation among the negotiating parties. Third, consistent with game theory, high domestic support among the citizens of the nations involved allowed the leaders of states to make decisions knowing that their citizens supported these decisions. Finally, the parties involved made appreciation of the environment a goal during the negotiations and for the eventual treaty.

Gordon concludes with a chapter summarizing the theories, studies, and results described in the previous chapters. This final chapter examines the successfulness of each hypothesis as well as the major findings from the case studies. Gordon reminds the reader of the

great need for facilitating equitable distribution of this very fragile resource, and provides areas of concern for future authors to investigate and discuss, so as to help ensure humanity protects its most precious natural resource for the years ahead.

This book appeals to an audience interested in either finding a summary of the current studies concerning interstate water accords or finding a starting place to focus further study. While the author explains much of the research and literature behind water accords, he leaves many avenues for perspective researchers to explore. For anyone exploring or considering this area of study, this book is essential. It provides a much-needed overview of the topic and provides a fantastic cross-reference of a variety of unconnected theories to interstate water accords.

Dennis Woody

Chris Wood, *Dry Spring: The Coming Water Crisis of North America*, Raincoast Books, Vancouver, B.C. (2008); 384 pp; \$22.95; ISBN 1-55192-814-0, paperback.

Dry Spring is a comprehensive examination of current and future environmental and geopolitical issues arising from the world's changing weather patterns and their effects on the distribution of water. Chris Wood, a journalist and author by trade, combines interviews, specific narratives and personal experiences from his travels to elucidate the various issues arising from water's use and distribution throughout North America. Wood then extrapolates these stories and examples to demonstrate climate change's global effect on fresh water.

Dry Spring opens by examining the gamut of environmental crises and natural disasters caused by shifting weather patterns and the distribution of water. The first chapter opens with a narrative set in British Columbia's burgeoning Okanagan Valley. Wood uses the narrative to demonstrate how population growth in a semi-arid climate with limited hydrologic resources, coupled with drought conditions, leads to a tinderbox and rampant forest fires. This narrative segues into an examination of the increase in fires throughout the world's forests. Wood examines historical data from each populated continent to demonstrate climate change's direct influence on forest and wild land fires. Chapter two's in-depth discussion of drought flows naturally from the first chapter's examination of dry and burning forests. In this chapter, Wood provides a thorough representation of the disastrous compounding effect drought has on agriculture, business and the world's population in general.

Following the discussion of fire and drought, *Dry Spring* delves into the opposite end of the weather spectrum in its chapter 3 discussion of what Wood labels, "The Curse of the Plenty." Wood cites several specific instances, such as hurricane Katrina, as examples of the intensify-

ing weather throughout the continent and the world. *Dry Spring* takes time to note the fact that even though there may be more water coming down at a specific instance, use capabilities and absorption ability rarely coincide. The discussion of violent and wet weather leads well into chapter 4's topic of the warming climate's effect on snow and ice. In this chapter Wood takes time to demonstrate that disappearing snow and ice equates to diminished fresh water storage capacity. Again, Wood observes historical patterns to show that winters are generally becoming shorter while summers are getting longer. Throughout chapters three and four Wood notes the inherent problems with the timing of the release of water and humankind's ability to put such releases to use.

In chapter 5, Wood diverts from the discussion of changing weather and its effects on the distribution of fresh water, and instead takes an in-depth look at The Great Lakes and their many surrounding controversies. Much like most of the other chapters, chapter 5 opens with a crisp narrative; this one is set in the forests of Michigan. The story of groundwater pumping in Michigan blends seamlessly into the ongoing debate between Canadian Great Lakes provinces and their counterparts in the United States over the use and protection of the lakes. Wood notes the stark differences and surprising similarities on each side of the border and amongst the several states and provinces.

Chapter 6 is a comprehensive historic and factual discussion of the Colorado River system. This chapter focuses on the problems innate in Herbert Hoover's Colorado River Compact. Wood thoroughly examines the history and future of the river, including the impact of its many dams and diversions. The discussion includes varying examples of the vast changes that have occurred to Northwest Mexico and the American Southwest throughout the taming of the Colorado.

Chapter 7 continues the region specific theme of chapters 5 and 6, this time focusing on the eastern slope of the Canadian Rockies in the province of Alberta. This chapter introduces the reader to the numerous problems inherent in overuse of groundwater in arid landscapes. Wood opens this chapter with a story of a large lake and its dramatic decrease in volume. This story leads into a discussion of the oil sands in northern Alberta and the vast amounts of water necessary to extricate their valuable crude. Wood closes the chapter with a detailed discussion of agriculture and its future in the province.

Wood expounds the theories and predictions of several climatologists, biologists and other scientists in chapter 8 of *Dry Spring*. This chapter is not merely a recap of the first four chapters, but instead attempts to demonstrate the varied and unpredictable effects the changing climate will have in the future. The chapter's title, "Outlook 2030: Wild and Wilder," illuminates its content. Wood notes the erratic changes experienced recently are only a precursor of what is to come. Wood states that it is increasingly difficult to predict the weather and

its constant changes because human inputs to climate change have such a delayed effect. Throughout the chapter, Wood is meticulous in explaining the compounding effects of a warming climate.

In chapter 9, Wood examines the various methods and structures humankind has implemented to divert and store water in order to provide urban, agricultural and industrial needs. The chapter recants the historical uses of dams, reservoirs and diversions. In examining the history of water projects, Wood notes the diminished utility of large dams and reservoirs, as well as the need for alternative storage methods. In addition to marginal utility, Wood explains the various negative environmental impacts water diversion and storage structures have exacted.

Chapter 10 of *Dry Spring* is much less doom and gloom in its examination of what governments, corporations, organizations and individuals have done and can do in the face of global climate change. Throughout the chapter Wood examines environmentally friendly ways to save, treat and use water. Wood closes the chapter noting that more entities must enact such measures if they expect to handle the unpredictable future of weather.

In the final chapter of *Dry Spring*, Wood takes a chance to speak directly to his fellow Canadians. He notes that many Canadians can ease up on their extreme "aqua-nationalist" position, because it is highly unlikely that the Americans will ever come storming with their guns to steal Canada's water. Throughout this chapter, Wood takes a reasoned, logic based approach and systematically debunks several of the cano-centric arguments espoused in Maude Barlow's book *Blue Gold*. In a well reasoned and compassionate statement, Wood notes that it is inappropriate to hoard water when your neighbor is dying of thirst.

The vivid narratives throughout *Dry Spring* put a human face on the devastating impact of a lack or overabundance of fresh water. Woods' consistent use of citations in the book bolsters many of his arguments and thus his overall credibility. Overall, *Dry Spring's* forceful imagery is effective in conveying the urgency of global climate change. Though in general *Dry Spring* is a warning of coming crisis, it provides a calm centrist view on how such a crisis can be prepared for and minimized.

Tim Fiene

Roberta Ulrich, *Empty Nets: Indians, Dams, and the Columbia River*, Oregon State University Press (2nd ed. 2007); 254 pp; \$19.95; ISBN 0-87071-469-4; soft cover.

Empty Nets: Indians, Dams, and the Columbia River provides a thorough history of the Columbia River Indians' struggle to maintain their treaty-granted right to fish in the face of economic development, apathetic bureaucracies, and a sometimes hostile public. Roberta Ulrich, a former reporter for United Press International and *The Oregonian*,

chronicles the story from the first of a long line of broken government promises in the 1930s to today.

Ulrich first learned about the ongoing Columbia River saga in the 1970s. Forty years after the construction of the Bonneville Dam, the Army Corps of Engineers had only provided the Indians with one-tenth of the land the government promised as replacement for flooded fishing sites. Ulrich, haunted by the federal government's indifference toward the Indians, has closely followed the developments surrounding the Columbia River Indians' struggle since the 1970s. The recent history of the Columbia River Indians, as told by Ulrich, is a tale of false promises, prejudice, politics, and, above all, a people's persistence.

In the first chapter, *The Dam*, Ulrich describes life on the river before the construction of the first dam through the words of those who remember it. In the 1930s, children learned their tribe's centuries-old fishing customs and often lived on the river most of the year, only returning to the reservations for the winter months. The author emphasizes the central importance of salmon in the lives of the people who call themselves the "People of the Salmon." Not only did the salmon provide subsistence, as they had for thousands of years, but salmon were also central to the Indians' religion. Despite encroachment by whites, attempts at forced assimilation by the government, and opposition from industry, the Columbia River Indians had managed to maintain their fishing customs. Then, in 1933, President Roosevelt ordered work on the Bonneville Dam along the Columbia River as part of a plan to fight the Great Depression. As the water behind the dam rose, a number of the Indians' fishing sites and homes became submerged.

The second chapter, *The Promise*, details the beginning of the Indians' long struggle to receive compensation for the lost fishing sites in the form of "in-lieu" sites. The Bureau of Indian Affairs, with the help of 30 Indians who provided affidavits, brought a claim against the Army Corps of Engineers for compensation for loss of the sites. After months of negotiations and delays caused by bureaucratic stalling and disagreement amongst tribes, the Corps agreed to provide the Indians with six in-lieu sites, totaling approximately four-hundred acres, as compensation for the flooded sites.

Chapters Three and Four, *Money and War* and *Dams and Delays*, cover a series of delays that kept the Corps from purchasing the land that it promised to obtain for in-lieu sites. WWII and a lack of funding delayed the promise. After repeated failed attempts to obtain \$50,000 for work on the proposed in-lieu sites, the Corps finally received the money in 1945. However, the money was never used for purchasing in-lieu sites. That same year, with power generation in the growing Pacific Northwest becoming a pressing need, the Corps authorized the construction of the McNary Dam and recommended construction of the Dalles Dam. The proposed Dalles Dam would flood Celilo, one of the largest, oldest, and most important fishing sites on the Columbia

River. Ulrich details how, despite protests by the Indians, it was inevitable that development interests would prevail. In the meantime, the Corps slowly moved forward on negotiating the purchase of in-lieu sites. By 1953, fourteen years after promising replacement sites, the Corps began work on four sites that came to only a fraction of the promised acreage.

In Chapters Five and Six, *Another Loss* and *Half a Loaf, of Less*, Ulrich describes the fight against and aftermath from the construction of the Dalles Dam. Though the tribes eventually won a settlement of \$27 million as compensation for the losses from the construction of the Dalles Dam, problems did not end. The settlement resulted in resentment between the tribes and river people. Many river people did not belong to a formal tribal organization. As a result, they resented sharing the settlement money with those who lived on the reservation and never came to the river. The completion of the dam and subsequent flooding of Celilo resulted in a dislocation of the river communities. Proud fisherman had no choice but to accept dead fish from hatcheries in order to support their families. Despite the pain of the Celilo loss, the Indians continued their fight for the in-lieu sites. The Corps eventually obtained a small site at Cascade Locks. However, even with that addition, the Corps still had \$40,000 leftover, but provided only five sites totaling forty acres.

In *Under Attack*, Ulrich describes the struggles of those who lived on one of the few in-lieu sites. The Corps had promised to provide facilities at the in-lieu sites for drying fish. The facilities the Corps ultimately provided were useless for drying fish and, as a result, many families made the drying sheds their homes. At one site, the Corps backed out of its obligation to provide a water supply because it would be too expensive. In the meantime, the battle to preserve fishing rights continued as the states attempted to restrict what methods the Indians could use to catch fish. When conflicts arose between state and tribal fishing regulations, officials responded by arresting Indian fishermen for violating state regulations.

In Chapter Eight, *Besieged*, Ulrich tells the story of David Sohappy's fight to keep his permanent home at Cook's Landing in-lieu site. The police arrested Sohappy for fishing outside the state-prescribed limits. Following his release from jail, he asked a court to define Indian treaty rights and the extent to which the state could regulate them. In 1969, U.S. District Court Judge Robert C. Belloni handed the Indians a much needed victory, holding that state regulations could not discriminate against tribal fishers and must be necessary for conservation. Most importantly, he held the state must regulate fisheries so that tribal fishers could take "a fair share" of the runs. The next challenge Sohappy faced was a new interpretation of the rules issued by the BIA for use of the in-lieu sites, which disallowed permanent dwellings on the sites. The BIA came under increasing pressure to improve the sites due to

the unsanitary conditions. The first step was removing families living on the sites. After a series of meetings, committees, and proposals, they made little progress toward updating the sites.

In Chapter Nine, *An Uneasy Truce*, Ulrich scrutinizes the story of the Indians' success in maintaining their treaty-granted fishing rights through federal courts. In 1974, U.S. District Court Judge Boldt narrowed the definition of "a fair share" when he ruled that the treaties entitled the Northwest Indians to half the salmon and steelhead. As a result, states had to accept the necessity of involving tribes in implementing fish management plans. The tribes began hiring their own biologists to represent their own interests and to ensure the future of the salmon runs.

In *Conviction and Eviction*, Ulrich describes the "Salmonscan" sting that took place soon after the Indians' court victories. Undercover agents would approach Indian fishermen and attempt to purchase salmon out of season. Agents arrested the fishermen when they attempted to sell the salmon. One of the arrested fishermen was David Sohapp, who the court later sentenced to five years in prison for selling \$4,675 in salmon and steelhead. Many believe that agents targeted Sohapp as retaliation for his success in winning fishing rights in court. In 1984, the BIA renewed its effort to remove residents from the in-lieu sites by issuing eviction notices. The Sohapp family refused to leave. In 1990 the Court of Appeals finally ruled in favor of the Indians, holding that because permanent residences existed before the construction of the dam, the BIA exceeded its authority when it ordered permanent residents out of their homes at the in-lieu sites.

In *A New Start*, Ulrich discusses new legislation to protect the scenic Columbia River Gorge and new efforts to finally complete the 1939 in-lieu site promise. In 1988, Senator Daniel Evans of Washington sponsored a bill that authorized spending of up to \$2 million, and ordered the Corps to finally fulfill its promise of providing 400 acres of in-lieu sites. Sports fishermen, windsurfers, and other non-Indian interest groups vehemently opposed the Indian-only access points. While Senator Evans intended for the Corps to complete the sites within a couple of years, nine years later they were not yet complete. Environmental impact statements and other procedural requirements slowed the construction.

In *A Shovelful of Mud*, the pattern of broken promises continues as delays hamper the completion of the in-lieu sites. The Indians remained a low priority, just as they were in 1939. Construction of the sites resulted in conflicts over various issues, from the preference for Indian workers in the construction contracts to the handling of Indian remains.

In the final chapter, *Blame to Share*, Ulrich looks back at all the changes that occurred over the sixty-year period during which the Indians fought for the sites. While the Corps could have spent \$50,000 in

1945 to uphold its promise, in 1995 the agency estimated a cost of nearly \$67 million. In addition, the population has boomed in the Pacific Northwest while salmon runs continue to dwindle. During the sixty years that the government failed to find the money to replace Indian fishing sites, it easily found the money to construct other public parks and boat launches with top-notch facilities all along the Columbia.

In the *Epilogue*, Ulrich provides an update on developments since the first edition publication of *Empty Nets* in 1997. The tone is optimistic although still cautious. As of 2006, twenty-nine of the thirty-one sites were on track for completion by September of 2006. In addition, the project added a new component for the reconstruction of the Celilo Indian Village that disappeared under the waters behind the Dalles Dam. Ulrich's optimism is tempered by warnings that new struggles may lie ahead with respect to the provision. River Indians have long pushed for housing for those who the dams displaced, and the battle may not be over yet.

Empty Nets provides a thorough, chronological account of the incredible number of setbacks faced by the Columbia River Indian community in their struggle to maintain their ancestral fishing practices and hold the federal government to its promise. Ulrich combines the meticulously researched bureaucratic record with the voices of a number of Columbia River Indians who lived through the sixty-year saga. *Empty Nets* is a comprehensive account of the Columbia River Indians' struggle for justice and essential to an understanding of Indian issues in the Northwest.

Mary Kate Finnigan

John Ross, Rivers of Restoration: Trout Unlimited's First 50 Years of Conservation, Skyhorse Publishing (2008); 130 pp; \$40.00; ISBN 978-1-60239-211-3; hardcover.

Rivers of Restoration chronicles the first fifty years of the conservation work done by Trout Unlimited ("TU"), one of America's most ubiquitous conservation organizations. Written by John Ross, a renowned outdoor writer and photographer, the book periodically delves into the history of TU, but mostly focuses on the results of the organization's restoration work. Each chapter describes TU's restoration efforts in a specific area. Because the quality of trout fisheries is inextricably linked to resource management activities such as mining, grazing, and logging, the author uniquely portrays the history of resource management and environmental consciousness throughout the United States.

Chapter 1, *American Fork, Utah* describes the mining boom that began near Salt Lake City as early as 1839 and lasted until the late 19th century. Most mines closed by the 1940s, leaving behind a highly degraded ecosystem laden with thousands of tons of toxic mine tailings.

When Snowbird ski resort acquired the Pacific Mine to expand the ski resort, TU formed a partnership with Snowbird, the Forest Service, and other parties to reclaim the mine area and restore water quality to the stream. A large grant from Tiffany & Co., volunteer work from local boy scouts, equipment and labor donated from Snowbird, as well as federal funding, enabled TU to complete the project. This collaborative conservation effort resulted in native Bonneville Cutthroat Trout returning to the watershed.

In Chapter 2 *Au Sable, Michigan*, the author indulges into TU's history, describing TU's earliest restoration efforts. George Griffith, a traveling hosiery salesman too old to fight in World War II, spent most of the war on the banks of his favorite trout stream, the Au Sable River. After his appointment to the Michigan Conservation Commission, Griffith began a public campaign to improve the Au Sable fishery. George Mason, one of Griffith's friends, president of American Motors and national treasurer for Ducks Unlimited, first approached Griffith with the idea of forming TU. Mason held the first meeting in his Michigan home in 1950. During the first meetings, the members established many of the core concepts that have endured the test of time: fly fishing-only regulations, catch and release, and improving habitat for native trout instead of stocking non-natives. Mason passed away in 1954, and the organization did not officially form until 1959, under the direction of Griffith. With Griffith's guidance, TU soon grew to over thirty chapters, and became active throughout the United States.

Shifting to a western water quantity focus, Chapter 3, *Bitterroot River, Montana* tells of an increasingly populous and thirsty area of Montana near Missoula. In 1939, the government dammed the Bitterroot River to form Painted Rocks Reservoir. The government sold the reservoir water in short-term, twelve-year leases, allowing water users to hedge against higher prices in future years. Agriculture and development rapidly increased. It soon became clear that the Bitterroot River fishery would greatly suffer if someone did not preserve water for recreational purposes. In 1958, the Montana Department of Fish, Wildlife, and Parks secured perpetual rights to 5,000 acre-feet of reservoir water for just such purpose. Later, TU worked diligently to secure an additional 10,000 acre-feet of Painted Rocks water. However, this amount of water was insufficient to protect the fishery in the driest and hottest years, and other water uses continued to expand. If the newest round of water came up for lease in 2004 without more water dedicated for piscatorial purposes, TU feared that "pressures from development, agriculture, and global warming would put them out of reach . . . forever." After lengthy negotiations with several state agencies, TU secured 10,000 acre-feet of water to the Bitterroot in perpetuity, forever ensuring sufficient water to sustain the fishery in even the hottest and driest summer months.

Chapter 4, *Blackfoot River, Montana* again tells a tale of the ruinous effects that can result from unregulated grazing, mining, and logging in trout habitat. For several decades, many considered the Blackfoot River to be an area of abundant natural splendor, inspiring Norman Maclean to write his revered novel *A River Runs Through It*. However, unprecedented levels of natural resource exploitation began to severely degrade the Blackfoot. Logging and grazing removed many of the plants and trees that filter sediment and stabilize the banks of the Blackfoot and its tributaries, destroying habitat vital for aquatic insects and trout spawning. In 1975, the tailings dam of the Mike Horse mine washed a toxic plume of lead, copper, and zinc into the headwaters of the Blackfoot, creating a dead zone that reached ten miles downstream. Several concerned citizens aligned in the late 1980s to form the Big Blackfoot Chapter of TU, successfully defeating a proposed gold mine on the Blackfoot. This effort led to more organization, and brought about the Blackfoot Challenge, a social, economic, and environmental movement to align concerned stakeholders and continue the restoration and maintenance efforts on the Blackfoot.

Chapter 5, *Catskill Rivers (Beaverkill, Willowemoc, Delaware), New York*, delves into the rich history of one of America's oldest and most revered fly fishing destinations, known by many as the birthplace of American fly fishing. In the early 1900s, power companies and cities dammed many of the Catskill Rivers. Although only a large native brook trout population had previously inhabited the river, several species had been introduced to the river, including bass, Atlantic salmon, and rainbow trout. TU began its first Home Rivers Initiative in the Catskill area in 1994. By working with state, federal, and local government agencies to restore rivers to their natural courses, curtail floodplain development, and bring increased flows for fishery purposes, TU ensured that both the fish and the anglers who are vital to the region's economic stability will remain in the Catskills for many years to come.

Chapter 6, *Clyde River, Vermont*, begins by describing the frenzy of anglers that came to fish Atlantic salmon in the area. The death knell for the Clyde River salmon came when Citizens Utility began constructing the fourth and final dam on the river in 1957. The dam was of limited value in terms of generating electricity. So, when a spring flood in April 1994 destroyed the dam, anglers cheered as the salmon once again returned to this stretch of the river.

When Citizens Utility applied for a fifty year permit to reconstruct the dam, the law obligated the Federal Energy Regulatory Commission ("FERC") to consider not only the economic benefits of such projects, but also the environmental impacts. This mandate led FERC to join TU and the U.S. Fish and Wildlife Service in recommending that Citizens Utility permanently remove the dam to support salmon fishing, representing a dramatic shift in FERC policy. TU was instrumental in the campaign, organizing river clean-ups, monitoring river flows, and

building consensus among private and public groups. However, the elation over FERC support did not last long, as Great Bay Hydro acquired Citizens Utility, and proposed to release a mere 30 cfs into the Clyde River, and to trap and truck migrating salmon around their spawning beds. The Vermont Natural Resources Council sued, claiming that the plan was insufficient to protect the fishery, but the court ruled for the utility.

Chapter 7, *Cutthroats of the Basin, Nevada*, follows the story of TU's efforts to restore Bonneville and Lahontan cutthroat trout to a semblance of their former glory. The Bonneville Cutthroat trout, integral to the culture of the Goshutes tribe, had been slowly disappearing over the past century, and most thought them extinct until Don Duff, chair of Utah's TU Council, rediscovered the trout in some creeks on the Goshutes Reservation. TU began developing partnerships to fence cattle out of the streams and breed new populations of the species. Thirty-five years later, both the Bonneville and Lahontan cutthroats have returned to the Goshutes Reservation. The chapter ends by inquiring who will carry on the noble work of Duff and Pat Coffin, a fisheries biologist with the Bureau of Land Management, into the future.

Chapter 8, *Deschutes River, Oregon* explores one of the Northwest's premier salmon fisheries, and the dam building and busting history that have characterized the region. The Deschutes River is tributary to the Columbia River, a renowned salmon fishery. Ever since 1958, dams on the Columbia and the Deschutes have blocked salmon spawning in 143 million acres of the Columbia River Watershed. Though dam builders have developed many novel ways to address the problem, spawning has continued to decline throughout the watershed. The FERC re-licensing of the Pelton and Round Butte dams on the Deschutes was a perfect opportunity to address some of these problems. TU, Portland General Electric, and the Confederated Tribes of the Warm Springs Reservation developed a \$26 million water intake/fish passage tower, which allows the dam operator to regulate the water temperature of dam releases, and provides a more effective method of transporting salmon around the dams.

Chapter 9, *Falling Spring, Pennsylvania*, describes agricultural and developmental degradation of a stream that became noticeable as early as the 1950s, "choking the stream" with sediment and nitrate runoff. In response to the growing danger, concerned citizens formed the Falling Spring chapter of TU in the mid-1970s and started stabilizing the river's banks to minimize sedimentation. When a proposed new housing development at the stream's headwaters drew the attention of the TU chapter in 1988, TU and other concerned citizens formed the Falling River Greenway, Inc., and proposed a partnership focused on protecting the river by amending land use ordinances to provide for conservation and public access easements. The collaboration restored

several miles of the stream, improved the fishery, and helped to return the historic swarms of insects to Falling Spring.

Chapter 10, *Garcia River, California*, again focuses on the detrimental sedimentation effects of logging and grazing. The sedimentation of the Garcia River in California has drastically reduced the numbers of Coho salmon and steelhead running up the river to spawn. These effects were especially prevalent in Mendocino County, an area known for vast forests of redwood and Douglas fir. The California Chapter of TU knew that any restoration efforts in this area would necessarily involve the Mendocino Redwood Company, owner of 228,800 acres of the watershed of the Garcia River's south fork. TU partnered with the company and began restoration efforts in 1998. The partnership prevented thousands of tons of sediment from entering the river, fenced cattle out of the streams, and stabilized banks. These efforts increased steelhead numbers, and salmon are once again returning to the Garcia River to spawn.

Chapter 11, *Great Smoky Mountains, North Carolina and Tennessee*, details the challenge that stewards of the Great Smoky Mountains National Park faced in reviving a declining fishery. Before the area became a national park, logging, damming, and overfishing had reduced native brook trout populations. The Park Superintendent introduced rainbow trout, hoping to increase the Park's attraction to anglers. However, this motive proved counterproductive when a biologist discovered in the 1970s that the park's brook trout were actually a distinct subspecies, the Southern Appalachian brook trout. Since that discovery, TU has been volunteering and raising money to help the Park protect and replenish the native trout.

Chapter 12, *Guadalupe River, Texas*, explains how a stream in southern Texas came to be one of the 100 best trout streams in America. The Army Corps of Engineers dammed the Guadalupe River to control flooding, creating Canyon Lake in 1964, and locals soon introduced rainbow trout to the river. The reservoir planners thought that the dam release water might be cold enough to sustain a trout population. With TU's help, they found a particular rainbow species that would survive from one year to the next, thus having the potential for a self-sustaining population. In southern Texas, water temperature is a constant threat, as are decreased flows due to development and energy needs. In 2000, TU secured a flow of at least 200 cfs for the fishery. Though the Guadalupe River may never become a self-sustaining fishery, TU's efforts have produced a valuable fishing economy in the area, and have introduced stream restoration and conservation to a new area in the United States.

Chapter 13, *Housatonic River, Connecticut*, explores an area of the northeast United States that "was the birthplace of America's vast network of hydro-electric plants." Dams in the area appeared as early as 1904, and the shallow reservoirs routinely released water hot enough to

kill trout into the river, resulting in frequent fish kills as recently as the 1990s. When Falls Village Dam, one of the suspected culprits of the hot water releases, came up for FERC relicensing in 2001, TU partnered with the Housatonic Fly Fishermen's Association ("HFFA") and other groups to convince FERC that run-of-river flows were necessary to maintain the integrity of thermal refuges and sustain the trout population. The new flow regime began in 2005, and TU has yet to evaluate the overall success of the program.

Chapter 14, *Kennebec River, Maine*, tells the tale of a full circle metamorphosis, from historic fishery to dam-laden industrial mecca and back again. Though this area provided commercial fishermen with a large bounty of salmon as early as the late 1700s, the Edwards Dam was built on the Kennebec River in 1837, and continued to operate until 1999. In the early 1980s, TU and other angler groups began lobbying for the return of alewife runs in the Kennebec, believing that this would result in the restoration of salmon and striped bass as well. TU raised \$7.25 million to fund the campaign, and the government removed Edwards Dam in 1999. TU is now working to eliminate another dam in the area, which could open 9,300 more acres to these native species.

Chapter 15, *Kettle Creek, Pennsylvania*, chronicles the coal mining history of Pennsylvania, which produced a large amount of acidic runoff, which was toxic to both trout and the insects they need for sustenance. In 1998, TU collaborated with the Kettle Creek Watershed Association in an effort to clean up the watershed. By using remote sensing technology to determine the location of coal mines and the movement of the acidic runoff into the creek, and using ponds to filter out heavy metals, the group has largely reduced the amount of toxic runoff entering the watershed. As a result, brook trout have returned to the stream, developing a viable economy based on angling and tourism.

Chapter 16, *Kickapoo River, Wisconsin*, takes the reader to the Driftless Area in the mid-western United States, a valley with fertile soil and excellent trout habitat. The area drew many immigrant settlers in the 1850s, and they quickly exploited the fertile soils and abundant forests. Spring floods began to fill the Kickapoo River and others with sediment from the denuded landscape. Roger Widner, a man who had grown up along the banks of the Kickapoo, began to lobby the state and TU to help restore the river. Collaboration with TU's Blackhawk Chapter resulted in TU's second Home Rivers Initiative, which began in 1996. This effort then evolved into the Driftless Area Restoration Effort, which has brought spawning brown and brook trout back to the region through stream bank stabilization and construction of fish habitat structures, and opened the stream to the public through public access easements.

Chapter 17, *Little Tennessee, Tennessee*, starts with a description of the Cherokee Nation communities that the Tennessee Valley Authority

inundated by constructing several dams in the Little Tennessee River Valley. These dams turned historically warm-water fisheries into premier tailwater trout fisheries, and the stocking of brown and rainbow trout in the rivers began in the 1940s. After the historic controversy over the construction of the Tellico Dam, which destroyed the habitat of the snail darter, a listed endangered species, the leadership of the Tennessee Valley Authority became more aware of the economic opportunities that abound in tailwater trout fisheries. Thus, the company has devoted over \$200 million to restoring flows and oxygenating the water below several dams in the area, producing some of the finest trout habitat in the southeastern United States.

Chapter 18, *Muddy Creek, North Carolina*, portrays the historic farming community that has existed in this area since the Civil War. Many of the local farmers began channelizing the streams to dry up the wetlands and thus increase the farmable acreage. This practice resulted in the deposition of some 30,000 tons of sediment from Muddy Creek into the Catawba River, North Carolina's premier trout fishery. In 1998, TU began to restore the Muddy Creek watershed, raising over \$10 million for conservation projects, restoring sixteen miles of Muddy Creek and vastly improving the fishery.

Chapter 19, *Nushagak River, Alaska*, examines a current controversy that has yet to play out in Bristol Bay, North America's largest salmon fishery. Most of the land in this area is slated for hardrock mining, including the proposed Pebble Mine, which could become the world's largest gold and copper mine. Opponents "see the Pebble Mine as Pandora's Box," a project which would bring widespread mining and the accompanying environmental degradation to a 1,000 square mile area. Mine officials proposed building a tailings dam 4.3 miles long and 740 feet high, as well as a tailings lake in the area's premier rainbow trout fishery. If the dam ruptured or the tailings lake failed, billions of gallons of toxic slurry would flow downstream, destroying the fishery. This chapter focuses on the potential future problems in the area, discussing little about TU's efforts to prevent the mineral development and exploitation of the area.

Chapter 20, *South Fork Snake River, Idaho*, opens with two TU members selectively harvesting rainbow trout on the South Fork of the Snake River in 2004 as part of a comprehensive plan to reintroduce native Yellowstone Cutthroat trout. In addition to this effort, TU and a coalition of several local, state, and federal groups established a Home Rivers Initiative on the river in 2002. The group has pushed for harvesting rainbows and managing river flows to maximize cutthroat spawning and minimize rainbow spawning. Additionally, the group also funded an economic impact study to demonstrate the value of the fishing and tourist economy for the local communities.

Chapter 21, *South Platte, Colorado*, heralds TU's efforts to defeat the proposed Two Forks Dam, which would have inundated the revered

Gold Medal waters of the South Platte River. Denver Water previously constructed several other dams on the South Platte and its headwaters, including Cheesman Dam, built in 1905. The Two Forks Dam, which would back up the river for another twenty miles, would have resulted in devastating effects on the fishery and other rare species that inhabit the area. In the mid 1980s, TU formed a coalition of local and state interest groups and lobbied the EPA to recommend prohibiting Two Forks Dam. In March 1990, the group got its wish. In 2004, Denver Water joined forces with TU to develop the South Platte Protection Plan, which will force water providers to consider alternative methods of supplying thirsty municipalities, such as Denver, while mandating consideration of the environmental and economic benefits of Gold Medal trout water.

Chapter 22, *History of Trout Unlimited*, expands on the history of TU that the book touched on in Chapter 2. In the summer of 1950, George Mason, George Griffith, Al Hazzard, Opie Titus, Jim McKenna, and Don McLouth met at Mason's house on the South Branch of the Au Sable River in Michigan. That night they developed TU's core philosophy: perpetuating wild trout for future generations. Though TU did not officially form for another nine years, the idea of trout fisheries conservation had taken hold. Mason died a few years later, and Griffith eventually joined with fourteen others to found TU in 1959. Soon after, TU chapters began forming all over the United States. TU's first real conservation effort culminated in 1952, when the state implemented fly fishing catch-and-release regulations on the South Fork of the Au Sable River. Thus began TU's storied history of coldwater fisheries conservation. The author then notes "TU Milestones" by decade from the 1960s to the present. Lastly, the author defines the future goals of TU as four broad themes: 1) *Protect* watersheds to ensure the highest quality habitat for native and wild fish; 2) *Reconnect* fragmented streams to sustain healthy populations of native and wild fish; 3) *Restore* degraded coldwater habitat through collaboration with landowners and other stakeholders; and 4) *Sustain* conservation efforts by building capacity within all levels of TU with a particular emphasis in enabling young people to successfully engage in long-term conservation efforts so that TU's legacy will endure beyond the current generation.

Peter Johnson

Robert Glennon, *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters*, Island Press (2004); 314 pp; \$18.95; ISBN 1-55963-400-6; paperback.

Robert Glennon's *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters* discusses the relationship between humans and groundwater in the United States, tells numerous stories about how

that relationship has developed in localities across the country, and proposes changes to help provide a more sustainable relationship between humans and groundwater.

In the first chapter, *The Worth of Water in the United States*, Glennon lays out a short history of water development in the United States. He begins by explaining how the nation's waters have provided a valuable natural resource for economic growth during the past three centuries. He discusses the roles played by the federal government, agriculture, and industry in developing the nation's water resources. Glennon also analyzes the legal doctrines of riparianism and prior appropriation.

Chapter 2, *Human Reliance on Groundwater*, provides a historical overview of groundwater pumping. Various human civilizations have constructed wells since 2000 B.C. During the late nineteenth century, High Plains farmers used windmills to pump groundwater for irrigation, while the City of Tucson burned wood to fuel steam engines to pump groundwater for municipal use. In the early twentieth century, improved drilling and pumping technology as well as the development of the internal combustion engine allowed people to pump larger quantities of water from ever-increasing depths. The widespread availability and quality of groundwater and permissive legal doctrines that fail to recognize groundwater's role in the hydrologic cycle have led to an increasingly unsustainable reliance on groundwater for various uses.

Chapter 3, *How Does a River Go Dry?*, tells the story of the Santa Cruz River in Tucson, Arizona. Human civilizations have relied on the Santa Cruz River to support subsistence farming since 8,000 B.C. However, in the late nineteenth century, European settlers began raising cattle and wheat in the area, requiring increased irrigation. Increases in surface and groundwater irrigation, along with the destruction of riparian habitats, led to entrenchment of the Santa Cruz. Eventually, in the 1940s, the Santa Cruz's perennial flows ended. Glennon uses the Santa Cruz River as an example to explain the hydrologic cycle. Specifically, Glennon explains the concepts of a "gaining stream" and a "losing stream," using the Santa Cruz and its underlying aquifer as an example. Ultimately, Glennon concludes, groundwater pumping killed the Santa Cruz.

Chapter 4, *A River at Risk*, tells the story of the Upper San Pedro River in Arizona. This river, which is one of the last perennial, dam-free streams in the Southwest, supports a spectacularly diverse riparian habitat utilized by a wide array of migratory birds. In 1988, Congress designated the San Pedro Riparian Natural Conservation Area and expressly reserved a federal water right sufficient to protect this riparian habitat. Pro-development local government officials funded numerous studies in an effort to show that expansion of a nearby military base would not affect the San Pedro's flow. All of these studies, however, concluded that existing groundwater pumping already affected the river's flow negatively, and that further development would only

exacerbate these problems. Although the proposed military base expansion never occurred, both incremental growth of the civilian population and increased agricultural irrigation continue to threaten the San Pedro flow. The ongoing battle between local officials, the federal government, private conservation organizations, and international agencies will only continue unless the concerned parties find a solution.

Chapter 5, *Tampa Bay's Avarice*, describes how the growing population in the cities of St. Petersburg and Tampa has negatively affected the lakes and other waterways in surrounding counties. In 1996, in order to meet growing demand in these cities, local water officials developed three major well fields, pumping a total of 255 million gallons per day ("mgd") from aquifers in neighboring counties. These wells degraded ninety-five percent (95%) of the area's lakes, causing nearly half to dry up completely or suffer other serious impacts, resulted in extensive property damage due to subsidence, and caused environmental degradation from reduced water flows in the area's creeks, streams, and wetlands. These negative effects led to conflict between local and regional water authorities, as well as extensive litigation between various parties. Furthermore, drought, minimum flow requirements, and development of wells for bottled water suppliers are adding to the pressure on the area's aquifers.

Chapter 6, *The Tourist's Mirage*, explains how San Antonio's River Walk has affected the Edwards Aquifer and several endangered species. The San Antonio River, which was once navigable, dried up due to groundwater pumping decades ago. For nearly a century, San Antonio has pumped up to 10 mgd of water from the Edwards Aquifer to create the illusion of a natural river through its now thriving downtown area. Texas courts still abide by the English rule of capture, which grants overlying landowners the right to pump as much water as they want. This rule results in seemingly absurd uses, such as large-scale catfish farms. Groundwater pumping has resulted in litigation to protect endangered species that inhabit the area's springs and have suffered from declining water levels.

Chapter 7, *Suburban Development and Watershed Initiatives*, describes how groundwater pumping for domestic use affects Massachusetts' relatively water-rich Ipswich River Basin. Beginning in the 1990s, like the Santa Cruz River in Chapter 3, stretches of the Ipswich went dry for the first time. Conflict exists between historical towns that have well-established riparian rights to surface waters during high flows and newer suburban communities that must rely on groundwater. A study funded by a new state-sponsored watershed initiative group concluded that groundwater pumping, not surface diversions, caused the Ipswich to go dry. Glennon highlights the disparity between the water use restrictions and pricing between different localities, and discusses efforts to use treated municipal wastewater to recharge the river. However, in

order to restore historic flows to the Ipswich, newer developments must dramatically reduce their groundwater pumping, if not shut down altogether, during summer and fall months.

Chapter 8, *A Game of Inches for Endangered Chinook Salmon*, tells the story of California's Cosumnes River. A century's worth of the U.S. Army Corp of Engineers' flood control projects, as well as massive population growth, have left the Cosumnes River as the Northern California's last major river without a dam. Largely unregulated, groundwater pumping has lengthened the amount of time the river is dry, thereby threatening to destroy the Chinook salmon's fall breeding grounds. Incremental development constantly threatens to drain even more groundwater from beneath the Cosumnes; however, augmentation plans and private conservation efforts offer some hope for sustaining a sufficient flow for the Chinook to survive.

Chapter 9, *Wild Blueberries and Atlantic Salmon*, describes how irrigation for blueberries in Southern Maine affects the Atlantic salmon's breeding season and the areas groundwater supplies. Wild blueberries grow easily without irrigation in Eastern Maine, which receives over four feet of rainfall annually. Farmers, however, learned that irrigation can triple, and even quadruple, their blueberry harvest. Until recently, farmers relied almost exclusively on surface waters from Maine's rivers to irrigate their crops. Then, environmental groups surmounted opposition from local political officials and successfully petitioned to have the Atlantic salmon categorized as an endangered species. As a result, farmers are evaluating surface storage solutions, groundwater recharge, and groundwater mining as possible substitutes for surface water. The problem with groundwater mining, according to Glennon, is that Eastern Maine's porous topography will cause rivers to quickly feel the effects of groundwater pumping. As a result, the salmon may still have inadequate flows.

Chapter 10, *Size Does Count, at Least for French Fries*, explains how Minnesota's Straight River suffers the negative effects of groundwater pumping. Beginning in the late twentieth century, farmers in this area began producing potatoes for McDonalds, which requires growers to produce large, consistently sized potatoes. In order to meet McDonalds' standards, growers began irrigating their fields, usually using groundwater. In addition, McDonald's requires its potato processors to store potatoes in a 95% humidity environment so they do not lose their white color. In order to create such an environment, processors withdraw water from the aquifer below the Straight River. In response to concerns raised by environmental groups, the potato industry has made significant efforts to reduce its impact on the Straight River. Ultimately, however, it appears that the consumer's demand for perfectly shaped and colored french-fries may be too much for the Straight River.

Chapter 11, *The Black Mesa Coal Slurry Pipeline*, tells the story of how groundwater pumping to operate the nation's only coal slurry pipeline affects the Hopi Indian Reservation in Arizona. Peabody Energy Company's ("Peabody") coal slurry pipeline utilizes groundwater from the Hopi Indian Reservation to transport crushed coal, mined from a nearby Navajo reservation, 273 miles to the Mohave Generating Station in Nevada. During the past century, 90 percent of the springs located on the Hopi Indian Reservation have gone dry. Controversy exists over how much Peabody's groundwater use has affected the springs, but the coal mining provides valuable economic support to the Hopi tribe and Navajo nation. Nonetheless, with the pipeline in growing need of repair or replacement, the Hopi tribe, the Navajo nation, Peabody, and the federal government are trying to find a solution for everyone.

Chapter 12, *Is Gold or Water More Precious?*, examines the mining industry's use of groundwater in Nevada. Open-pit gold mines, like those owned by Barrick Gold Corporation ("Barrick"), essentially require mining companies to lower the water table in order to reach ore that water would otherwise saturate. For mining companies, this water is a waste product. By 2010, Barrick will have pumped 4 or 5 million acre-feet of groundwater in fifteen years. Nearby springs and the Humboldt River could feel the resulting decrease in flows for a century or more. However, the powerful economic interests behind mining operations have outweighed environmental concerns thus far.

Chapter 13, *All's Fair in Love and Water*, tells the story of how groundwater pumping to support Atlanta's growing population is negatively affecting oysters in the Apalachicola Bay. In addition, groundwater pumping for increased irrigated agriculture has negatively affected the Chattahoochee River's flow. A dispute between Georgia, Florida, and Alabama led to an interstate compact governing the use of surface waters, but groundwater use is largely unregulated. Furthermore, dredging reduced the amount of nutrients that make it to the estuary. In order to maintain a healthy environment for oysters and other marine life in Apalachicola Bay's estuary, the Chattahoochee River must provide enough nutrients and fresh water to feed the oysters and keep salt-water predators at bay. Georgia instituted a market-based program to reduce agricultural irrigation during low flows, but Florida would like to see more effective measures put into place.

Chapter 14, *The Future of Water*, describes innovative plans to provide water for the increasingly inevitable development near Grand Canyon National Park ("Park"). Canyon Forest Village Corporation ("CFV") wants to develop 212 acres of land near Tusayan, Arizona, the gateway to the Grand Canyon. The increasing number of tourists to the Grand Canyon has created high demand for new development in Tusayan, which lies inside a national forest just outside of the Park. However, the Havasupai Indian Reservation, which contains beautiful natural springs, lies just to the west. CFV proposed to create four sepa-

rate water systems, including a water harvesting system to capture runoff from roves and parking lots. In addition, CFV proposed a complicated augmentation plan involving surface water from the Colorado River as well as groundwater recharge. Finally, the plan called for private covenants to restrict groundwater pumps to emergency use only. Unfortunately, in Glennon's opinion, voter referendums and litigation on the state and federal level have delayed CFV's innovative plan.

In chapter 15, *The Tragedy of Law and the Commons*, Glennon argues that because individuals usually act to maximize their individual welfare, which simultaneously reduces the social welfare, we must stop allowing limitless groundwater use. He contends that most states have failed to "eliminate the gap between law and science" when it comes to groundwater. Furthermore, our population growth and excessive water use are incompatible. Glennon balances the pros and cons of regulatory versus market-based solutions for addressing environmental concerns. In conclusion, Glennon recommends a mixture of improved regulations, market-based solutions, and conjunctive management. In fact, he gives a specific list of recommended societal, as well as individual, changes we could make to improve the current situation.

In *Water Follies*, Glennon masterfully tells stories of how groundwater affects our lives every day, and vice-a-versa. *Water Follies* is an enjoyable read for both water professionals and laypersons. Moreover, it will help educate any reader by promoting groundwater awareness, reform, and conservation.

Travis Keenan

CONFERENCE REPORTS

9TH ANNUAL COLORADO WATER LAW SUPERCONFERENCE

CLE INTERNATIONAL

Denver, Colorado March 12-13, 2009

INTRODUCTION

James S. Lochhead, program co-chair from Brownstein Hyatt Farber Schreck, Glenwood Springs, and Raymond L. Petros, program co-chair from Petros & White, Denver, opened the conference and welcomed the participants.

DAY ONE: THURSDAY MARCH 12, 2009

FEATURED PANEL PRESENTATION: PRIVATE EQUITY AND WATER

Scott S. Slater, of Brownstein Hyatt Farber & Schreck, Los Angeles, moderated the first session of the day. The featured panel discussed the current and future role of the private sector in water law and water regulation. Each panelist offered different considerations of private sector control, including economic considerations, infrastructure issues, interstate issues, and the impact of climate change.

Dr. David Sunding, Co-Director of the Berkeley Water Center at the University of California Berkeley, began with a discussion of the economic considerations involved with private sector control over water supply and use. According to Dr. Sunding, resource allocation rules lead to disparities in water use, which then lead to disparities in the value of water, thus creating opportunities for private development of new water supplies. Because of this system, Dr. Sunding argued that the best opportunity for privatization of water would be through infrastructure improvement. Namely, the private sector could have the greatest positive economic impact by improving water storage, alternative supplies (e.g. utilizing more recycled and desalinated water), and conveyance. To close, Dr. Sunding outlined two California success stories, the Semitropic Groundwater Storage Program and the Kern Water Bank Authority.

Robert Trout, Partner at Trout Railey Montañó Witwer & Freeman, Denver, discussed Northern Colorado's investment in Colorado Big

Thompson ("CBT") water units as an example of successful public-private water control. In particular, Mr. Trout elaborated that the CBT program began in the 1930s and continues to allow water utilization to its highest beneficial use via this public-private partnership ("PPP"). The operation of public oversight over the water supplies allows consistent agency and regulatory control, while the privatization prevents purchase of CBT water units solely for investment capital. Rather, through the PPP, the CBT program requires that a purchaser of a water unit show a present beneficial need for such water. In sum, this program serves as an example of successful interplay of public and private water regulation.

Disque Dean, CEO of Water Asset Management in New York, discussed the private sector's perspective pertaining to water regulation. Mr. Dean emphasized that the future of water is a consideration for both sides, and therefore the future of regulation requires everyone's cooperation. In present times, water regulation faces two major problems, infrastructure and storage, and in order to fix them, water regulators need both financial and human capital. The result of this situation is that, because water systems are breaking down and because there is not enough money and effort going back into them, society needs to maximize public and private consideration.

Finally, Patricia Mulroy, General Manager of the Southern Nevada Water Authority, presented the public sector's perspective pertaining to water regulation and privatization. Ms. Mulroy discussed how, at least in the municipal universe, agencies have always formed public-private partnerships to maximize regulatory efficiency. The biggest problem arises, however, when regulators must look across state boundaries. Complications arise because states must then take into account upstream and downstream rights, as well as usage rights existing outside the United States. In addition, Ms. Mulroy elaborated on climate change as the biggest problem on the horizon. She argued that every state and locality is interconnected and interdependent, so therefore the government needs to privatize water to maximize cost efficiency, and that public agencies must provide proper oversight. However, as a final note, Ms. Mulroy cautioned that the private sector might bring devastation if it is allowed to utilize water sources for venture capital.

A 50-YEAR VISION FOR COLORADO WATER LAW

The morning continued when Harris D. Sherman, Executive Director of the Colorado Department of Natural Resources, presented several current problems and proposed solutions within Colorado's water systems. Mr. Sherman first elaborated on the "Great Divide," the fact that 80 percent of water exists in Western Colorado, but that the Eastern Slope consumes 80 percent of all water in the state. In addition, agriculture encompasses 80 percent of water use in the state, followed

by municipalities and industry, then energy and non-consumptive uses (e.g. recreation). Population change presents another great challenge to water regulation, as well as climate change, which experts anticipate will create anywhere from five to twenty percent reductions in water availability. Mr. Sherman presented two basic questions: (1) where will the water come from; and (2) how will we balance the competing needs of all water consumers?

Mr. Sherman then presented three possible solutions to the current water regulation problems. First, water conservation must increase by changing people's behavior during droughts, and utilizing technical changes to save the water. Second, the state must shift from sustainable agricultural to urban transfers. Lastly, Colorado must adopt West Slope Trans-Basin Diversions to maximize both economic and environmental enhancements.

In concluding, Mr. Sherman announced that the ultimate goal in Colorado is a sustainable water supply for now and for the future. Three questions thus linger with regards to Colorado's future. Is the doctrine of prior appropriation infinitely adaptable, given our dwindling water supplies? Should we examine changing the law to require protection of agriculture, and/or change in land use patterns? Lastly, what is the role of state government, local governments, the development community, and water providers in finding solutions to meet Colorado's future water needs?

RECENT CASE LAW AND LEGISLATION

Douglas Kemper, Executive Director of the Colorado Water Congress ("CWC"), next discussed the current state legislation that the CWC is monitoring. Some of the highlighted legislation included:

-HB-1129: CWC supports a bill that allows for the reclaimed use of "salvaged water" (e.g. captured rain and snow water). The reclamation would occur in the form of pilot projects in new real estate developments.

-HB-1233: CWC supports a bill that would allow Colorado to recognize the existence and use of acequias and, in connection therewith, would authorize creation of acequia water districts.

-SB-080: CWC supports a bill that would allow residents to apply salvaged water to any residential or domestic water wells, including existing wells, proposed wells, and mountain hut wells.

-HB-1142: CWC opposes a bill that would create an election system, in place of appointments, for the directors of water conservancy districts. CWC argues that an election system would remove the quality of representation over the districts.

THE DEBT MARKET MELTDOWN AND ITS EFFECTS ON WATER

Michael R. McGinnis, of Brownstein Hyatt Farber & Schreck, Denver, next discussed how the current economic situation in the United States has, and will continue to, affect water regulation.

With regard to the debt market meltdown, Mr. McGinnis called attention to the “burst” of the housing bubble as being the primary cause of the market meltdown in the United States. The destruction of the housing market led to a crisis in August 2008 for the mortgage, credit, hedge fund, and foreign bank markets. This then led to a dramatic decrease in the value of municipal bonds, creating over \$500 billion in municipal debt. As a result, this crisis caused the destruction of water issuer systems, such as the Colorado Water Resources and Power Development Authority. The impact on water issuer systems thus created strong disparities in water values and challenges over water rights.

Mr. McGinnis next discussed a possible solution for the current water crisis: public-private partnerships. With PPPs, a partnership with one or more private sector companies may provide funding and operations for a government service, such as water regulation. The benefit is thus that municipalities can receive continuous and adequate funding to create new water facilities to operate their water regulation systems.

Mr. McGinnis ended his discussion by enumerating several PPP success stories: the Tampa Bay Seawater Desalination Plant (2008), The Fountain Creek Recovery Project (2008), The Atlanta-Fulton County Water Resources Commission and Veolia Water North America Water Infrastructure (2006), and the CH2M Hill OMI Seattle Cedar Water Treatment Facility (2006).

ETHICS

The final speaker of the day, David Robbins, Partner at Hill & Robbins in Denver, discussed some future needs pertaining to legal water claims. Because water law is becoming more complicated, there is likely to be an augmentation of water claims that will threaten senior water rights. Thus, the legal community needs to begin responding to these issues, and one of the ways Colorado responded was by entering into a Water Court Committee process.

Mr. Robbins discussed that Colorado created a Water Court Committee to form recommendations for the state legislature on matters of water rights and ethical responses to resolving such claims. A primary concern for dealing with the future of water law is the lack of education among the public about what water resource practitioners actually do in their work. Along those lines, the Committee is working to address the problems raised by lack of public knowledge with issues like hydrology and water allocation.

Lastly, Mr. Robbins discussed the great need to unify legal standards and to prepare easy-to-understand water law materials for non-

lawyers. According to Mr. Robbins, a problem among water courts is a lack of any uniform understanding of water allocation. Without such uniformity, water courts cannot make the best possible decisions. In addition, water courts serve many *pro se* litigants, and the lack of user-friendly legal materials creates a great disadvantage for these non-legal claimants.

Brandon Campbell

DAY 2: FRIDAY, MARCH 13, 2009

FARMERS RESERVOIR AND IRRIGATION COMPANY: A CASE STUDY

John P. Akolt, III, General Counsel, Farmer's Reservoir and Irrigation Company ("FRICO"), the Burlington Ditch, Reservoir and Land Company, and the Wellington Reservoir Company, opened Day Two of the conference with a case study on an irrigation-to-municipal change of water right for two ditch companies, FRICO and the Burlington Ditch, Reservoir and Land Company ("Burlington"). Akolt first gave a brief history of the ditch companies at the turn of the 20th century, which irrigated eastern Colorado. The courts originally decreed Burlington the direct flow and storage rights in question in 1885, and FRICO allegedly expanded the rights in 1909. Akolt focused on issues surrounding the direct flow right, although the case involved litigation over both the storage and direct flow rights.

Akolt framed the presentation in terms of two major legal considerations with general applicability for the audience, namely, the use of the Burlington water rights adjudicated in 1893, and the preclusion effects of previous change-use cases on the rights. The Water Division One court held in November 2008 that Burlington did not have the right to change its decreed 1885 rights because neither Burlington nor FRICO proved intent to apply direct flow water below Barr Lake. The court construed "susceptible to irrigation" from historical testimony as insufficient for intent to irrigate the full amount of the direct flow water decreed, and held that twenty years was an unreasonable amount of time to perfect an appropriation. Akolt considered the rights in the case the water court cited for "reasonable period of use" for perfecting an appropriation distinguishable from the Burlington rights. The rights in the court-cited case involved conditional water rights, not already adjudicated rights, so Akolt reasoned that the court should have also limited other ditches' rights by this logic. Akolt also respectfully disagreed with the court that the issues it litigated in a previous case were identical and thus barred from re-litigation by issue and claim preclusion. He reasoned that the previous litigation involved a general adjudication allocating priorities while the current case involved changes issues in terms of the historical use of the 1885 Burlington

water rights. Akolt ended the presentation saying that FRICO and Burlington would appeal and file Motions for Reconsideration on some aspects of the findings following the water court's entry of a Final Decree, which the court had not yet filed as of this conference date.

THE WESTERN SLOPE'S RESPONSES TO THE UNCERTAINTY OF FUTURE WATER AVAILABILITY: WILL THERE BE ENOUGH WATER TO SUPPORT DEVELOPMENT? THE ECONOMICS OF OIL SHALE; MANAGING THE COMPACT

Eric Kuhn, Director of the Colorado River Water Conservation District in Glenwood Springs, discussed the Western Slope's challenges and responses to managing uncertainties of the Colorado River system water supply. Kuhn discussed three major categories of uncertainty affecting the current water demands of the Colorado River Compact ("Compact") states: hydrology, including climate change; unresolved legal disputes; and future demand uncertainties. Kuhn presented paleo-hydrological studies demonstrating a more realistic mean flow supply of 13.5 to 14.8 million acre-feet per year at Lee Ferry versus the Compact's projected 17.5 million acre feet. He related that although climate change studies have yielded different results, all recent projections have showed a decline in runoff for most of Colorado's rivers. Kuhn was particularly emphatic that the results were even more dire considering "the certainty of future temperature increase trumps the uncertainty of future precipitation levels," and that even small changes in mean natural flow at Lee Ferry (e.g. 10%) could cause "significant unacceptable impacts throughout Basin." The two major legal uncertainties he discussed involved Mexico under the 1922 Colorado River Compact and 1944 Mexican Treaty and Navajo Indian rights issues under the Compact. Kuhn discussed the consequences for signatory states in the event of surplus and drought in terms of the agreements with the Republic of Mexico, particularly for the Gila River system, which cannot currently efficiently deliver to Mexico. Kuhn was concerned with the failure of parties to quantify the Navajo reserved rights, which has Upper and Lower Basin interests. Finally, Kuhn explained how Southern California's water demand could affect supply in upstream states because challenges facing supply from the California State Water Project might force Southern California to rely more heavily on Colorado River water supplies.

Kuhn explained that Colorado's potential oil shale development could arguably consume the state's remaining entitlements under the Compact. Maintaining that no major changes to the "Law of the River" were likely in the near future, Kuhn described three types of responses imperative for meeting demand challenges: identifying and avoiding unacceptable outcomes with health and safety as top priorities, maintaining effective working relationships among stakeholders, and increasing reliance on science in decision-making, particularly in imple-

mentation. He praised the Upper Colorado River Commission for fostering positive stakeholder relationships but warned that future challenges may overwhelm voluntary cooperation among states.

In closing, Kuhn cautioned against giving people the impression that they have more water than they do, proffering that the river is only the “sum of its parts.” He fielded questions on curtailment scenarios, maintaining that Colorado should have contingency plans using its pre-1922 Compact rights, and that the Basin states would likely achieve an agreement with their lawyers before United States Supreme Court intervention.

MUNICIPAL CHALLENGES TO WATER USE OPTIMIZATION: WATER
QUALITY CONSTRAINTS; AGRICULTURE TO URBAN TRANSFERS;
DROUGHT/CLIMATE CHANGE; PRAIRIE WATERS PROJECT FROM THE
CITY’S PERSPECTIVE

Mark Pifher, Director of Aurora Water, painted a picture of what the city of Aurora is doing to optimize its water use. Pifher look at five variables: scarcity, climate change, statutory and regulatory changes in terms of quality, statutory and regulatory changes in terms of quantity, and “competing values” (e.g. agricultural to municipal transfers). Pifher focused on agricultural to municipal transfers as the low-hanging fruit, transitioning from the politically unacceptable “buy & dry” to a “continued farming” program. Aurora is currently putting together a template on facilitating such transfers, looking at the size of the transfers relative to affected areas and the transfers’ water quality impacts. The city is tackling the problem from a basin-wide perspective and focusing transfers on investment versus yield on unproductive lands and moving waters off individual parcels rather than whole ditches or farms. Aurora’s “continued farming” program installs highly efficient irrigation systems, changes cropping patterns and alternates sources of water. The program helps keep fields in irrigation, alleviates drought concerns, adds infrastructure improvements, converts some of the land back to native grasses, and maintains agricultural “ownership” of its water rights, providing a win-win situation for agricultural and municipal interests. Finally, Pifher discussed the status of the rules affecting water transfers through the most recent major federal cases, with the courts split on whether water transfers require Clean Water Act National Pollution Discharge Elimination System (NPDES) permits. The Colorado rule currently excludes non-treated water, which would otherwise implicate thousands of additional permits, but Colorado is starting to resolve the issue through legislative hearings.

SETTLEMENT AND THE USE OF NEGOTIATION: LESSONS FROM THE BLACK CANYON OF THE GUNNISON

Bart Miller, Water Program Director of Western Resource Advocates, Boulder, John H. McClow, General Counsel for Upper Gunnison River Water Conservancy District, Gunnison, and David Gehlert of the Natural Resource Section Environmental & Natural Resources Division of the United States Department of Justice, Denver, then presented lessons learned from the negotiation of the Black Canyon of the Gunnison ("Black Canyon") water flow rights following litigation of that case. Miller first described the federal component of the issue, which involved a federally-reserved water right which spawned litigation in 2003, following a back-room agreement in which the federal government delegated the federally-reserved right to Colorado. The district court held in 2006 that the federal government improperly delegated the determination and acquisition of the park's flows to the state but still neglected to quantify the water rights. Miller described the history of the water rights in the Black Canyon (designated a National Park in 1999), pointing out that the federal government did not try to clarify the conditional water rights for the Black Canyon's proper flows until 2001, which met with huge opposition because of Upper Gunnison property owners' rights becoming junior to the park's rights and potentially impacting a number of uses.

McClow described how dozens of parties then ultimately entered into formal mediation from September 2007 to June 2008 to reach agreement on the final stipulated decree. The negotiated settlement involved wet, dry and average year analyses for determining desired flows, contingency plans for dry-year flows to protect listed species and their habitat in the Gunnison River, incorporating benefits into the flows such as fishery health and the "Roar of the River" aesthetics of the famous gorge, and attempted coordination with the Aspinall Unit's Environmental Impact Statement.

Gehlert discussed the challenges and successes of the settlement and negotiation, including the large number of parties in the case, and the conflicts not just between groups, but also among them. The biggest lessons learned included the willingness of parties to serve as quasi-mediators, despite having one overall professional mediator, forming breakout groups without lawyers, and the importance of reducing the number of parties involved. Gehlert also mentioned the importance of letting people simply vent, intense word-smithing to avoid giving the appearance that one party favors one more than another, putting aside conflicts over the law and science, and being creative and willing to compromise, cautioning not to "let 'perfect' be the enemy of 'good enough.'"

SUPER DITCH FOLLOW-UP: AN UPDATE FROM THE LOWER ARKANSAS VALLEY

Peter Nichols of Trout, Raley, Montano, Witwer & Freeman presented on the Super Ditch Company (“the Company”) and Lower Arkansas Valley Water Leasing program, a follow-up on the temporary water leasing program alternative to conventional “buy and dry” of irrigated land in the Lower Arkansas Valley. Nichols explained the purpose of the Super Ditch, namely to preserve irrigated agricultural production in the Lower Arkansas Valley while allowing municipal and other users to lease water to meet their unmet consumptive and non-consumptive needs.

The Lower Arkansas Valley Water Conservancy District (“District”) established the Super Ditch in 2008 to allow irrigators in the valley to work collectively to maximize the value of their water rights, particularly during fallowing periods, with irrigators participating to the extent they desire (i.e. up to 100% of their land). Nichols explained that the Company would act as the broker between cities and irrigators, negotiating leases and determining the yield of leasable shares, among other things. To date, the District has spent over \$600,000 of its own funds to evaluate the feasibility of the program, prove the concept, and address essential antecedent issues to the formation of the Company. Such activities included a field trip to the Palo Verde Irrigation District in California in 2006, in which local Lower Arkansas Valley ditch owners collected information on an ongoing successful fallowing-leasing arrangement between the Palo Verde district and the Metropolitan Water District of Southern California, economic analyses of regional water markets and impacts, and legal considerations on articles of incorporation and antitrust issues for the “Lower Arkansas Valley Super Ditch Company.” Nichols ended the presentation by stating that the District plans to come into operation during the 2009 water year and will be filing its first water court change applications for its first leases. Nichols received questions involving allocating demand for multiple party interests and whether there were any complications with lenders.

INVASIVE SPECIES: ZEBRA MUSSELS IN COLORADO

Elizabeth Brown, Invasive Species Coordinator, Colorado Division of Wildlife, closed the conference with an update on the zebra (*Drissena polymorpha*) and quagga (*Drissena rostriformis bugensis*) mussel infestation problem in Colorado and the west. Brown gave a short history of the infestation problem, beginning with the zebra mussels’ first United States sighting in 1988 in the Great Lakes via a transoceanic vessel from the Black and Caspian seas and their first western sighting in Lake Mead in 2007, explaining that the mussels travel over land on boats and trailers or downstream in natural or conveyed water flow. Brown then gave an overview of the mussels’ biology, describing such

powerful invasive characteristics as their byssal threads, which they use to attach to substrate and which clog water distribution systems, their destruction of the food chain base in aquatic ecosystems through plankton removal and their excretion of heavy metals, and their prolific propagation, with a single female producing up to one million eggs per year, ten to fifteen percent of which reach maturity. The mussels damage boats, fishing, and beach recreation with a total yearly cost to businesses and communities of over five billion dollars. She then described actions environmental enforcement officials are taking in Colorado, which has infestation problems in Pueblo Reservoir, Tarryall Reservoir, Jumbo Reservoir, and the four Colorado-Big Thompson lakes. Colorado passed the ANS Act (Aquatic Nuisance Species Act) in May 2008, making it "illegal to possess, import, export, ship, transport, release, plant, place, or cause an ANS to be released." Brown ended the presentation describing ongoing statewide monitoring, prevention and law enforcement efforts designed to eradicate and mitigate contamination.

Suzanne Lieberman

UNIVERSITY OF DENVER WATER LAW REVIEW

2009 SYMPOSIUM

Denver, Colorado

March 4, 2009

WATER LAW 101: UNDERSTANDING THE FUNDAMENTALS OF WATER LAW

Dan Vigil, Assistant Dean and Lecturer, University of Denver Sturm College of Law, presented one of the first sessions of the day on the fundamentals of water law.

Mr. Vigil briefly explained that Colorado follows the doctrine of prior appropriation, where the use of the water need not be near the source of the water itself. He mentioned that the courts previously discussed but ultimately decided against the possibility of Colorado being a hybrid state, where some water owners have prior appropriation rights and some have riparian rights. Mr. Vigil noted that practicing in hybrid states is difficult and many are trying to move away from prior appropriation.

Next, Mr. Vigil explained the doctrine of riparianism, where those who own land abutting a watercourse have the right to use the water. Riparianism gives owners the right to use the water, but only on the land abutting the watercourse, thus it ties water use to the watercourse. Under this doctrine, a landowner owns to the middle of the stream and the land ownership gives the owner the right to use the water.

There are currently 29 riparian states, all of which, in general, have a more abundant water supply than the arid western states.

Mr. Vigil explained that years ago, Colorado needed to adopt a system other than riparianism; a state with a limited number of watercourses provides few opportunities to own rights to the water. So, Colorado adopted the doctrine of prior appropriation, where the use of the water itself was important, not the ownership of land.

In Colorado, Mr. Vigil remarked that the legislature takes up water issues almost every time it meets in an effort to figure out how to bring in more water to deal with its population growth. Colorado only gets to keep one-third of the water originating within its borders because it is a source state for at least 16 other states. Colorado struggles with how to meet the needs of an exploding population when it is unable to increase the annual amount of snow and rain. Mr. Vigil noted the additional challenges imposed by the invasion of destructive insect species and the presence of water consuming plants growing along water banks. Additionally, the agricultural industry and the development of the oil shale industry create additional pressures.

Mr. Vigil explained that all the water in Colorado is fully appropriated, meaning it is all spoken for, before proceeding to describe how water rights owners acquired the right to use the water in the first place. He explained that owners must acquire the water right independent of land ownership. For example, if an owner buys land with a river running through it, the owner would not have any rights to the water based on land ownership. Long ago, an owner only needed to put the water to beneficial use to acquire the water right. Then Mr. Vigil pointed out the doctrine of relation back, which is necessary because it takes a long time to move water. This means that the water rights relate back to when an owner first starts to work on a ditch if it takes the owner a long time to put the water to beneficial use. Before acquiring the water right, the owner would get a conditional decree with the option to renew every six years.

Mr. Vigil explained that water rights, once obtained, are difficult to lose, even though some states recognize that one may lose a water right through forfeiture. While Colorado does not recognize forfeiture, it does recognize abandonment. However, abandonment is difficult to prove because it requires showing the intent to abandon, and it is hard to prove an owner intended to throw away such a valuable right. Mr. Vigil noted that there is a statutory presumption of abandonment after ten years, but it is only a presumption.

Next, Mr. Vigil explained that the Colorado constitution provides the undeniable right to divert the unappropriated water of any natural stream. However, this provision is not as important as it used to be because no available water remains. Now, someone wanting to acquire water rights must purchase them because there are no new sources of water. He explained that a lot of water law today involves helping indi-

viduals through the complicated process of buying and selling water rights.

Mr. Vigil then explained the different impact on water rights during a drought under prior appropriation and riparianism. Riparianism is a community-based system where everyone suffers equally. However, if you have a higher priority under prior appropriation then you will get water before others with a lower priority. Prior appropriation is not a community-based system because some people suffer completely, while others do not suffer at all. Buyers in a prior appropriation state should look to buy water rights with a higher priority.

Next, Mr. Vigil discussed the concept of transferring water rights. Owners can only transfer the water that they used. For example, if an owner applied eight cubic feet of water to the land, but four cubic feet was return flow to the stream, then the owner could only transfer four cubic feet. Transferring water rights is also difficult because transfers are subject to the "no injury" rule, meaning that courts will allow transfers if there are no injuries to other people and anyone who the transfer might affect has a right to complain.

Mr. Vigil noted that the idea of taking water from the stream for use elsewhere provided the premise for Colorado water law. Now courts recognize natural beauty, recreation, and fishing as beneficial purposes; however, this change occurred after there was little water left in the stream. He noted that the legislature is exercising more creativity in order to find ways to keep water in the stream.

Mr. Vigil concluded with a brief discussion of ground water in Colorado. Denver planned ahead by taking water from the western slope and preserving the right while there was still water available. On the eastern plains, there is a large aquifer that the state is mining, meaning that the rate of withdrawal exceeds the rate at which rain and snow replenishes the aquifer. The aquifer is a finite resource that takes 1000 years to replenish. In the rest of Colorado, owners can use ground water on the land directly above the water source at a withdraw rate of one percent per year.

Mr. Vigil noted that there are different systems of administering ground water and that most of the areas outside of Denver rely on aquifer water, whose replenishment is not likely in the near future. Although these areas are working furiously to deal with the scarcity of water in light of a burgeoning population, they are facing an uphill battle because water law does not move quickly.

Susan Summers

CONFLICTS OF INTEREST FOR THE WATER PRACTITIONER: ETHICAL DILEMMAS AND APPROACHES FOR ATTORNEYS

Cynthia Covell, of Covell & Alperstein, P.C., spoke on conflicts of interest in water law practice, focusing on recent changes to the Colorado Rules of Professional Conduct as they relate to the unique situa-

tions water law practitioners face. Colorado adopted the new version of the Rules of Professional Conduct (“Rules”) in 2008, and these rules contain not only differences from the old version, but also more examples and clarifications.

Ms. Covell began with a discussion of Rule 1.7, Concurrent Conflicts of Interest. This rule covers the ground addressed by the rules governing present and former clients in the previous version of the Rules. First, Ms. Covell explained that there are two types of direct adversity conflicts under 1.7(a)(1). First, there are conflicts where clients are directly adverse, and second there are material limitation conflicts where there is a significant risk that the lawyer’s ability to represent the client may be materially limited. While it is easier to recognize situations where the lawyer is representing two clients who are directly adverse, as such conflicts arise in either the same litigation, a settlement situation, or in court during cross-examination, Ms. Covell said it is more difficult to identify and predict material limitation conflicts. However, because these types of conflicts are very common, it is prudent to identify the potential conflict and create a plan to address it if the conflict becomes a reality.

Some of the situations in which material limitation conflicts arise are when a relationship with another client may materially interfere with a consideration of all of the alternatives in a given case, when a lawyer has knowledge of a former client that makes it possible to predict the client’s litigation or settlement strategy, and when a lawyer interviews for a job at a firm whose clients are directly adverse to the clients of the attorney’s present firm.

Not all material limitation conflicts require the attorney to forfeit representation of a client. However, it may be necessary to have a waiver and consent form in place to deal with any potential conflicts.

One type of material limitation conflict especially pertinent to water lawyers is a positional conflict. These conflicts surface when a lawyer advocates for one legal position in one court, and a different or adverse legal position in another court. Because the water courts are limited in number, other members of the bar often find out that the water lawyer has taken a divergent position in another court and this can harm a water lawyer’s credibility. While many states do not see positional conflicts as conflict of interests, Colorado considers them conflicts of interest because of the small number of water courts and the method of direct appeal to the Supreme Court. If there is a significant risk of a positional conflict, a lawyer must withdraw from one side of the representation, and possibly from representing both clients.

The Colorado Bar Association Ethics Opinion 58 clarifies a water lawyer’s duties in respect to potential conflicts that stem from representing multiple clients who are involved in the litigation of water rights from the same river system, saying that this does not per se constitute an ethical impropriety. However, there is a conflict of interest if

the water supply of one client is in fact impaired as a result of representing the other client. Ms. Covell said this opinion is limited, however, because it does not address groundwater, imported water, produced water, or non-tributary groundwater.

Ms. Covell also said that with experience, most water lawyers start to know when a conflict is likely to arise. In her experience, conflicts of interest often come up in augmentation plans. Additionally, although the law may not view a certain situation as having a conflict of interest, Ms. Covell said that clients have a different view of injury. It is up to water lawyers to explain to clients how their representation of other clients who have an interest in the same water will not harm them. Additionally, water law is unique because most lawyers have long-term clients with multiple interests, which can raise the feeling that a conflict of interest is imminent.

When trying to determine if a conflict of interest exists, water lawyers must gather as much information as they can about the proposed representation. At times, this may require the disclosure of confidential information of a current client if the client consents. Additionally, conflict checking procedures and waiver/consent forms are essential to determine whether a conflict exists.

Water law practitioners have a greater chance of being subject to an investigation for conflicts of interest because investigators are less familiar with the general types of situations that occur in the field of water law. Additionally, individual water rights' holders sometimes perceive that there is a conflict and request investigation or file grievances because of the perception that the attorney has violated the duty of loyalty. In particular, others might perceive a lawyer who is involved in litigation on both the eastern and the western slopes as having a conflict of interest. Ms. Covell believes that good lawyer-client communication is the best way to work through such conflicts with clients.

A client may consent to a conflict before representation commences. However, even if client is willing to consent, the lawyer must make an independent determination whether a conflict of interest exists through asking the following questions:

- Who are the clients?
- Can I provide competent representation?
- Is it prohibited by law?
- Will it bring directly adverse litigation?

Moreover, a lawyer must have communicated adequate information and explanation about material risks and reasonably available alternatives to the proposed course of conduct to the client. They must be aware of relevant circumstances, foreseeable conflicts, and the implications of multiple representation. A client must give informed consent in writing, including email. Water lawyers should be aware, though, that a client could revoke consent.

Allison Graboski

GREEN DEVELOPMENTS IN COLORADO WATER LAW

Robert Wigington moderated a panel of three public interest water law attorneys and organizers. Wigington, the western water policy counsel at The Nature Conservancy, has been affiliated with both western water issues and freshwater biodiversity conservation efforts since he started working at the Conservancy. He noted his main goals are restoring rivers back to their natural condition and keeping them that way.

Drew Peternell, Colorado director of the Western Water Project at Trout Unlimited ("TU"), discussed how his organization works to maintain and restore flows in Colorado's rivers and streams, primarily by using the resources offered in the Colorado water court system and in various administrative agencies. TU is a national non-profit organization, with the goal of conserving and protecting trout and salmon in their natural habitats. As a sportsman conservation group, TU attracts many fisherpersons who support protecting fish populations in rivers. Because of the organization's aims, the Colorado office works specifically on streamflow issues to preserve healthy trout populations, taking a water quantity, as opposed to quality, approach.

Peternell detailed three reasons why low streamflow is a major problem in the West: (1) the arid climate; (2) the prior appropriation doctrine, which creates incentives to remove water without providing incentives to leave water instream; and (3) population growth, creating increased demands for water and putting additional pressure on stream ecosystems. Peternell also highlighted three of the major tools his office uses to protect streams: the Instream Flow Program, the Wild and Scenic Rivers Act, and the Reserved Rights Doctrine.

Colorado's Instream Flow Program vests authority in the Colorado Water Conservation Board ("CWCB") to hold appropriation permits for "instream" use, creating a water right to leave water in the channel. Before this legislation, water permits only allowed permit holders to divert water out of the stream. Two subsequent bills helped to strengthen the Program. The first bill appropriated money to the Program, and the second removed a disincentive in the law to lease water. This second bill quashed fears that a permit holder could lease his water for a non-consumptive use, resulting in a loss of his permit because he failed to put the water to a consumptive use.

The CWCB obtains permits in two ways: through new appropriations, and by acquiring senior water rights and converting those rights to instream flow permits. However, there is a limitation to the former method. Because Colorado follows the prior appropriation doctrine, these new instream permits only have priority over subsequent junior rights holders. Thus, senior permit holders may continue to use as much water as their permits allow, and the CWCB's instream use cannot affect the quantity of senior rights holders' consumptive use.

Another tool Peternell uses at TU is the federal Wild and Scenic Rivers Act. This act allows the U.S. Fish and Wildlife Service to designate rivers as wild and scenic, and the designation gives these rivers greater protection. However, many states have reservations about relying solely on this Act. Water law is historically a state issue, and states are thus concerned with federal agencies exercising jurisdiction over state problems. As a result, Colorado only has one designated river.

The final tool Peternell detailed was the Reserved Rights Doctrine. Under this doctrine, the federal government sets aside a parcel of land for some special purpose, entitling the federal government to a water right to serve that purpose. For example, when the government designates a National Park, such as Black Canyon, a water right becomes necessary to maintain the fish in the Park's rivers. However, the process of obtaining water rights under is tedious, requiring a lengthy time to obtain.

Finally, Peternell detailed two problems with Colorado's water system, each of which impedes water protection. First, the water court system does not consider the public interest or environmental impacts in its decision-making. But, the court does offer some remedies. A person can object to a water application, which will require the applicant to prove all elements under strict scrutiny, including proof of anti-speculation and proof of a reasonable need for a reasonable amount of water for a specific purpose. Second, conservationists argue that the state standard for minimum flow level utilizes very low instream flow numbers, which are inadequate for the survival of fish. This allows for minimum values that are too low for any real protection of fish populations.

Next, Becky Long of the Colorado Environmental Coalition ("CEC") spoke about the environmental work of her organization. The CEC's goal is to share information obtained by other environmental groups to form a well-educated environmental community. They have built networks among conservationists, local governments, water providers, and other interested parties. The CEC not only promotes policies that promote a healthy environment, but also policies that encompass sound economic plans. By bringing different groups together, environmentalists are able to benefit from the work of others and utilize the combined resources and strengths of groups with different, but similar, goals.

The CEC provided indispensable work for the passing of the 2006 Colorado legislation for recreational in-channel diversions. This legislation recognized and expanded recreational diversions. The CEC worked to bring all the important stakeholders together to ensure the legislation passed. The group had a site-specific approach, concentrating on Golden's kayak park, and a community-based approach, ensuring that all people and groups involved understood the consequences of the new program.

Finally, Amy Beatie from the Colorado Water Trust (“CWT”) spoke about the relatively new idea about the “greening” of water quantity, as opposed to merely quality. This is contrary to past thinking about water use because, traditionally, users removed water from streams for consumptive use. A psychological switch is occurring as more lawmakers and community members think that ecological and scientific uses of water are just as important as consumptive uses.

CWT concentrated its attack around land trust developments, which have been the most successful conservation efforts. Using this approach, the Trust worked on projects in the Instream Flow Program, primarily to create new water acquisitions. These acquisitions, which move water into the Instream Flow Program, are a good way to put water to green quantity uses because more water stays in the river. Additionally, CWT protects and enhances streamflow, using a wide range of other programs, including moving points of diversions and creating fish ladders. Finally, CWT consults with land trusts as they encounter water issues, to ensure protection of water on these lands.

Shannon Carson

LEGISLATIVE UPDATE OF WATER ISSUES

INTRODUCTION

Chris Treese, the Manager of External Affairs for the Colorado River Water Conservation District, discussed the legislative history of water issues here in Colorado. There is a dynamic system of water law in Colorado. In his work for the Colorado River District, Treese makes sure that Western Colorado has a voice in the evolution of water law in the state, especially in relation to the Colorado River. Its mission is to conserve and protect the Colorado River water for Western Colorado, and to put water from the Colorado River and its tributaries to beneficial use for the State of Colorado. Treese discussed some of the historical bills that have affected water rights in Colorado, starting with those regarding instream flow protection. He also covered the legislation regarding recreation in-channel diversion, planning and development, flexibility, conservation, and other important issues.

Legislation Regarding Instream Flows

In 1973, House Bill 73-097, the legislature introduced instream flow protection in Colorado, allowing the environment to appropriate and hold water to use in priority. This bill allowed for the holding of a minimum amount of water for the protection of the environment. In 2002, Senate Bill 02-156 allowed for the creation of a Water Trust, and allowed for a change from absolute water rights to instream flow rights. The purpose of this change was to allow for the protection of the environment. This bill led to a debate about how the language might im-

pact environmental groups, and whether improvement of the natural environment was feasible. The next year, House Bill 03-1320 provided a short-term loan of existing absolute perfected water rights to an in-stream flow. In 2008, House Bill 08-1280 provided for the long-term lease or loan of existing traditional water rights to an instream flow. The No Injury Rule would apply to these loans.

Recreation In-Channel Diversion

In 2001, the legislature responded to judicial precedent with Senate Bill 01-216. The legislature decided under what circumstances it would allow water rights for recreation in-channel diversions. The legislature reviewed this bill in 2006, passing Senate Bill 06-037, which developed some further side guidelines and additional clarifications concerning the appropriation of recreation in-channel diversions. Treese noted these laws recognize the many reasons that recreation is invaluable to Colorado, especially economically.

Planning and Development Legislation

As the Colorado legislature is truly a representation of its people, there have been several bills put forth with the help of planners and engineers. In 2003, Senate Bill 03-110 authorized the Water Conservation Board's activities, one being a Statewide Water Supply Investigation to examine statewide demands and water supplies looking out 20 to 30 years. This project did not answer the question of who needed to be in charge of the planning process. Most of this responsibility would go to the in-state water utilities and water districts. The Big Straw Project was a proposal based on the idea that the Colorado River has some unappropriated waters, and that Coloradoans should go below Grand Junction and put in either an on-channel or off-channel arrangement for pumping, so as to pump that water back up to its headwaters. This would serve many different basins in Colorado. In 2005, House Bill 05-1177 created a roundtable process for the seven major basins and the Denver Metropolitan area. The roundtable process of citizens ensures that Colorado continues to have value-driven water development, and that peoples' voices are heard. This bill has been important in bringing different types of people, including those involved with community development, into the water law discussion. In 2007, Senate Bill 07-122 authorized a study to look at what amount of water in Colorado, and the risks of development of the Colorado River System. Then in 2008, for the first time the same piece of legislation tied together water and land use, by House Bill 08-1141. This bill requires that a developer must demonstrate an adequate, permanent water supply before it can get a development permit. Although logical, a very long and difficult debate preceded the enactment of this bill.

Flexibility

Treese noted the Water law system in Colorado is responsive, and to be responsive, it must be flexible. Many of these bills are in response to the droughts of 2001 through 2003. In 2001 with House Bill 01-1354, the legislature authorized water banking, a notion that you could store surplus water from that year in a physical location and hold it for later. This bill, however, only applied to the Arkansas River Basin. In 2002, House Bill 02-1414 gave the State Engineer the authority to make approvals for substitute water supplies, and to authorize the moving of water around the basin within the prior appropriation system; the Senate passed a similar bill in 2003, Senate Bill 03-073. The House authorized water banking statewide under House Bill 03-1318, whereas the previous bill only allowed water banking in the Arkansas River Basin. However, even though water banking is available, no one has used it yet in Colorado. House Bill 03-1001 gave the State Engineer temporary authority to approve changes of water rights, recognizing the amount of time it takes the judiciary to settle many of these cases. Also in 2003, House Bill 03-1334 authorized interruptible supply plans, where a city may contract with a farmer to allow the city to compensate him or her for the cessation of irrigation so that the city may use the water in times of drought. In order for this to be legal, however, the Governor must have officially declared a state of drought. Nonetheless, in 2004, House Bill 04-1256 removed the requirement that the Governor had to declare a drought in order for an entity to utilize an interruptible water supply agreement. Expanding on this concept, House Bill 06-1124 created an arrangement similar to interruptible water supply agreements, known as a rotational crop management contracting. The No Injury Rule applies to these contracts.

Conservation Bills

In 2003, three water conservation bills failed. Following that, in 2004 House Bill 04-1365 required that any municipality with a population over 10,000 must have a water and drought preparedness plan, and must file such plan with the state. In House Bill 05-1070, the legislature invalidated Homeowners' Association covenants that would limit or prohibit xeriscaping. Finally, House Bill 05-1254 created a water grant program to promote water efficiency.

Other Legislation

In 1998, House Bill 98-1006 created the Species Conservation Trust Fund. This would especially become pertinent to those species on the Colorado River. The bill also addressed candidate species, in order to prevent listing under the federal Endangered Species Act. In 2002, House Bill 02-1252, gave the voters of certain counties the right to

change the voter structure for Commissioner elections, and created the Colorado Foundation for Water Education. While Senate Bill 03-278 imposed fees on water rights, this concept proved largely unadministrable. In 2007, House Bill 07-1168 allowed for the creation of forest health districts, in recognition that forest health is ultimately a water quality and quantity issue. House Bill 07-1132 allowed the water court to consider water quality impacts in change of water right cases. Finally, in 2009, Senate Bill 09-080 and House Bill 09-1129 addressed the capture of precipitation.

The second speaker, Brett Fox, an Associate at Brownstein Hyatt Farber Schreck, LLP, discussed the Colorado water legislation currently in progress in both the State Senate and House. Fox noted that a few issues have garnered sufficient attention for the formation of a subcommittee on the topic. One such issue is surface water versus groundwater usage in the South Platte River Basin. Fox explained that a few irrigation districts with water rights postdating 1900 are objecting strenuously to the groundwater bills. The recent development of groundwater access and its relation to prior surface water rights have garnered controversy in Colorado. While the law recognized the relationship between groundwater and surface water rights early on, the system in place was slow to catch up. The 1969 Adjudication Act enabled well pumping out of priority, if the water user replaced the amount through an augmentation plan. By 2000, there were several Colorado Supreme Court cases regarding the State Engineer's authority to allow junior appropriators to pump out of priority under augmentation plans. The legislature responded, and passed legislation to put the augmentation plans into action. The two pieces of legislation that are currently under consideration are House Bill 1174, which exempts out-of-priority depletions caused by pumping prior to March 15, 1974 from replacement requirements in any future augmentation plan entered in Water Division 1. Senate Bill 147 authorizes substitute water supply plans for replacement of out-of-priority lagged depletions caused by pumping of wells included in decreed augmentation plans prior to January 1, 2003. The bill would allow use of augmentation water sources that the augmentation plan does not identify, that the court has not previously decreed for augmentation use, and that a pending water court application for change of a water right to augmentation and replacement uses would not include. This bill has support from the Water Congress and does not have any significant opposition. Fox noted that these two bills reflect the tension that has existed for generations regarding how to integrate groundwater into the prior appropriation system without injuring senior appropriators.

Fox also discussed two bills that focus on rainwater harvesting. House Bill 1129 would allow ten new developments to conduct pilot projects for non-potable uses, using a 30 percent augmentation requirement and permanent augmentation plans upon pilot project

completion (or project retirement). Similarly, Senate Bill 80 would authorize limited rainwater collection for household, fire protection, stock watering, and irrigation of up to one acre of lawns and gardens. The bill is structured as an alternative means of diversion for exempt wells under statute Section 37-92-602, and small capacity wells in designated basins under statute Section 37-90-105.

The next speaker, Steve Sims, a Shareholder at Brownstein Hyatt Farber Shreck, LLP, focused on the current legislation regarding coalbed methane production and its effect on water quality. First, he provided a brief overview of the process. Sims stated that where there is coal, there is methane. One can burn and use the methane just like natural gas. Engineers have found the best way to harvest the methane is to sink wells down into the coal formations. For this process to work, the engineers must remove the water that is in the coalbed formations to eliminate some of the hydrostatic pressure, causing the gas to release. The problem is that some of the coal seams have connections to streams, resulting in the pollution of streams through the discharge of coalbed wastewater.

Currently, there is a draft bill that will create some safe harbors where the well operators will know whether or not the coal seam that they are pumping is tributary to a stream. There is also a directive to the State Engineer to encourage a rulemaking that will firmly delineate the presumptive lines between tributary and not tributary. The new rules could also apply to oil and gas producers, since they often release a small amount of water during production. Sims noted that countries all over the world, as well as other states, look to Colorado as a place where the government has integrated groundwater and surface water rights.

Kathlyn Bullis

ADVANCING FRESHWATER CONSERVATION IN THE CONTEXT OF ENERGY
AND CLIMATE POLICY: PRACTICAL APPROACHES IN FAST MOVING
STREAMS

Adell Amos, Esq., Assistant Professor and Director of the Environment and Natural Resources Program at the University of Oregon School of Law, discussed using prior appropriation to manage water resources in light of increased demand from energy and reduced supply as a result of climate change. Specifically,

[p]rior appropriation in coming years may prove its value or its failure as a tool for the management of water resources as opposed to mechanism for allocating water rights. The urgent question is whether the doctrine of prior appropriation has the agility and flexibility to deal with the changing landscape at the intersection of water, energy and climate policy. In the modern era, states have allocated many, if not all, of the water rights, so the prior appropriation doctrine now

must be a tool, not an impediment, to make a system of managing those allocations work for all of the citizens of the west.

Ms. Amos began with an overview of climate change, mitigation, adaptation, and the implications for water law. She explained how existing water policy allows for adaptation and mitigation in response to climate change. For example, promoting conservation, conserving wetlands, and implementing comprehensive urban water plans are examples of good water law policy as well as good climate change adaptation and mitigation strategies. However, Ms. Amos cautioned that in adopting solutions to water shortages and climate change, policymakers should not exacerbate either or both problems. For example, desalination of seawater could help solve water shortages, but it is an energy-intensive process and emissions from the energy used could exacerbate climate change.

Ms. Amos then presented a series of hydrologic data and maps illustrating drought, population, and climate change trends. These maps and data showed that in the western United States, the areas that withdraw more water than precipitation replaces also have the largest population growth. Moreover, climate change models predict that the western United States will receive less precipitation in the future. Ms. Amos noted that reliable predictions of precipitation are unavailable because of the many variables in the hydrologic cycle. Because prior appropriation responds to conditions on the ground, it provides needed flexibility in responding to this uncertainty.

Ms. Amos next explained the importance of connecting energy policy and water law. Energy production, such as oil shale and biofuel production, is the fastest growing user of water. Likewise, water treatment, transport, and use consume a large proportion of energy. For example, in California, 18 percent of energy demand is for water. Reductions in energy demand for water would reach the same result as all other energy-reducing proposals combined. Thus, it is unclear whether California can meet its carbon dioxide reduction targets without addressing the energy used for water. Moreover, junior water right holders have questioned the rights of senior water right holders who use more energy. Additionally, the solution for some areas that lack water is to move water via energy intensive pipelines. This energy consumption, in turn, releases more greenhouse gases exacerbating climate change and drought.

Ms. Amos discussed mechanisms within prior appropriation that may assist decision makers in energy and water policy. Ms. Amos described the disadvantages and advantages of prior appropriation. The disadvantages include: it favors old inefficient uses, it lacks flexibility, it creates incentives for wasteful practices, it creates a vested interest, and it lacks a mechanism to evaluate use. The advantages of prior appropriation in adapting to climate change include that it is built on the principle of storage, it includes the concept of beneficial use, which

can be redefined to exclude wasteful uses, it has transfer processes already built in, allowing shifts to less energy intensive uses, and it recognizes the public nature of water, allowing states flexibility in responding to new uses and shortages.

Finally, Ms. Amos discussed solutions for water, energy, and climate change policy. First, there needs to be recognition of the relationship between water and energy at the legislative and administrative levels. Second, prior appropriation may provide the flexibility needed to address some of these issues. Third, state water agencies need to reorient their mission from water allocation toward water management and planning. Fourth, governmental and other entities need to promote energy and water conservation. Fifth, there needs to be implementation of national water and energy policies that recognize the interrelationships between these two resources.

Roberta Kennedy

27TH ANNUAL WATER LAW CONFERENCE

CHANGE IN THE MIDST OF CONSTANTS: ADAPTING WATER LAW TO MEET NEW DEMANDS

San Diego, California

February 18-20, 2009

WATER LAW 102: GROUNDWATER BASICS

The conference began Thursday morning with a session entitled "Water Law 102: Groundwater Basics." David E. Hansen, Ph.D., P.E., from Hansen Allen & Luce, Inc., began the session with an overview of the engineering aspects involved in groundwater administration. Dr. Hansen first defined basic groundwater terms and discussed the attributes of mountain and valley geology and its impacts on the flow of groundwater. To illustrate these impacts, Dr. Hansen described the groundwater drilling occurring in the Emma Park region southeast of Salt Lake City, Utah. Dr. Hansen pointed out that, in determining the location of wells, one needs to take into consideration geologic strata that directly affect the distribution of surface runoff between drainages and, subsequently, the seepage of surface water into groundwater. He also addressed the inconsistencies that can occur in groundwater pumping. Under normal well pumping conditions, the water level initially declines quickly, but then stabilizes over time. However, both groundwater mining and changing groundwater conditions can negatively influence groundwater pumping. Accordingly, Dr. Hansen stressed the importance of accurate data collection over time to adjust

pumping rates and thereby maximize the resource. Dr. Hansen also pointed out that groundwater source zones can vary significantly within a region and commonly interfere with each other. Therefore, pumping in one zone can have a direct impact on the water level in other groundwater zones. Finally, Dr. Hansen concluded by noting that while a definitive conclusion surrounding the interaction of groundwater systems may be difficult, it is still important to rely on well-versed experts who can explain, to the best of their abilities, those interactions to judges and juries.

Robert "Bo" Abrams, Professor of Law at Florida A&M University College of Law, was next to speak. He presented an overview of groundwater law and its associated regimes. Mr. Abrams first addressed the importance of groundwater as it relates to societal demand, including agricultural, municipal, dispersed domestic, and industrial uses. Groundwater carries with it certain advantages over surface water, such as increased reliability, improved quality, and advantages related to the infrastructure costs of storage and delivery. Historically, American groundwater law developed independently from surface water law due to limits in knowledge and technology. However, states applied common law property doctrines to the resource. Mr. Abrams discussed rules of capture, i.e., absolute ownership and the American reasonable use rule, rules of sharing, i.e., the Restatement Second of Torts reasonable use rule and correlative rights, and the prior appropriation doctrine, based on a rule of priority of use. Mr. Abrams provided a hypothetical scenario in which a city's newly opened rural well farm harms other users by lowering the water table. He then addressed the problem through the lens of each common law doctrine. Mr. Abrams discussed the movement during the twentieth century towards state administrative systems incorporating the permitting of groundwater use. These systems provide states the ability to proactively avoid harm to the resource, and produce statutes and regulations that add specificity to the management of the resource. In conclusion, Mr. Abrams gave a survey of modern problem areas in groundwater law, including the interaction of groundwater and stream water, conflicts between users due to well interference and overdraft, land subsidence from groundwater pumping, saline intrusion, and aquifer storage and recovery.

PLENARY PRESENTATION 1: INTERSTATE WATER LAW: NEW COMPACTS AND NEW APPROACHES

Owen Olpin, former Farr Professor of Law at the University of Utah and Special Master overseeing *Nebraska v. Wyoming*, moderated the first session of the day. He began the discussion by describing three pathways for the allocation of interstate water: Article III original jurisdiction, direct congressional allocation, and interstate compacts. Mr. Olpin explored the role of Article III jurisdiction in the *Nebraska v*

Wyoming cases over the enforcement of the 1945 North Platte Decree. He concluded with a discussion of interstate compacts and noted that the Supreme Court prefers interstate compacts because the compacts encourage negotiations between the states.

James C. Brockmann, of Stein & Brockmann, P.A. in Santa Fe, New Mexico, spoke about the Pecos River Compact compliance program. He discussed New Mexico's approach to meet its interstate compact obligations on the Pecos River. Mr. Brockman noted that New Mexico succeeded in complying because the state took responsibility and did not try to force the entire solution upon the residents of the Pecos Valley.

Noah Hall, professor at Wayne State University Law School, explained the Great Lakes Compact as a model for interstate water management. He discussed the evolution of the compact from its inception to its negotiations to its final passage in Congress. The compact itself bans all diversion out of the watershed with few exceptions. Further, for water use in the basin, the compact provides a short list of minimum standards for water withdrawal including rules regarding return to watershed, prohibition of adverse environmental impacts, water conservation, and reasonable use determinations.

PLENARY PRESENTATION 2: WATER AND ENERGY: UNEASY ALLIANCE

Elizabeth Thomas, from the Seattle, Washington office of K&L Gates LLP began this presentation recognizing the inextricable connection between water and energy – just as energy producers depend on water supplies, so too water producers depend on energy supplies. In order to expound on this idea, the panel members looked at this nexus from a few different angles.

Mark Robinson, Director, Office of Energy Projects, Federal Energy Regulatory Commission ("FERC"), discussed harvesting energy from natural water movement, known as "hydrokinetics," and the role of the FERC in regulating these energy sources. FERC regulates both ocean hydrokinetics sources, including tidal, wave, and current projects, and in-river projects, which are non-dam turbine systems. Hydrokinetics present a statistical energy panacea of sorts – on paper, the wave movements of the world's oceans produce over 250 terawatts of energy every year. Mr. Robinson does not believe that the United States could ever harvest that much energy, but hydrokinetics could play a large role in increasing the 9 percent share hydropower plays in the nation's total energy portfolio.

Mr. Robinson talked about the various projects under production or in the design phase, as well as the FERC's jurisdictional authority and regulatory process. In short, the FERC has authority over projects that affect federal lands, utilize a navigable waterway, produce energy sold via interstate commerce (like the power grid), or utilize excess federal project water. The city of Hastings, Minnesota uses excess fed-

eral project water on the Mississippi River by placing a power turbine at the bottom of an Army Corps of Engineers' lock and dam system. Similarly, a company testing ocean-based buoy-turbine technology would fall under the FERC's jurisdiction under navigable waters, federal lands, and interstate commerce. Mr. Robinson also stressed the difference between preliminary permits and actual licenses. Preliminary permits do not authorize construction of hydrokinetic projects, but do allow permit holders to conduct feasibility studies and hold the priority of the permit holder to build the project if FERC grants the license. Currently, FERC has only issued two licenses, but they have issued 137 preliminary permits, and have another 88 preliminary permit applications pending.

Next, Thomas W. Beauduy, the Deputy Director and Counsel for the Susquehanna River Basin Commission, spoke about the impact of gas development on the water resources of the Susquehanna River Basin. According to Mr. Beauduy, the Marcellus Shale Formation has the potential to produce 50-400 trillion cubic feet of gas, but in order to recover this gas, developers must use approximately one million gallons of water for each one thousand feet drilled for gas wells. Put together, this much water use in the Susquehanna River basin, which would eventually drain into the Chesapeake Bay, is cause for concern not only for the Susquehanna River Basin Commission, which is responsible for monitoring the water use, but also the municipalities and other large water users in the area the water use would also affect.

Finally, Kristy A. Niehaus Bulleit of Hunton & Williams in Washington, D.C. addressed the various issues regarding the use of water in the actual production of energy in power plants. Ms. Bulleit provided an overview of the use of water in power production, and how different kinds of plants use water in different ways. "Wet" power plants use a neighboring water resource to cool condenser coils, either in a system that uses water once and returns it to its source or in a system that recycles the water. There are Clean Water Act regulations that cover the location of water withdrawal and return locations for these water sources. However, while the regulations favor the closed systems that recycle water, there is still an open question regarding the cost-benefit analysis of certain types of cooling mechanisms and how the Clean Water Act regulations cover cooling condenser water discharges.

BREAKOUT SESSION 1A: EMERGING AND NEW BALANCES IN TRIBAL AND FEDERAL WATER RIGHTS

Jeanne S. Whiteing, of Whiteing and Smith in Boulder, Colorado, provided an overview of the *Winters* federal Indian reserved water rights doctrine. She discussed the basics of the doctrine, namely, that upon the establishment of an Indian reservation, the federal government reserves sufficient water to the reservation, and the priority date is the date of establishment of reservation. However, the questions still

stand: Who reserved the rights? Did the Indians reserve from the reservoirs, or did the federal government reserve on behalf of the Indians? The *Winters* case and subsequent cases have not answered this question.

Ms. Whiteing further noted that in the second half of the twentieth century, settlements have quantified the water rights of most reservations, with the exception of the quantifications of the five reservations in *Arizona v. California* and the Wind River Reservation. To date, the United States and various tribes have completed twenty-three Indian water rights settlements, and Congress has approved most of them. Several settlements are also currently pending in Congress.

Next, Scott Bergstrom from the Division of Indian Affairs, U.S. Department of the Interior, offered a federal perspective. He began by establishing the context for the federal outlook. First, the United States holds legal title to water that it holds in trust for the Indians. Second, although the parameters are hazy, the United States has responsibility to protect Indian water rights. Third, federal water rights must ensure that there is sufficient water for the purpose that the water was originally set aside, especially to make reservations livable. Fourth, Mr. Bergstrom explained the effects of the McCarran Amendment, which waives the sovereign immunity of the United States in a suit designed to establish the rights to a river or other source of water, and where the United States appears to own or be in the process of acquiring rights to any such water. Ultimately, state courts may adjudicate federal water rights claims under state law.

Mr. Bergstrom subsequently examined some unique issues, such as fishing rights. The Supreme Court has not focused on fishing or other purposes that led to the establishment of Indian reservations, and thus has not examined off-reservation uses for water. Fish that rely on off-reservation water may support the inhabitants of the reservation. Thus, reserved fishing rights include water rights sufficient in quantity and quality to support the fishing rights.

Jeremy Jungreis of Nossaman LLP investigated the future of *Winters* rights in a time of drought and climate change. He introduced some emerging issues. First, can federal entities acquire federal water rights on acquired lands through public domain rather than reservation in the West? Second, can the federal government obtain federal rights in riparian jurisdictions? Third, if federal rights exist, how should courts or stakeholders measure them? Fourth, who gets priority in a riparian system when there is a drought, and temporal priority is not a factor? Finally, what should federal agencies do to protect their rights? Mr. Jungreis then reviewed the fundamentals of riparianism and concluded with a discussion of *Alliance to Save the Mattaponi v. Commonwealth of Virginia*.

BREAKOUT SESSION 1B: OPPORTUNITIES AND OBSTACLES WHEN CHANGING RESERVOIR OPERATIONS

The session addressing reservoir operations began with a symbolic and analytical take on the reservoirs of the Western United States. To the generation that built them, the dams and reservoirs of the West represent national treasures in the desert. And while they bring power, flood control, agriculture, river transportation, and many other benefits, they are also expensive to build, maintain, and take down.

Steve Cone of the United States Army Corps of Engineers' Institute for Water Resources began the presentation by addressing the role of the Corps in the nation's water supply, especially in the West. At the most basic level, Mr. Cone reiterated that the Corps does not buy or sell water; it leases storage space in its reservoirs. Also, when it comes to building reservoirs in the future, the Corps fulfills multiple uses, including flood damage reduction and mitigation, hydroelectric power, irrigation water, and water storage. Many of the present questions, however, relate to the dependable yield of water storage leases, where a municipality could lease storage in a project but only be able to draw water five out of six years.

Tim Rameriz of the San Francisco Public Utilities Commission spoke about the Tuolumne River, a major water source for the San Francisco metropolitan area. Mr. Rameriz detailed the Hetch Hetchy Water and Power system, a series of three reservoirs that provide almost 85 percent of the city's water supply. One of the changes to this project include controlled floods intended to mimic spring snowmelt conditions, but as the Mr. Rameriz stated, the opportunities are few and the obstacles many.

BREAKOUT SESSION 2A: PRIVATE WATER TRUSTS: AN EMERGING FORCE IN WATER MANAGEMENT

Janet Neuman, Professor of Law at Lewis & Clark Law School, filled in on short notice to moderate this panel discussion on the legal and institutional issues that arise for land trusts and water trusts, including their roles in managing surface and groundwater for the protection of species habitat and water quality. The panel included Amy W. Beatie, Executive Director of the Colorado Water Trust, Konrad Liegel, partner at K&L Gates LLP, and Steve Shropshire, managing shareholder at Jordan Schrader Ramis PC.

The panel began by discussing the structure of land trusts as they lead to water trusts. Mr. Liegel, with his extensive experience as counsel to land trusts, set forth the basic organization of land trusts as tax-exempt, non-profit organizations organized under state law. Land trusts have been very successful in terms of land preservation and therefore carry large political clout. These incentive-based trusts attempt to work within the context of existing regulations to find willing

sellers and buyers of land. Mr. Liegel noted that the best land trusts are those that are community and mission oriented, proactively working on conservation projects that fit the needs of a region. Mr. Shropshire discussed the water trust as a constructive form of interaction with senior water rights holders, based on the land trust model. A water trust is an out-of-the-box alternative to litigation that can ensure the appropriate stage agency acquire instream flows for conservation. Ms. Beatie outlined the history of the Colorado Water Trust ("CWT") and its role in providing "teeth" to the Colorado Water Conservation Board's ("CWCB") program for stream and lake protection.

The panel next discussed the importance of understanding the framework of state law in administering a water trust. All panelists stressed the need to understand the legal context that surrounds these entities. Following a question from the audience on the monitoring of streams to ensure that conservation water is not used, the panelists noted the importance of monitoring and how some organizations have their own monitoring system, while others rely on USGS data.

The next topic for discussion was the funding of water trusts. Ms. Beatie stated that the CWT, as a young organization, tries to gain funding any way possible. CWT utilizes state funds the CWCB received for instream flow acquisitions, as well as recouping costs through the re-marketing of historical consumptive use below the lower terminus of a protected instream flow. Mr. Liegler related water trust funding to land trusts, pointing out that land trusts receive funding from transactions, members, donors, and government grants. Mr. Shropshire added that funding could also stem from federal funds associated with the listing of fish species as endangered under the Endangered Species Act. However, he warned that the administration of such funds could be less than streamlined.

The final topic for discussion was the challenges and opportunities that face water trusts in the future. Ms. Beatie pointed out legislation from the 2008 Colorado legislative session that aids the long-term leasing of instream flows, as well as bills providing funding to the CWCB. She did see challenges in Colorado's no-injury rule, where a change of water rights must not injure other water users. In accordance with this doctrine, a change in an irrigation right requires the dry-up of irrigated land, which many rights holders do not understand and can limit their incentive to enter into conservation transactions. Mr. Liegel saw opportunities for land conservation projects to work closely with water trusts to increase the protection of water quality and species habitat. He saw challenges in dealing with federal tax regulations that place restrictions on tax deductions for qualified conservation contributions as they relate to the donation of conservation easements. Mr. Shropshire noted the challenges and opportunities that exist for water trusts to develop confidence amongst agricultural communities where the more senior water rights are. Part of this confidence issue is perform-

ing adequate injury analysis to prevent future injury to other users and thereby deteriorate any confidence within the community. Mr. Shropshire also saw an opportunity in the public's awakening to the concept of sustainability as a way to support the work of water trusts. Mr. Shropshire later noted, during the question and answer period, that another new source of funding for these entities may come from companies interested in reducing their "water footprints," similar to carbon footprints.

BREAKOUT SESSION 2B: PRACTICE SKILLS - UTILIZATION OF EXPERTS

It is a well-known fact that lawyers and scientists do not always speak the same language. In water cases especially, this can hamper effective representation of clients. Water law cases often turn on highly technical data; however, lay people decide the outcome of these cases, requiring attorneys to effectively translate the technical data into terms that the fact-finders can understand. Expert witnesses can either help or hinder this process. The focus of this panel was to give attorneys some insight into the effective use of experts.

Gene Franzoy, Fanzoy Consulting, Inc., an agricultural engineer, works with parties in water rights cases. Mr. Franzoy noted that when putting together a team of experts for a trial, they must work compatibly, understand their role in the team, and know how their role interacts with other experts' testimony. Mr. Franzoy has four rules regarding expert testimony in trials. The first rule is that experts should never function as attorneys because they lose credibility if they advocate for a party. Second, experts should always present data without bias. If there is any bias, it may shade the data unfairly, and undermine the science behind it. Third, experts and attorneys should never underestimate the opposing party's experts, nor should they overestimate their own expertise. The fourth rule is that every member of the team should be willing to approach their own point of view as a devil's advocate, to find problems and strengthen the testimony.

Experts may help attorneys in various aspects of the case, including testimony, interrogatories, depositions, cross examination, and post-trial briefs. After discussing several cases that he was involved in, Mr. Franzoy emphasized that experts should know what their job is, and that attorneys should know what to expect from experts.

David Huntley, a hydrogeologist in the Department of Geological Sciences, San Diego State University, focused his discussion on the use of groundwater modeling in disputes. Groundwater modeling plays a big role in understanding groundwater elevation or pressure, the directions of groundwater flow, rates of groundwater flow, directions of contaminant transport, concentrations of contaminants, and the history of release of contaminants. There are several types of groundwater models. Groundwater Flow and Elevation models show the directions, rates, storage, land subsidence, and fluid pressures. Solute

Transport Models show changes in concentration, concentration distribution, and the longevity of concentration.

Mr. Huntley noted that there are both pros and cons to using models. While models are not always perfectly accurate, the data that produces them may only be available for a limited period, and models are the best way to predict future directions, as well as to see the past directions. Models, as opposed to actual measurement, are also able to produce three-dimensional images, and are easier to convey information to lay audiences, like those found on a jury. Mr. Huntley noted that attorneys should keep in mind that three-dimensional models are much easier for juries to read than contour maps, and that simple models are often better than real groundwater models; whenever possible, a physical model will work better than a picture of one. Mr. Huntley also warned that litigants can utilize models “for evil,” because scientists can develop models to support only one side of the conflict, and can mislead judges, juries, and even expert arbitration panels. Ultimately, credibility of the experts is key when using groundwater models.

David Sunding, an environmental and natural resources economist in the Department of Agricultural and Resource Economics, University of California, Berkeley, discussed the use of economic testimony in litigation. Mr. Sunding stated that the economics of water resources involves issues of property rights, creation of markets, the valuation of risk and uncertainty, and dynamic optimization. Storage of water has large economic impacts, including the cost of environmental restrictions, and climate change. Main areas in the economics of water resources are the valuation of water rights, groundwater use, water resource infrastructure and water management, and water quality impacts. Several techniques for placing a value on water rights are market data and constructed value, including development of an optimization model. Water economists derive groundwater value from the amount of water available, storage capacity, and its stabilization value. Moreover, economists can utilize various techniques in determining water value, including comparables and optimization analysis. Numerous tools for measuring the value of water quality degradation include market data, treatment and remediation costs, limitations of water management, and survey techniques for measuring nonuse values.

PLENARY PRESENTATION 3: EPA NPDES TRANSFERS RULE

David R.E. Aladjem, Partner at Downey Brand LLP in Sacramento, moderated the panel as the speakers examined the questions arising from the final rule promulgation on June 9, 2008, of the Water Transfers Rule and its associated litigation.

Benjamin H. Grumbles, former Environmental Protection Agency (“EPA”) Assistant Administrator for Water, began by noting that the Clean Water Act (“CWA”) manages water pollution and not the

movement of water; however, when dirty water moves into clean water, a pollution problem results. He stated that the best reading of the CWA is that water transfers are exempt from regulation, but that a plausible reading may include the need for a 402 permit for moving dirty water into clean water. Because there is a nationwide increase in the movement of water, the government needs to address these issues. Mr. Grumbles next discussed the two main issues arising from the Water Transfers Rule: the state designation provision and the unitary waters theory. He noted that the Transfers Rule allows states to take actions consistent with Section 510 if the states are concerned with pollution.

Next, David Guest, managing attorney for EarthJustice's Tallahassee office, provided a different perspective. He noted that the states do not have a good history of addressing water pollution themselves, and gave the Cuyahoga River fires as an example. He further explained that most of the arguments against National Pollution Discharge Elimination System ("NPDES") permits for water transfers are based on a "bureaucratic doomsday" argument, that every one of the thousands of water control structures in the United States would require a Clean Water Act permit. Mr. Guest stated this argument is flawed, discussing the pending litigation regarding Lake Okeechobee with its flume that extends fourteen kilometers into the lake. The pollution flows at the rate of a medium river, poses a health threat, and can trigger toxic algae blooms. Mr. Guest ended with exploring the possible outcomes of the litigation.

Karen Tachiki, General Counsel for the Metropolitan Water District of Southern California, introduced her presentation by explaining her interest in the Transfers Rule. As a wholesaler of water for the Southern California coastal plain, the District's sources of water are the Colorado River and state water projects. Faced with a severe water shortage in Southern California, the District is concerned that the government will require more and more permits. Ms. Tachiki also mentioned some benefits of the new Transfers Rule: (1) it offers certainty to the states that the federal government will not subject existing supplies to additional permitting requirements; and (2) it recognizes state control.

PLENARY PRESENTATION 4: INNOVATION AND ADAPTATION AMIDST CLIMATE CHANGE AND PUBLIC DEFICITS

This plenary presentation looked at three very different areas related to water and how they have undergone changes in the last few years. Starting the panel, California State Assembly Committee on Water, Parks & Wildlife principal consultant Alf W. Brandt addressed the California Commission Study and how the overall climate for discussion about the climate has changed since 2006. California is looking to respond to its own "superdrought," and other government responses,

from the Intergovernmental Panel on Climate Change to the National Conference of Mayors, have bolstered California's desire to look at policy reactions to climate change and water use seriously. In one of the most striking moments from his presentation, Mr. Brandt connected the vast systems that transport water across the state of California to greenhouse gas emissions. According to the California Commission study, at least 19 percent of all energy used in the state of California goes towards the water cycle – transporting, treating, and delivering water.

Next, Professor Dan Farber from the University of California at Berkeley spoke about the impact of climate change on the application of the National Environment Policy Act (“NEPA”), and what tools are available in the current regulatory structure. Additionally, he outlined five key weaknesses in the Act that prevent effective regulation in a post-climate change world. First, the process starts later than it should. Essentially, Professor Farber argued that NEPA is something done after a party has made up their mind – a cart-before-the-horse mentality that is not very effective. Second, there is little systemic follow-up; government agencies and other groups rarely check the predicted outcomes of a project against the reality. This relates to point three – transparency and access. There are very few Environmental Impact Statements and even fewer Environmental Assessments readily available for groups to check. Fourth, Professor Farber discussed the need for robust solutions to uncertainty within the NEPA process. If people cannot agree on the impacts of climate change, it becomes difficult to incorporate those anticipated impacts into the planning process. Finally, Professor Farber stressed greatly the need to avoid a backburner, do-nothing mentality.

Peter Hughes, formerly of CH2M Hill, gave the last presentation of this plenary session on the Masdor Project, a planned city in Abu Dhabi, United Arab Emirates, that CH2M Hill is helping design. The United Arab Emirates and Masdor's designers intend the city to be entirely carbon-neutral, an incredible feat considering its location in the middle of the Arabian Peninsula's scorching desert and the need for massive cooling systems. Mr. Hughes talked about the logistic, cultural, and engineering challenges with this project, as well as the potential for others to share in the designer's learning experience with this project.

PLENARY PRESENTATION 5: AQUIFER STORAGE AND RECOVERY

Daniel B. Stevens, a hydrologist and groundwater management consultant with Daniel B. Stevens & Associates, Inc., discussed the technical issues associated with aquifer storage and recovery (“ASR”). Mr. Stevens noted that artificial recharge, which is any engineered process intended to add water to an aquifer, is not a new process; in fact, Mill Creek and the Santa Ana River recharged the Bunker Hill

Basin as early as 1890 and 1911, respectively. ASR is also widespread, as thirty-two states and twenty-six countries use the process. The Environmental Protection Agency estimates that there are 1,185 aquifer recharge and ASR wells in the United States.

The objectives of artificial recharge include underground storage reservoirs, the abatement of water quality degradation, abatement of land subsidence, and to diminish flood impacts. Mr. Stevens noted that the advantages of underground storage over dams are lower capital investments, fewer landscape and cultural impacts, more limited environmental impacts, less public opposition, less evaporative use, and more long-term sustainability.

Sources of water for artificial recharge include storm water runoff, treated or recycled water, and imported water. Mr. Stevens further explained the basic types of artificial recharge systems: spreading basins and channels on the land surface, infiltration trenches, vadose zone and dry wells, aquifer storage, and recover wells. Characteristics of infiltration basins include permeable soil, an unconfined aquifer, and large areas of land, while having relatively low construction costs. Mr. Stevens noted that in spreading basins and channels, wind and sun expose water to evaporation; however, the remainder of the water percolates downward through the soil. After percolating downwards, gravity, geology, and soil properties affect the flow of the water. Infiltration basins require permeable soil, large areas of land, and an unconfined aquifer, while construction costs remain low. Conditions optimal for vadose zone and dry wells include permeable soil above the water table and minimal land requirements; however, construction costs are relatively high, and the process requires extensive pretreatment of wastewater and turbid surface water.

Mr. Stevens discussed Soil Aquifer Treatment ("SAT"), which is the improvement of water quality that occurs as infiltrated water moves through native soil and aquifers. Water users commonly use this to process wastewater as a source of artificial recharge. Regarding SAT, the most important processes occur in the top few feet of soil, where the soil naturally removes or diminishes nitrates, dissolved organic carbon, bacteria, and viruses. Advanced wastewater treatment may include microfiltration, reverse osmosis, ultraviolet light radiation, and hydrogen peroxide, which may allow the water to meet drinking water standards.

Mr. Stevens emphasized during his presentation that artificial recharge is becoming an important part of water management plans. The most common methods are spreading basins and ASR wells. The sources of artificial recharge create public health concerns, and require strict regulations from states. Nonetheless, despite such concerns, Stevens hypothesizes that population growth will necessitate consideration of artificial groundwater recharge strategies.

Rita Maguire served as the Director of the Arizona Department of Resources from 1993 to 2001; however, she currently works as a practitioner for Maguire & Pearce, PLLC. Because of her diverse professional history, Maguire discussed how Arizona implements ASR from both a legal and a governmental perspective.

Maguire discussed two programs, the Central Arizona Groundwater Replenishment District (“CAGRDR”), and the Arizona Water Banking Authority (“AWBA”), and she touched on other programs such as the Lower Santa Cruz Recharge Project (“LSCRPR”). Arizona passed CAGRDR in 1993, which allows homeowners and water providers to demonstrate to the Arizona Department of Water Resources that a 100-year assured water supply is available to meet their water requirements. The members (either Member Lands or Member Service Areas) of the CAGRDR pay its costs and expenses. A subdivision may become a Member Land when its owner records covenants running with the land subjecting the land to an annual replenishment obligation, and the municipal provider that supplies the subdivision records a covenant agreeing to annually submit the necessary water delivery information to the CAGRDR. A city or water supplier may become a Member Service Area if it adopts a resolution and executes an agreement that irrevocably declares its service area to be part of the CAGRDR.

The CAGRDR pays to acquire both short and long-term rights on the Colorado River, as well as for the development of storage and recovery infrastructure. The CAGRDR uses three revenue sources, including enrollment fees, activation fees, and an annual replenishment tax.

Arizona created the AWBA in 1996, and has since stored 3.4 million acre-feet of Arizona’s unused Colorado River allocation, at a cost of \$228 million. The Underground Water Storage, Savings, and Replenishment Act of 1994 allowed the AWBA to bank the water. Arizona’s General Fund, water storage fees, and other fees fund the AWBA. The AWBA uses a water storage and credit system. For each acre-foot stored, the AWBA accrues a long-term storage credit, which is redeemable in the future when credit holders need supplies for municipal and industrial use.

Despite the challenges that these programs may face, Maguire believes that Arizona’s reliance on groundwater storage and recovery programs will play an important role in meeting the state’s water management and policy objectives for the foreseeable future.

KEYNOTE ADDRESS & HOT TOPICS

John Leshy, a member of President Obama’s Interior Department transition team and former Department of the Interior Solicitor, gave the keynote address for the conference. Mr. Leshy spoke initially about the transition between administrations at the Department of the Interior. While he warned that there would likely be no earthshaking changes, he spoke with confidence about the nominations of both Ken

Salazar as Secretary of the Interior and David Hayes as Deputy Secretary of the Interior. In his opinion, both these men are knowledgeable and experienced.

Mr. Leschy focused the majority of his speech towards the role government should play in water administration. State governments, with better perspectives on water issues than their federal counterparts, are better suited to the administration of water resources. Mr. Leschy sees opportunities for state governments to promote regulations and programs to maintain groundwater resources, foster ecological health, conserve and increase the efficiency of water use, and to improve regulations for water transfers to ensure such transfers are accounted for. Mr. Leschy suggested a role for the federal government of providing conditional federal aid, as an incentive to states to reform and upgrade their laws and administrative systems.

Mr. Leschy also addressed the Obama Administration's stimulus package as an opportunity for the improvement of nationwide water systems. While noting that the political challenges are daunting, this pool of funding should provide an impetus for officials to work together to connect national energy and agricultural policies with water policy. Mr. Leschy urged lawmakers and others to take advantage of the current inspiring political climate to meet the challenges of future water administration.

Thomas C. Jensen, partner at Sonnenschein, Nath & Rosenthal LLP, began the Hot Topics discussion by characterizing the stimulus package as a window into contemporary, albeit somewhat compressed, national politics. He noted that the level of funding going to water projects was extraordinarily small compared to the overall size of the stimulus package. Mr. Jensen identified a disconnect between what many would consider an important issue, western water, and how those issues register in the stimulus package. Mr. Jensen saw this as an opportunity for strong leadership within the water community to better frame the importance of water issues into a palatable light for the public. He analogized to the recent groundswell of public interest in renewable energy industries. If water issues could resonate with similar interest in the public, then public money would be more readily available to address the challenges facing western water management.

The Hot Topics discussion closed with A. Dan Tarlock, Professor of Law at Chicago-Kent College of Law, giving an overview of recent water law cases. Mr. Tarlock addressed United States Supreme Court cases involving interstate water compacts, as well as state cases involving the conflicts arising from increased development and urban growth in the West.

Kathlyn Bullis, Ryan Malarky, Danielle Sexton, and Paul Tigan

COURT REPORTS

STATE COURTS

ARIZONA

S. W. Sand & Gravel, Inc. v. Cent. Ariz. Water Conservation Dist., No. 1 CA-CV 07-0435, 2008 WL 4837693 (Ariz. Ct. App. Nov. 10, 2008, as amended March 9, 2009) (holding that an Arizona landowner had no taking and tort claims against a water conservation district when an underground storage facility caused the water table to rise, impacting the landowner's sand and gravel pits).

The Central Arizona Water Conservation District ("District") manages the Central Arizona Project ("CAP") to promote water conservation and operate underground storage facilities ("USFs") to store CAP water when there is no immediate demand for the CAP water. The District applied to the Arizona Department of Water Resources ("ADWR") for permits to operate the Agua Fria Recharge Project ("Project"), a USF. The Project consisted of a managed USF, which diverted water from the CAP canal into the Agua Fria River's channel to infiltrate the underlying aquifer, and a constructed underground facility that conveyed water downstream as surface flow after water saturates the aquifer. South West Sand & Gravel, Inc. ("South West") owns two properties near the Project: a South Property in the bed of the Agua Fria River and a North Property on the west bank of the river, higher than the streambed. ADWR issued the permits to the District in 1999, authorizing storage of 100,000 acre-feet of water each year for twenty years, but also requiring the District to maintain groundwater levels below the depth of South West's pits as they existed in 1999. The District began diverting water into the Agua Fria River in 1999, filling the aquifer beneath and adjacent to the river. This diversion raised the water table under South West's property to a level that interfered with its sand and gravel mining. As a result, South West sued the District in Maricopa County Superior Court, alleging negligence, negligence per se, trespass, nuisance, and inverse condemnation. The District moved for summary judgment, and the trial court granted it. South West appealed to the Arizona Court of Appeals.

South West argued that the District's use of a riverbed to transport and store water gave South West, as owner of the riverbed, a cause of action for a government taking and trespass. However, the court held that no taking occurred because South West never held the right it asserted in the first place. Specifically, an Arizona statute allows one to use the private property of another to carry water or as a USF. South

West owns its property subject to Arizona's reservation of natural channels to move and store water, so the District's use of the channel for an intended statutory purpose is not a taking.

South West also argued the District was liable for trespass, negligence, negligence per se, and nuisance. An Arizona statute allows the use of the Agua Fria River channel as a USF. The court concluded that authority to locate a USF in a channel logically included the authority to put water in that facility because storing water is the sole purpose of a USF. Thus, South West did not have the right to exclude others from the channel, and South West could not make a claim of trespass without that right. The Arizona legislature and courts recognized the importance of providing for water storage in natural watercourses to preserve groundwater and utilize Colorado River water, and that the CAP is indispensable for the maintenance of life and prosperity in Arizona. To further policy considerations that place importance on water in Arizona, one may use private property of another to carry water or for a USF. With little further explanation, the court held that the same reasoning precluded South West's negligence, negligence per se, and nuisance claims. South West claimed the doctrine of non-injurious use limited the District's right to transport and store water, relying on earlier cases involving disputes between two competing water users over irrigation wastewater. The court held that South West's claim that the doctrine of non-injurious use limited the District's right to transport and store water only applied in the limited context of two competing water users, not to the use of a river channel to transport and store CAP water.

South West argued that the state's reservation of natural channels included only natural water flow. The court disagreed, holding that the statute specifically contemplated the addition of water that is not natural to a waterway, and that landowners whose property adjoins a natural watercourse assumed the burden of their chosen location: they may not assert a claim for damages from mere use of the watercourse to move and store water. In addition, the court held that Arizona law does not recognize a landowner's right to a static water table level beneath her land.

In addition, South West claimed the District had a duty to determine that a USF will not cause unreasonable harm, and that this duty continues beyond the permit stage. Per statute, the ADWR may issue a permit for a USF if it will not cause unreasonable harm to land or other water users over the duration of the permit. The court interpreted this statute as not imposing a continuing obligation on the owner of the USF. The court gave great weight to the ADWR's interpretation of "no unreasonable harm": the ADWR considered harm to a pit at the time it granted the permit to be unreasonable, but ADWR did not consider harm to a pit that South West expanded after ADWR granted the permit to be unreasonable. Unreasonable harm only re-

lated to harm that occurred at the time of the permit, placing any future burdens on landowners rather than on a USF. The court held this interpretation was in accord with the legislative intent of encouraging use of Arizona's aquifers for storage of excess Colorado River water. Regarding South West's claim that ownership of overlying land gave it the power to preclude increased groundwater levels, the court held landowners do not own the groundwater below their property.

The court affirmed the trial court's grant of the District's motion for summary judgment regarding South West's taking and tort claims against the District.

Heather Rutherford

COLORADO

Archuleta v. Gomez, 200 P.3d 333 (Colo. 2009) (holding that an adverse possessor of water rights must demonstrate and quantify the amount of water put to beneficial use and the amount of water abandoned to the stream).

Ralph L. Archuleta and Theodore Gomez each own deeded interests in adjudicated water rights in the: (1) Archuleta Ditch, (2) Manzanares Ditch No. 1, and (3) Manzanares Ditch No. 2, all of which divert from the Huerfano River in the Arkansas River Basin. Gomez acquired his water rights and property from Sabino Archuleta, Archuleta's grandfather. In 1962, Gomez acquired the "upper parcel" and rights to the Archuleta Ditch. In 1968, he acquired the "lower parcel" and rights to Manzanares Ditch No. 1 and Manzanares Ditch No. 2. One year prior, Archuleta's father, Lupe Archuleta, acquired the land and water rights from Sabino that eventually became Archuleta's property in 1991. Gomez's land encompasses Archuleta's, and the irrigation ditches must pass through Gomez's property to get to Archuleta's.

Ditch delivery of water ceased during Lupe Archuleta's ownership period. First, Gomez plowed up the Manzanares Ditch No. 2 and intercepted water from Manzanares Ditch No. 1 through a by-pass device. For reasons not included in the record, the Archuleta ditch no longer extended to Archuleta's property.

Archuleta brought an injunction action against Gomez seeking restoration of his ditch right of way and water delivery. Gomez defended by claiming that he had adversely possessed all of Archuleta's deeded water right interests. Gomez based his claim on Lupe Archuleta's eighteen years of non-use of the water rights commencing in 1968. As evidence, Gomez offered Lupe's non-participation in rotation agreements, non-participation in ditch maintenance, and non-payment of ditch assessment payments. Additionally, Gomez offered, as evidence of possession, his actions with the two Manzanares ditches and the termination of the Archuleta ditch before it reached Archuleta's property.

The District Court for Water Division No. 2 held in favor of Gomez. The court determined that Archuleta's claim for interference with his use of the Archuleta ditch was substantially frivolous, and awarded Gomez attorney's fees. In particular, Gomez had successfully adversely possessed all of Archuleta's deeded water rights. As evidence of Gomez's possession, the water court relied primarily on rotation schedules that did not include Archuleta.

On appeal, the Supreme Court of Colorado reversed and remanded for further findings of fact. The court found the record insufficient to support both Archuleta's and Gomez's claims in two highly correlated issues. First, Gomez had not met his burden of proof for an adverse possession claim of water rights. Second, Archuleta must demonstrate that neither he nor his predecessor-in-interest abandoned his water rights to the stream.

To adversely possess water rights, the possessor must demonstrate that the possession of the claimed water was actual, adverse, hostile to the owner and under a claim of right, and open, notorious, exclusive, and continuous. Simply showing that Gomez intercepted the water does not satisfy these requirements. The court focused on the adverse and actual elements in deciding the case.

The fundamental question is whether the water use by Gomez was adverse to Archuleta. The court addressed this in two ways. First, rotational agreements between ditch users do not necessarily satisfy the burden of proof for adverse use. These agreements are often informal and open to misunderstanding, particularly over long periods involving successors-in-interest. Second, Gomez's own testimony contradicts proof of adverse use. He stated that a significant amount of tail water from his land floods Archuleta's meadow. This could indicate actual use by Archuleta, not Gomez.

Although not entirely unrelated to the adverse question, the court held that Gomez must also demonstrate actual beneficial use of the water, which is the most fundamental aspect of Colorado's prior appropriation law. The adverse claimant must establish in acre-feet, by a preponderance of the evidence, the amount of the deeded owner's water he put to beneficial consumptive use. Diversion alone does not suffice.

Similarly, Archuleta must demonstrate that he has not abandoned his water rights to the stream. Abandonment requires non-use for the statutory period of ten years and the intent to abandon. Loaning, leasing, or good faith efforts to sell the water rights may rebut the presumption of intent to abandon. Adverse use may also rebut abandonment. While tail water flooding of Archuleta's land may indicate use, the record did not contain evidence of the amount of use by either party.

On remand, the water court must determine the amount of beneficial use of Archuleta's water rights made by Archuleta and Gomez and

how much Archuleta abandoned to the stream. No court in Colorado has used the quantification rule previously but it flows naturally from the doctrines of prior appropriation and beneficial use. The court remanded to the water court for determination because that court is the only appropriate place for such determination.

Gomez may demonstrate his beneficial consumptive use of Archuleta's water by showing proof of the common predecessor-in-interest, Sabino Archuleta's, actual beneficial use compared to the use made after the property transfers. He may also show that he was water short during years he used only his own water rights or that he broke out more acres into production by using Archuleta's rights. Archuleta may show non-abandonment by demonstrating beneficial consumptive use through sub-irrigation. If Archuleta can show consumptive use, the claim for injunctive relief will not be frivolous and will invalidate the water court's award of attorney's fees.

Justice Martinez dissented from the opinion, concluding that the adverse claimant need not show he beneficially used a specific quantity of water expressed in acre-feet. While not explicit, the record indicates that Gomez beneficially used Archuleta's water, and the majority articulated no statute or previous case requiring the adverse possessor demonstrate a quantitative beneficial use.

Accordingly, the court reversed and remanded.

Daniel Vedra

GEORGIA

Lee v. Ga. Power Co., No. A08A2291, 2009 WL 357992 (Ga. Ct. App. Feb. 16, 2009) (holding: (1) Lee's property was subject to Georgia Power Company's right to control the Tallulah River's flow; (2) a plaintiff cannot base a claim for the negligent release of excessive water from a reservoir on the negligent storage of the water, unless the negligent storage caused or forced the release of excessive water; and (3) the law does not require dam owner-operators to warn downstream property owners when they release water).

In September 2004, heavy rains from Hurricane Ivan caused the water level in Georgia's Tallulah River and Lake Rabun to rise rapidly. Once the water in Lake Rabun rose above the Mathis Dam flood gates, Georgia Power Company ("Georgia Power") released water into the Tallulah River. Georgia Power did not warn downstream property owners before opening the flood gates and releasing water.

Troy Lee ("Lee") owned downstream property adjacent to the river. Lee claimed that once Georgia Power released water, the water level inside his shop rose to six feet deep and damaged his property and machinery. Lee sued Georgia Power claiming, *inter alia*, that Georgia Power was negligent because it stored excessive water in Lake Rabun reservoir and failed to warn downstream residents before it opened the flood gates. The trial court entered a judgment notwith-

standing the verdict finding Georgia Power not negligent. Lee appealed to the Court of Appeals of Georgia and claimed, in part, the trial court erred when it: (1) directed a verdict that the deed to Lee's property gave Georgia Power the right to drain and flush the Tallulah River across his property; (2) charged the jury with incorrect instructions; and (3) denied his motion for directed verdict with respect to Georgia Power's duty to warn downstream property owners.

First, the court addressed Georgia Power's rights under the deed to Lee's property. The trial court concluded that the deed to Lee's property gave Georgia Power the "right to drain and flush" the Tallulah River across his property. The court determined that interpreting the deed was a question of law for the trial court to determine; here, the trial court heard expert testimony that Lee's property was subject to Georgia Power's right to control the river. Additionally, upon reviewing the record, the court determined that Lee stipulated to the deed. The court, therefore, affirmed the directed verdict as to the deed.

Next, the court addressed the charged jury instructions. The trial court's charge stated that "[i]t is the duty of the owner/operator of a dam to use ordinary diligence in releasing water," and further that "[t]he owner/operator of a dam has a right to release water periodically . . ." The charge also indicated that lower riparian landowners must base their claims against the dam owner-operator upon "the negligent release of excessive water from the reservoir behind the dam and [not] . . . upon the negligent storing of the water, unless the negligent storing caused or forced the release of excessive water." The court determined that the trial court's charge was an accurate statement of Georgia law. Therefore, failure to charge the instructions in the exact language Lee requested was not error.

Finally, the court addressed Georgia Power's duty to warn downstream property owners. Lee argued the trial court erred when it denied his motion for directed verdict with respect to Georgia Power's duty to warn. When it denied his motion, the trial court held that any duty to warn was a matter of tort law and therefore a question for the jury. Moreover, Lee did not cite any controlling authority that required dam owner-operators, as a matter of law, to warn downstream property owners when they opened flood gates. The court found the trial court accurately stated the law, and accordingly did not err.

In conclusion, the Court of Appeals of Georgia found that the trial court did not err when it directed the verdict as to Georgia Power's rights under the deed, that it gave proper jury instructions, and it correctly applied the law regarding the duty to warn downstream property owners. Therefore, the court affirmed the judgment notwithstanding the verdict for Georgia Power.

William J. Garehime

ILLINOIS

Alderson v. Fatlan, 898 N.E.2d 595 (Ill. 2008) (holding that riparian rights generally do not accompany an ownership interest in land abutting an artificial body of water unless the state recognizes the body of water as a natural watercourse).

The dispute between appellants-petitioners Robert and Wanda Alderson (the “Aldersons”) and appellees-respondents Leo Fatlan and four neighboring homeowners (jointly, “Fatlan”), involved the determination of whether riparian rights accompanied the Aldersons’ ownership interest in a portion of a man-made lakebed. The man-made lake at issue was originally a sand quarry. Fatlan purchased the entire quarry property in 1968, excluding a portion of the northeast end that crossed onto the McElvain family lot. The McElvains never disputed the quarry’s incursion onto their property. In 1974, Fatlan discontinued mining operations and permitted the quarry to fill with water, which resulted in the man-made lake at issue. Approximately seven years later, Fatlan sold four residential lots on the south side of the quarry, and built a home for himself on an adjacent lot. Fatlan and the neighboring homeowners have since used the man-made lake exclusively for recreational purposes.

The conflict between Fatlan and the Aldersons arose when the Aldersons purchased the McElvain property in 1998. Two years later, after failed attempts to quiet title to the Aldersons’ property by adverse possession, Fatlan and the other homeowners blocked the Aldersons’ access to most of the lake by installing a restrictive fence through the lake along the Aldersons’ property line. As a result, the Aldersons filed suit against Fatlan and the other homeowners claiming, among other things, that they had a right to the reasonable use and enjoyment of all the surface waters of the man-made lake because they owned a portion of the lakebed.

The Circuit Court of Will County determined that the water-filled quarry at issue was a lake. Therefore, the circuit court held that the Aldersons, as owners of a portion of the lakebed, had rights to the reasonable use of the surface waters of the entire lake. The Appellate Court for the Third District reversed the circuit court’s judgment and remanded the case for an entry of summary judgment for Fatlan and the other homeowners. The appellate court stated that the water-filled quarry was not a body of water “of natural origin,” and thus, not a lake. Therefore, the appellate court found that the Aldersons’ ownership interest in a portion of the lakebed did not give them rights to use all the surface waters of the water-filled quarry. The Aldersons appealed the appellate court’s ruling.

At the outset of its discussion, the Supreme Court of Illinois noted that other jurisdictions had developed two different approaches to resolving the rights of riparian owners whose property abuts the shore of

a lake and includes a portion of the lakebed. The first approach, the common law rule, states that the owner of a portion of the lakebed only has the right to the exclusive use and control of the waters located above that property. Illinois, however, follows the second approach, the civil rule, which states the owner of a portion of a lakebed is entitled to the reasonable use of the entire surface of the lake.

Next, the court determined that the water-filled quarry was a man-made lake. Therefore, the court stated the issue was whether riparian rights extend to a man-made lake. Generally, riparian rights do not extend to owners of property abutting an artificial lake because it would be inequitable to give property owners rights to a body of water that someone else created, merely because their property touches the water. However, the court explained an exception to the general rule, recognized as the "artificial-becomes-natural rule," may apply in certain situations. Courts may recognize an artificial body of water as a natural watercourse if: (1) the body of water is of a permanent character; (2) the circumstances under which the original party created the body of water indicate the intent to make the body permanent; and (3) people have consistently used the body of water with such an intention for a significant period of time. The court also noted that other courts have only applied the artificial-becomes-natural rule when the party seeking to invoke the rule has used the artificial body of water without dispute for a significant period of time.

The court concluded that the artificial-becomes-natural rule did not apply to the case at bar because the Aldersons had not used the man-made lake for a long period of time, and the Aldersons' use of the man-made lake had been a matter of dispute since their purchase of the McElvain property. Further, the court stated the Aldersons could not argue that they had used the man-made lake as a permanent body of water for a significant period of time by tacking on the years during which the McElvains owned the property, because there is no evidence the McElvains used the man-made lake. While the Aldersons argued their ownership of the lakebed was sufficient to entitle them to use the entire lake, the court disagreed stating the adoption of such a ruling would lead to inequitable results. Lastly, the court noted that the Aldersons did not have rights to the man-made lake as a result of a grant, easement by prescription, or easement by implication. Thus, the court affirmed the judgment of the appellate court in favor of Fatlan and the other homeowners.

Kimberly Folk

KANSAS

Frank v. Kan. Dep't. of Agric., 198 P.3d 195 (Kan. Ct. App. 2008) (affirming the district court holding that the Kansas Division of Water Resources acted within its authority and was entitled to deference, where the chief engineer's interpretation of an ambiguous Kansas stat-

ute provided a rebuttable presumption that a stream existed in a watershed area even where a well-defined bed and banks were no longer visible, resulting in a finding that a landowner unlawfully obstructed a stream while constructing a groundwater pit on his land).

Acting on a permit obtained from the chief engineer of the Kansas Division of Water Resources (“Division”), plaintiff, T.W. Frank (“Frank”) built a groundwater pit on his land in rural Sumner County, Kansas. As a condition of the permit, Frank built an embankment to prevent surface water from entering the pit. However, after the completion of the pit and embankment, and upon complaints from neighboring landowners that Frank’s embankment caused a water back-up and flooding, the Division concluded that Frank had obstructed a stream, exceeding the authorization of his permit and in violation of Kansas law. The Division required that Frank obtain an additional permit authorizing a stream obstruction to continue with the project. Frank challenged the Division’s interpretation of the statute as unreasonable and beyond the scope of the law. After the District Court of Sumner County affirmed the Division’s findings, holding that the Division was entitled to administrative deference, Frank appealed to the Court of Appeals of Kansas.

By statute, Kansas law prohibits stream obstructions absent a permit from the Division, but the statute gives no guidance as to what constitutes a stream. To clarify the statute, the Division promulgated a regulation defining a stream as any waterway with well-defined banks, even when water does not flow continuously. In addition, the regulation provided for a presumption that in certain watershed areas, a stream could have existed in any location unless a landowner conclusively demonstrates that a well-defined bed and banks did not exist before beginning a proposed project. Frank’s property fell within the scope of this regulation; it lay within a watershed area, but had changed over time such that a determination that a stream with a well-defined bed and banks once existed was no longer possible on visual inspection. Frank’s primary argument was that the Division’s interpretation of the statute and resulting regulation was unreasonable, and that the statute intended to require that a stream with defined bed and banks must exist immediately before creating an obstruction.

The court held that where factual disputes are determined by applying an agency’s expertise, and where an agency is responsible for administering a statute that requires expert administration, that agency is entitled to deference. Further, the court held that when an agency’s statutory interpretation is entitled to deference, the court will uphold its interpretation if there is a rational basis for it, even where other interpretations are also possible. The court found that the Division’s interpretation and regulation was rational because the Division’s definition of a stream as a well-defined watercourse essentially tracked pre-existing Kansas case law, and because the position that a well-defined

stream need not be discernible to presume one existed was consistent with the legislative purpose to give the Division jurisdiction over stream obstructions. The court explained that Frank's proposed interpretation, that a stream must be in existence immediately before an obstruction is built, would allow a person to avoid the statute's reach and nullify the Divisions authority by modifying a stream's bed and banks prior to building the obstruction.

Finally, upon granting the Division deference as to the presumption that a stream could exist anywhere in a watershed, the court found that Frank failed to meet his burden of establishing that a stream did not exist. In fact, the court found that the Division provided ample evidence, based on physical and hydrological analysis of Frank's property, that a well-defined stream or channel likely did exist at some point. For the foregoing reasons, the court affirmed the district court ruling, holding that the Kansas Division of Water Resources correctly determined that Frank had to obtain a permit under the Kansas stream obstruction law.

Jeff McGaughran

Frick Farm Prop., L.P. v. Kan. Dep't of Agric., 190 P.3d 983 (Kan. Ct. App. 2008) (holding that the Department of Agriculture, Division of Water Resources ("DWR"), can terminate a private owner's water rights if, after DWR presents a verified report of nonuse, the owner fails to meet its burden of showing either (1) lawful and beneficial use of the water within 5 years, or (2) due and sufficient cause for nonuse).

In November 2002, Frick Farm Properties ("Frick Farm") purchased a water right from Bernard Debes ("Debes") who had previously owned the water right since 1982. In January 2003, Frick Farm received notice that no one had used the water right in 3 years. In January 2004, Frick Farm received another letter from Division of Water Resources ("DWR") stating that no one had used Frick Farm's water right in 3 years and that DWR would terminate the water right if the period of nonuse continued for 5 years. In response, Frick Farm sent DWR a letter stating that Debes had been unable to use the water right because of his poor health and that Frick Farm had only possessed the right since October 2002. In August 2004, Frick Farm received a letter and a draft verified report from DWR advising Frick Farm that DWR would use the draft verified report as prima facie evidence to terminate Frick Farm's water right. However, the letter gave Frick Farm another opportunity to report a reason for the nonuse of its water right. In October 2004, DWR sent a verified report to Frick Farm stating that DWR had found no valid cause excusing the nonuse from 1985 to 2003. At a subsequent hearing, DWR concluded that Frick Farm had abandoned and forfeited the water right by failing to establish due and sufficient cause for the nonuse.

The Secretary of Agriculture denied Frick Farm's petition for administrative review, and the Kansas District Court affirmed the DWR order. The district court reasoned that DWR correctly interpreted and applied the law when terminating the water right. Additionally, the district court found that the verified report of nonuse constituted substantial evidence supporting DWR's ruling. Upon appeal to the Kansas Court of Appeals, the court affirmed the district court's ruling terminating the water right.

Frick Farm argued that its water right is equivalent to a property right that the State could not terminate without first proving every element of the water right's forfeiture. However, the court held that the State, which created the property right to the water, can place conditions on the retention of that right. Specifically, the court cited the Water Appropriation Act as explicitly granting the State authority to terminate any owner's water right if the owner fails to make beneficial use of the water for 5 successive years, and is also unable to provide due and sufficient cause for the nonuse. Debes and Frick Farm failed to make beneficial use of the water right and did not provide sufficient cause for nonuse. Furthermore, because DWR's letters gave Frick Farm sufficient notice and DWR held an abandonment hearing pursuant to statutory procedures, the court held that the state did not violate Frick Farm's due process in terminating its water rights.

Frick Farm also argued that DWR relied exclusively on the verified report and did not support its forfeiture claim with additional evidence. The court, however, agreed with DWR's argument that the verified report was prima facie evidence of nonuse that, if uncontradicted, was sufficient to sustain a verdict. The court reasoned that after DWR presents a verified report, the owner of the water right has the burden to show either lawful and beneficial use of the water or due and sufficient cause for its nonuse. Because Frick Farm established neither of these elements, the court held that substantial evidence existed to support the termination of Frick Farm's water right.

The court affirmed the DWR's order terminating Frick Farm's water right because DWR followed the relevant statutory procedures, did not violate Frick Farm's due process rights, and presented substantial evidence of Frick Farm's forfeiture.

Michael Eden

MONTANA

Bitterroot River Protective Ass'n v. Bitterroot Conservation Dist., 2008 MT 377, 346 Mont. 507, 198 P.3d 219 (holding that the Montana Natural Streambed and Land Preservation Act applies to Mitchell Slough because it meets the definition of a "natural, perennial flowing stream," and the Montana Stream Access Law applies to Mitchell Slough because it meets the definition of a "natural water body").

The Bitterroot River runs through Ravalli County in southwestern Montana. Roughly paralleling the Bitterroot River on its eastern side is a body of water called Mitchell Slough. Mitchell Slough splits off from the Bitterroot River, carrying a large portion of the river's flow, which runs down the watercourse and subsequently empties the remnant water back into the Bitterroot River ten miles downstream.

Mitchell Slough shares attributes of both a natural stream and of a man-made diversion off the Bitterroot River. Some historic documents refer to Mitchell Slough, or portions of the Mitchell Slough, as the Right Fork of the St. Mary's Fork of the Bitterroot River. Mitchell Slough flows continuously year-round, with a large portion of the flow coming from the Bitterroot River diversion, with no documentation of it ever running dry. Additionally, Mitchell Slough acts as a natural channel, supporting a riparian ecosystems and a resident fishery. However, the Mitchell Slough also has a long documentable history of use as a canal. A headgate existed on the Bitterroot River as early as 1915 to control diversions into Mitchell Slough. Furthermore, many secondary diversion structures re-divert Bitterroot River water out of Mitchell Slough at various locales and irrigate around 4,300 acres.

In 1999, the Bitterroot Conservation District ("BCD") began a determination of whether Mitchell Slough was a natural, perennially flowing stream under the Natural Streambed and Land Preservation Act ("310 Law"). The 310 Law forbids any activity that alters or modifies the bed or banks of a "natural, perennial flowing stream" without a permit issued from a local conservation district like the BCD. The BCD subsequently found that Mitchell Slough was not a natural water body under the language of the 310 Law, and therefore activities on the Slough do not require 310 Law permits.

The Bitterroot River Protective Association ("BRPA") sought judicial review of the BCD's 310 Law decision, alleging the BCD erred in its determination of Mitchell Slough as a non-natural stream. Other parties to the BRPA suit also alleged that the public had access to the waters of the Mitchell Slough under The Montana Stream Access Law ("SAL"), which allows public access and recreation on "natural water bodies." A group of landowners along Mitchell Slough ("Landowners"), however, intervened seeking a declaration that the slough was not subject to SAL. BRPA in response successfully moved for joinder of the Montana Department of Fish Wildlife and Parks ("FWP") as an involuntary plaintiff. Therefore, under the SAL question BRPA and FWP argued against Landowners, seeking a determination that Mitchell Slough exists as a natural water body within the meaning of the SAL.

On both matters, 310 Law as well as SAL, the District Court ruled that Mitchell Slough was not a "natural" stream. The district court ruled that 310 Law intended a natural, perennially flowing stream to mean one "in the absence of man-made manipulation." It similarly

found that under SAL, a natural water body is one that is not “artificial or manufactured.” Under both definitions, the district court ruled that, due to the headgate on the Bitterroot River and man-made channel work, Mitchell Slough existed as a man-made entity. Under the respective decisions, 310 Law did not protect Mitchell Slough from alteration of bed or banks without a permit, and SAL did not protect public recreational access and enjoyment of the Mitchell Slough waters. The BCRP appealed to the Montana Supreme Court, and the court considered issues related to both the 310 Law and the SAL.

First, the court looked to whether the district court erred in upholding that Mitchell Slough did not qualify as a natural perennial flowing stream under 310 Law. The court noted that the 310 Law lacked a definition of “natural, perennial-flowing stream.” Therefore the court looked to the purpose of the 310 Law. Since the title of the law purports to “preserv[e] the natural or existing shape, form and course of streams,” the court held that it contemplated protection of water bodies even if those waters were no longer purely “natural.” In such circumstances, the court ruled that important factors to consider include: whether portions of flow in the water body occur naturally, whether the banks and channel retain a natural character, and whether the water body occurred naturally but currently exists with extensive man-made modifications. Since Mitchell Slough contains some naturally occurring flow, not originating from the diversion of the Bitterroot River, and since natural channel characteristics exist, the 310 Law intended to protect the water body as it existed, even with extensive man-made modifications.

Following this line of reasoning, the court determined that the district court erred in its interpretation of “natural.” The court pointed out that if it were to adopt the district court’s definition of “natural,” the 310 Law would not even apply to the Bitterroot River because the river does not flow in absence of man-made manipulation. The court concluded that limiting the 310 Law’s applicability to “flows which have never been diverted, impounded, or appropriated” would be unreasonably narrow. Therefore, the district court erred in upholding the BCD’s declaratory ruling on Mitchell Slough as a matter of law. Furthermore, the purpose of the 310 Law protects Mitchell Slough as a natural perennial flowing stream.

Next, the court looked to whether the district court erred in finding that Mitchell Slough did not qualify as a natural water body under SAL. The court noted that analysis under SAL of a “natural water body” was separate and distinct from the 310 Law analysis of a “natural, perennial-flowing stream.” As such, the court’s findings regarding 310 Law had no bearing on Mitchell Slough’s status under SAL. Under SAL, the court identified three issues regarding Mitchell Slough’s qualifications for public recreational use: (1) whether Mitchell Slough could capably support recreational use; (2) whether Mitchell Slough

qualified as a “natural water body;” and (3) whether Mitchell Slough qualified as not merely a diversion of water “away from a natural water body -- one of the SAL’s exceptions.”

Under the SAL analysis, the court first addressed Mitchell Slough’s capacity for recreational use. It highlighted a history of hunting, boating, and fishing, with testimony establishing extensive fishing on Mitchell Slough as early as 1928. It held Mitchell Slough was capable of recreational use. Next, the court addressed whether Mitchell Slough qualified as a natural body of water under SAL. In review of the facts, the court highlighted evidence suggesting that Mitchell Slough once existed as a channel of the Bitterroot River. It also highlighted that Mitchell Slough included tributary groundwater, various surface water additions, and irrigation waste and return flows. In doing so, the court noted that although the Mitchell Slough is a diversion, the history and character of Mitchell Slough qualify it as a natural body of water under SAL. The court then discussed the final element, whether Mitchell Slough existed as a mere diversion from a natural body of water, which would preclude it from public access under SAL. Because of the same facts that indicate that Mitchell Slough qualifies as a natural body of water, the court held that this SAL exception did not apply to Mitchell Slough. Under the three elements of SAL, the court found that Mitchell Slough qualified for public access.

The court stated that, although the district court defined natural as “uninfluenced by man in any way,” a more appropriate analysis would focus “on how and to what extent man has impacted the waterway.” Under such an analysis, the Mitchell Slough existed as a natural body of water, not merely as a diversion. As such, the court held that SAL applied, allowing public access to Mitchell Slough. The court noted, however, that this ruling does not allow unfettered public access across private lands.

The court reversed and remanded for a judgment in favor of BCRP under 310 Law, and a judgment in favor of BCRP and FWP under SAL.

Ryan McLane

NEBRASKA

Bihuniak v. Roberta Corrigan Farm, 757 N.W.2d 725 (Neb. Ct. App. 2008) (holding that a lower landowner was not entitled to injunctive relief against an upper landowner, who caused increased amounts of surface water to drain onto the lower landowner’s land, because the upper landowner behaved reasonably and without negligence).

Marilyn Bihuniak and other owners of a quarter section of farmland in Buffalo County (jointly, “Bihuniak”) filed a complaint against Roberta Corrigan Farm and other owners (“Corrigans”) of land south of Bihuniak’s land. Bihuniak alleged that improvements Corrigans made to their land to construct a hardware store caused greater amounts of diffused surface water to drain onto Bihuniak’s lower land,

causing damage to the land and to crops on the land. Bihuniak sought an injunction against Corrigan ordering Corrigan to refrain from causing more diffused surface water to drain onto Bihuniak's land. Bihuniak also sought damages for the cost to repair Bihuniak's land and for crop losses. The trial court held that Bihuniak did not prove damages to the land or crops, and that Bihuniak was not entitled to injunctive relief because Bihuniak did not show that Corrigan acted negligently in causing an increase in surface water on Bihuniak's land. Bihuniak appealed the trial court judgment to the Court of Appeals of Nebraska.

The court reviewed this equity action *de novo* on the record. The court followed four long-standing rules. First, a landowner may protect his land from surface water, even to the damage of his or her neighbor, and the landowner is only responsible for negligence. Second, a landowner may deflect surface water by proper use and improvement and is not liable for consequential damage to his neighbor if he or she was not negligent. Third, an upper landowner, in the absence of negligence, may accelerate surface water in the natural course of drainage without liability to the lower landowner. Fourth, a landowner's right to discharge surface water does not allow him or her to collect and discharge water onto another's land by means of an artificial channel contrary to the natural course of drainage to the other landowner's damage and detriment. Here, even though there was an increase in the amount of surface water flowing across Bihuniak's land, the increased flow followed the same natural drainageway as before Corrigan's improvements to their land. Corrigan built a detention pond to reduce the flow of surface water; an engineer testified that the pond was too small but it met the city's requirements and the city approved the plans. Because the pond met those requirements, Corrigan did not behave negligently or unreasonably in dispersing water on Bihuniak's land. Thus, the court held that Bihuniak failed to both plead and prove negligence against Corrigan.

A grant of injunction is an extraordinary remedy that requires proving actual and substantial injury. Bihuniak presented evidence to show lost crop value in one year, but not in following years. In addition, Bihuniak did not present evidence of damage to the land. Consequently, the court held that Bihuniak did not show the requisite irreparable harm, so Bihuniak was not entitled to injunctive relief. The court affirmed the trial court's judgment that Bihuniak was not entitled to an injunction against Corrigan, and that Corrigan did not behave negligently.

Heather Rutherford

NEVADA

Howell v. Ricci, 197 P.3d 1044 (Nev. 2008) (holding that a letter written by the Nevada State Engineer is a decision subject to judicial re-

view, that a writ of mandamus is not available to review the State Engineer's decision, and that the State Engineer lacks the authority to resolve questions of title in water rights disputes).

The Supreme Court of Nevada considered whether the Howells, who claimed title to 116.43 acre-feet of water flowing over their property, had correctly appealed the claim in district court after the Nevada State Engineer denied their claim in a letter of decision. Just before the Howells took possession of the property, their immediate predecessors submitted a request for conveyance of the water rights to the State Engineer. The State Engineer denied the request based on an apparent conflict in the chain of title to the water rights. In 1944, the Pacific Reclamation Water Company filed applications for permits to change the point of diversion, manner, and place of the 116.43 acre feet of water which flowed over the Howells' property. Thus, the State Engineer concluded that, based on these applications, the water rights were no longer tied to the Howells' property. In 1999, the Howells filed suit in the District Court of Nevada to challenge the State Engineer's refusal to grant a report of conveyance.

In May of 2002, the court dismissed the Howells' petition based on Nevada law, which provides that judicial review of a State Engineer's decision must occur within 30 days of the decision. Because the Howells based their appeal on a 1944 decision, the court reasoned, their petition went beyond the 30 days allowed by statute. The Howells appealed, and Nevada Court of Appeals affirmed the district court's order.

After the court of appeals' decision, the Nevada Legislature amended state law to clarify the procedures for adjudicating and appropriating water rights. First, it added a provision to existing law which explained that only a court of competent jurisdiction has the power to determine conflicting claims to ownership of a water right. Additionally, it added a provision stating that when the State Engineer receives notification that a court of competent jurisdiction has entered a judgment confirming ownership of a water right or resolving a conflict in a chain of title, the State Engineer's office must conform to that judgment. The Howells interpreted these amendments to mean that the State Engineer's 1944 decision did not change the Howells' title to the water rights. Thus, in March of 2005, the Howells filed a petition for a writ of mandamus or judicial review in the district court. In March 2007, the district court dismissed the Howells' claim and this appeal followed.

On appeal, the Nevada Supreme Court considered which of the State Engineer's decisions are subject to review, what is the proper procedural mechanism to review such decisions, and whether the State Engineer has the authority to adjudicate water rights.

The Court first determined that any order relating to the administration of determined rights by the State Engineer was subject to re-

view. Thus, the court held that the informal letter sent to the Howells was reviewable under Nevada law. Next, the court explained that a writ of mandamus will not issue unless the respondent has no plain, speedy, and accurate remedy in the ordinary course of the law. In this case, the Howells could not rely upon mandamus because of the availability of the alternative legal remedy of judicial review. Thus, the court held that judicial review is the proper procedural mechanism for reviewing a State Engineer's decision. Furthermore, the court held that only a court of competent jurisdiction has the power to determine conflicting claims to ownership to a water right. Finally, the court held that because the State Engineer never had the power to resolve title questions, and the 2005 legislative amendments merely reaffirmed this, the amendments could not provide the basis for an appeal. However, the court noted that its decision did not preclude the Howells from contesting title ownership to the water rights in a quiet title action in district court.

As a result, the court affirmed the district court's denial of the Howells' petition for judicial review.

Allison Graboski

NEW JERSEY

Bubis v. Kassin, 960 A.2d 779 (N.J. Super. Ct. App. Div. 2008) (holding that the Public Trust Doctrine does not: (1) protect private views of the ocean from obstruction by the public's use of the beach below the high water mark, or (2) guarantee public access to a private oceanfront property devoted to uses other than public use.

Jack and Joyce Kassin (the "Kassins") own approximately 650 feet of oceanfront property in the Village of Loch Arbour and use it strictly for their own private enjoyment. The remaining 350 feet of oceanfront property in Loch Arbour is a public beach that a municipality owns and operates. On June 27, 2004, Sophie Bubis ("Mrs. Bubis") accessed the Kassins' beachfront property through a public access path and placed her beach chair below the mean high water mark (the "foreshore") directly in front of one of the Kassins' beach huts. Mrs. Bubis refused to relocate when a lifeguard, employed by the Kassins, asked Mrs. Bubis to move due to the obstruction of the Kassins' view. Mrs. Bubis left only after the police served her with a complaint and summons for defiant trespass.

Mrs. Bubis subsequently filed a motion for enforcement of litigant's rights in the Chancery Division of the Municipal Court alleging the Kassins interfered with her rights under the Public Trust Doctrine as well as her rights to use a portion of the Kassins' property above the foreshore. After an evidentiary hearing, the trial court concluded the Kassins could limit the public's use of the foreshore. The trial court allowed recreational activities such as surfing and fishing and reasonable rest periods within the foreshore; however, the trial court explic-

itly excluded sunbathing activities and placing beach chairs and other paraphernalia within the foreshore. Mrs. Bubis appealed to the Superior Court of New Jersey, Appellate Division (the "court").

The court began its analysis by restating that privately owned oceanfront property only extends to the high water mark. The State owns the foreshore in trust for its citizens. The court then emphasized that the public's right to use property held in trust extends to recreational uses regardless of the property owner. From this, the court concluded that although a private party that owns the property above the high water mark may regulate the use of the foreshore for safety purposes, that private party may not limit use of the foreshore merely to enhance the enjoyment of their own property. Thus, the Kassins violated Mrs. Bubis' rights when their lifeguard directed her to move her beach chair so that the Kassins' view would remain unobstructed.

The court then stated that the Public Trust Doctrine may require a right of public access to a privately-owned area. Relying on *Mathews v. Bay Head Improvement Ass'n* the court reiterated the four factors to be considered: (1) the location of the dry sand area in relation to the foreshore; (2) the extent and availability of publicly-owned upland sand area; (3) the nature and extent of the public demand for beach access; and (4) the usage of the upland by the owner as a commercial or business enterprise. The court applied these factors and determined that the public did not deserve a right to access the Kassins' upland property. First, the court reasoned that a publicly owned upland sand area is readily available in the property adjacent to the Kassins'. Second, the court noted that the adjacent publicly owned beach satisfied the public demand for beach access. Finally, and most notably, the court found that the Kassins did not use their property to conduct a business enterprise and thus the government could not create a right of public access without paying just compensation. Thus, Mrs. Bubis and the public may recreate and sunbathe within the foreshore, but Mrs. Bubis and the public may not use the Kassins' property under the Public Trust Doctrine.

Ultimately, the court reversed the trial court as to the limitations imposed on the use of the foreshore, but affirmed the limitations imposed on the use of the Kassins' private property.

Cody Doig

TEXAS

City of Del Rio v. Clayton Sam Colt Hamilton Trust, 269 S.W.3d 613 (Tex. App. 2008) (affirming the district court's holding that a landowner may reserve groundwater rights from the conveyance of a surface estate, and that the rule of capture will not permit appropriation of otherwise validly severed groundwater rights).

The Clayton Sam Colt Hamilton Trust ("Hamilton Trust") owns a 3,200-acre ranch in Val Verde County, Texas. The ranch lies above

part of the Edwards-Trinity Aquifer groundwater formation. In 1997, Hamilton Trust sold fifteen acres of the ranch to the City of Del Rio ("City"), but reserved from the conveyance all water rights associated with the tract. Despite this reservation, in the summer of 2002, the City drilled and completed a water well on the fifteen-acre tract to augment its municipal drinking water supply. Shortly thereafter, Hamilton Trust filed suit against the City, seeking a declaratory judgment that it owned the groundwater beneath the fifteen-acre tract. In response, the City filed a counterclaim seeking a declaration that Hamilton Trust's reservation was invalid as to groundwater, and asserting its own claim of ownership to any groundwater pumped to the surface. The 83rd Judicial District Court, Val Verde County, concluded that the water rights reservation was valid and enforceable as to the groundwater rights, and that ownership of the groundwater rights beneath the fifteen-acre tract belonged to the Trust. The City appealed to the Court of Appeals of Texas.

The City's primary argument was that pursuant to the rule of capture, one can only achieve ownership of groundwater if the groundwater is reduced to possession. In addition, the City argued that the absolute ownership doctrine further supported its position that ownership of groundwater only referred to a right of the surface estate to acquire possession of the water, not to the groundwater itself. The City reasoned that because the Hamilton Trust only reserved a right to acquire possession of the groundwater beneath the fifteen-acre tract, and because the City never developed the groundwater, thereby reducing it to possession, its claims of ownership were invalid. The court held that the City had confused the separate and distinct concepts of the absolute ownership theory and the rule of capture.

Citing the Texas Supreme Court, the court held that groundwater is a part of and no different from the soil, and the landowner is the absolute owner of it. The court continued that under the absolute ownership theory, groundwater is the exclusive property of the surface owner, and is as subject to sale or reservation as any other species of property. As such, the Trust was entitled to sever and reserve the groundwater from the surface conveyance to the City. The court went on to explain that the rule of capture does not confer an affirmative right to drain property from beneath a neighbor's tract; rather, it denies judicial remedy to a landowner whose neighbor is draining groundwater beneath the landowner's property. As applied, the court held that if the City owned the groundwater beneath the fifteen-acre tract and began developing it, the Hamilton Trust would have no judicial remedy for drainage from beneath its own ranch. However, because Hamilton Trust validly reserved the groundwater rights, the City did not own the groundwater and could not rely on the rule of capture.

A second argument of the City contended that Hamilton Trust's groundwater reservation violated the Texas Constitution's prohibition against the establishments of perpetuities, but the court quickly dismissed the argument. The City argued that because the Hamilton Trust failed to reserve access rights to the fifteen-acre tract, and thereby a means of reaching the groundwater, the severance of the groundwater rights would result in permanent alienation of the water resource, in contravention of public policy. Dismissing this argument, the court pointed out that Hamilton Trust would not need access to the fifteen-acre tract to pump the groundwater from beneath it. Hamilton Trust may access the groundwater from its own adjacent ranch, and as a result, the reservation does not violate the Texas Constitution's prohibition against perpetuities.

For the foregoing reasons, the court affirmed the district court ruling, holding that Hamilton Trust validly reserved groundwater rights, and the City could not continue pumping groundwater from its fifteen-acre tract.

Jeff McGaughran

Guitar Holding Co. v. Hudspeth County Underground Water Conservation Dist. No. 1, 263 S.W.3d 910 (Tex. 2008) (holding that water districts, when promulgating rules according to the Texas Water Code's goal of maintaining historic use, must consider both the amount of water historically used and the water's historical purpose).

Texas established groundwater conservation districts to manage the state's groundwater. These districts have broad authority to develop a management plan to conserve and protect groundwater within that district. The Texas Water Code ("Code") mandates the districts consider all types of groundwater uses and needs to develop fair and impartial rules. However, when enacting rules limiting use, a district may prioritize existing rights by safeguarding historic uses.

Due to inefficient planning and an arid climate, Hudspeth County Underground Water Conservation District No. 1 ("District") revamped its groundwater management plan. The new plan detailed three types of permits: (1) validation permits, (2) operating permits, and (3) transfer permits. The District granted validation permits to well users who had permits before the District promulgated this new plan. These permits entitled those users to withdraw three to four acre-feet per year for every acre irrigated during a designated historic period. If the user could not obtain a validation permit, the landowner could then apply for an operating permit. This permit calculated water use based on surface acreage, but operating permit holders could only extract water when the aquifer's water table reached a certain elevation. So, unlike the validation permit, which guaranteed a water right, an operating permit only granted water access during certain conditions. Finally, both validation and operation permit holders could apply for transfer

permits, which allow the landowner to transfer captured water out of the district. Thus, validation permit holders had a considerably greater transfer right because they had guaranteed water rights based on historic use.

Guitar Holding Company (“Guitar”) challenged this water scheme because despite owning significantly more land than other users, the District permitted other landowners to withdraw more water based on increased irrigation during the historic period. While the historic permit holders used the water for irrigation, the new users transferred the water out of the district. Under the new scheme, not only could the other landowners use more water, they could also transfer more water.

Both the District Court of Hudspeth County and the El Paso Court of Appeals upheld the District’s new management plan. Guitar argued the plan exceeded the District’s authority under the Code’s goal to preserve existing groundwater uses by granting certain landowners a perpetual franchise to transfer groundwater out of the district. The company argued the plan’s historic use requirement should link the type of use to its historic use. Thus, because historic users did not transfer the water out of the district, the District cannot now grandfather in a new usufructuary transfer right. The District responded, arguing that historic use only referred to the amount of water, regardless of its purpose.

The Supreme Court of Texas determined the meaning of the word “use” in order to analyze the extent of the District’s authority under the Code to preserve historic or existing use. When interpreting a statute, the court understands otherwise undefined terms to carry an ordinary meaning, as construed within the rest of the statute. “Use” ordinarily conveys some sort of purpose by the user, a meaning consistent with the application of the word in the rest of the Code. Additionally, the Legislature’s definition of “evidence of historic or existing use” included evidence of water’s beneficial use. Finally, policy concerns dictated a definition that includes purpose and amount because the District must effectively regulate groundwater and preserve existing uses. The court determined that when preserving a historic use, the District must determine not only the amount of water withdrawn, but also that water’s purpose.

Additionally, Guitar argued that a transfer permit is a new use. This classification is important because the District can impose more restrictive conditions on a new permit application. The court agreed with Guitar. If the District did not consider a transfer permit a new use, certain landowners could convert their entire water supply into a transfer permit without any restrictive conditions.

Finally, the court concluded that the new transfer rules did not protect existing uses because the rules allowed permit holders to change their use and transfer water out of the district. Once the user

transferred the water out of the district, there would no longer be a justification for protecting existing use because the user would not be utilizing the water for an existing use. The new rules did not protect existing uses but, in effect, created franchises for certain landowners. Because the District did not uniformly apply the limitations, the court found it exceeded its statutory authority and the rules were thus invalid.

The Supreme Court reversed the court of appeals' judgment and remanded the case for further proceedings.

Shannon Carson

UTAH

Conatser v. Johnson, 2008 UT 48, 194 P.3d 897 (Utah 2008) (holding that the public's easement in state waters includes any lawful activity that utilizes the water and any touching of privately owned river beds incidental to these activities is lawful).

In June of 2000, Plaintiffs Conatsers floated down Weber River in a rubber raft. The Johnsons, Defendants in this case, privately owned certain parcels of the riverbed below the non-navigable waters of the Weber River. While the Conatsers floated down the Weber River, Kevin Conatser exited the raft and walked along the riverbed owned by the Johnsons to fish and to remove the obstruction of a fence. The bottom of the Conatsers' raft and the paddles touched the part of the riverbed owned by the Johnsons. Upon exiting the Weber River, a Morgan County Deputy Sheriff cited the Conatsers for criminal trespass. While the criminal trespass charges were pending, the Conatsers sought a declaratory judgment in the Second District Court to determine if the public's easement in state waters included the right to touch privately owned riverbeds. The district court held that the public's easement to state waters only included activities performed upon the water; therefore, the public's right to touch privately owned riverbeds only included touching incidental to the activity of floating. The Supreme Court of Utah reversed.

Utah law provides that the public has an easement over state waters, regardless of who owns the riverbed below. The Court rejected the district court's narrow interpretation of the easement's scope and clarified that the public's easement includes the right to participate in any lawful activity that utilizes the water, not just activities performed upon the water. Therefore, in addition to the right to float upon the water, the public's easement includes the right to participate in activities such as fishing, hunting, and swimming.

The Utah Supreme Court's departure from the district court's narrow interpretation of the public easement demanded an equal departure from the district court's narrow holding that only touching incidental to the activity of floating is lawful. Although the district court's conclusion logically followed from the district court's interpretation of

the easement, the district court's narrow interpretation of the scope of the easement makes the conclusion wrong. Consequently, just as the court expanded the scope of the easement, the court also expanded the public's incidental right to touch privately owned riverbeds. The Court applied the same principle as the district court in acknowledging that the public has a right to touch privately owned river beds below state waters to the extent that the touching is incidental to the public's easement. Accordingly, lawful touching of the river bed must encompass all incidental touching occurring during the engagement of any lawful activity utilizing the water, including fishing, hunting, and swimming. Since the lawful activities of fishing, hunting, and swimming require the physical touching of one's feet to the river bed, walking and wading upon privately owned river beds is a reasonable touching, as is the touching of paddles or a raft bottom to the river bed. The Court then determined that the public's right to walk or wade upon a privately owned river bed incidental to enjoyment of the easement does not cause unnecessary injury to the owners of the river beds, and is thus, lawful.

The Supreme Court of Utah reversed the ruling of the district court and held that the public's easement to state waters grants the public the right to touch privately owned river beds, to the extent that the touching is incidental to the enjoyment of the public's easement in state waters. The incidental touching must be reasonable to the lawful activities that the easement protects, which includes activities such as fishing, hunting, and swimming. Further, the incidental touching must not cause unnecessary injury to the owners of the riverbeds.

Crystal Lay

WASHINGTON

City of Union Gap v. Wash. State Dep't of Ecology, 195 P.3d 580 (Wash. Ct. App. 2008) (holding that in order to claim either the "determined future development" or "municipal water supply" exception to the five year non-use statute, the owner, and not a third party, must show it took concrete measures towards fulfilling a plan to use the water within the statutory time frame).

Ahtanum Ridge Business Park, LLC ("Ahtanum") purchased real property, including water rights the previous owner had not utilized since 1995, in Union Gap, Washington in 1999. Ahtanum made an oral agreement, without any specification, to sell the water rights to the city of Union Gap ("Union Gap") in 1999. Union Gap applied to the Yakima County Water Conservancy Board ("Conservancy Board") for transfer of the water rights in 2001. The Conservancy Board approved the transfer in 2004 and, in compliance with Washington statute, submitted the decision to the Department of Ecology ("Ecology") for approval. Ecology reversed the decision, finding that under Washington statute, because no owner used the water rights for five years, and there

was no showing of an exception to this statute, Ahtanum relinquished its water rights to the state. The Washington Pollution Control Hearings Board granted summary judgment to Ecology and the Yakima County Superior Court affirmed that ruling. Ahtanum and Union Gap appealed to the Washington Court of Appeals, asserting that the water rights were exempt from the five-year nonuse rule under two exceptions.

The applicable Washington statute states that a water rights holder voluntarily relinquishes that claim for failure to use the water for five years without sufficient cause. Ahtanum did not dispute failure to use the water for five years, but instead relied on two of the sufficient cause exceptions: the owner claimed the rights for a "determined future development" and the owner claimed them "for municipal water supply purposes." The court reviewed each exception in turn, noting that when drafting these provisions, the legislature clearly sought to promote beneficial water use; therefore, the court would narrowly construe any exception.

The first exception, applicable if the holder claims the water rights for development within fifteen years, applies only if the holder makes a "determined" plan before five years of nonuse passes. Whether a holder has met this exception requires objective evidence showing the planned development, including application for the necessary permits and actual development, consistent with the plan. The water rights holder must be the one to take these affirmative steps, not an anticipated purchaser. The court held that Ahtanum's intention to sell the rights to Union Gap was not sufficient to meet this exception, and because Union Gap, not Ahtanum, filed for the transfer, Ahtanum did not take any of the requisite affirmative steps to reserve its water rights.

A water rights holder can also assert an exception to the five-year rule if it designated the rights for municipal water supply purposes within five years of the water's last use. The burden is on the holder to show that it asserted this right, and only the holder is entitled to the exception. Although Union Gap intended the water for municipal purposes, Ahtanum never transferred its rights to Union Gap. The court held that Union Gap could not assert this exception because it was not the owner, and Ahtanum did not intend to use the water for municipal purposes. It also found that Union Gap did not file for the transfer until 2001, more than five years after the last use of the water in 1995.

The court held that Ahtanum failed to show any exception to the statutory rule that a water rights holder relinquishes those rights if it fails to use them for five years; therefore, the court affirmed the summary judgment in favor of Ecology.

Julie Andress