ON THE BRINK OF TRAGEDY: REASSESSING GROUNDWATER MANAGEMENT IN CALIFORNIA

I. INTRODUCTION

Agriculture has been the lifeblood of California's Central San Joaquin Valley for decades.[1] Valley fruits, grains, nuts, vegetables, meat, and dairy have fed the United States and, to some extent, the entire world.[2] There is no question the world depends on agri-business and agri-business depends on water.[3] However, competing interests for water set the stage for a complex game of resource allocation and assertion of pre-existing legal rights resulting in more water being promised to users on paper than actually exists.[4] Users claiming "paper" water rights may presume that water is available when allocated and that each other user claiming a right to it will take only their lawful reasonable share.[5] This system of prior appropriation creates order to the distribution of water resources placing senior rights over junior appropriators.[6] By its nature, this system places all but the most senior rights holders in a state of perpetual uncertainty about their respective water deliveries.[7] The tragedy? Competition creates waste to prevent loss of these rights and compels overuse of alternative sources such as groundwater, to meet the remain-

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[1] 7 CAROLYN RICHARDSON & DAVID GUY, *Groundwater Rights, Importance of Groundwater and Types of Groundwater Rights*, CALIFORNIA ENVIRONMENTAL LAW & LAND USE PRACTICE §70.62 (Matthew Bender & Co., Inc. 2008). [hereinafter *Groundwater Rights*].

[2] CAL. DEP'T. OF FOOD AND AGRIC., CALIFORNIA AGRICULTURE HIGHLIGHTS 2007, *available at* http://www.cdfa.ca.gov/files/pdf/card/AgHighlightsBrochure07.pdf. (last visited Sept. 22, 2008).

[3] *Id.* at 2; CAL. DEP'T. OF WATER RESOURCES, *Groundwater: California's Hidden Resource, California's Groundwater Update 2003*, 57 (2003). [hereinafter *Groundwater Update 2003*].

[4] C-WIN Action Plan, California Water Impact Network, http://www.c-win.org/action-plan.html (last visited Sept. 22, 2008).

[5] CAL. CONST. art. X, §2; *Groundwater Rights*, *supra* note 1; MARYBELLE ARCHIBALD, *Governor's Commission to Review California Water Rights Law. Appropriative Water Rights in California, Background and Issues. Staff Paper No. 1*, 142 (May 1977).

[6] DAVID GETCHES, WATER LAW IN A NUTSHELL 101 (West Publishing Co. 1990) (1984).

[7] C-WIN, *supra* note 4.

ing needs.[8] Absent well-defined and uniform groundwater regulation, administered by a state-wide agency, underground water sources continue to be tapped without much regard to the continued viability of the source. Thus, when every landowner, business, farm, and municipality takes more than a reasonable share of water without planning for source replenishment, the source will ultimately run dry or drop to a zone of contamination.[9] Should this occur, those landowners, businesses, farms, and municipalities must find alternatives, but the alternatives are limited.

Conservation and storage may alleviate minor water shortages in the future, however, without more aggressive accounting of groundwater discharge and source recharge, as well as allocation management by an agency with broad authority over all water sources, the tragedy is simply deferred.

Prioritization is the cornerstone of any resource management system, but priorities change with social, economic, and political environments.[10] Under the current system, groundwater use rights may be prioritized by court decree.[11] Moreover, once the senior right is determined, that water user becomes motivated to preserve it to avoid relitigation.[12] This is true even if it means taking every drop of the water from the source allocated under that right. This results in the so-called "race to the well."[13] Of course, this scenario raises questions of practical priorities affecting a variety of issues. What happens when farmers do not have sufficient water for their crops? How will California deal with the effects of climate change on water sources? Should development be curtailed in favor of revitalization? Who will bear the financial burdens to resolve these issues?

This Comment focuses on existing groundwater management and its relationship to established doctrines of user rights to determine whether an integrated state agency system of regulation may adequately resolve allocation uncertainties in the face of growing competing needs. Discussion includes conditions in California giving rise to the need for regulatory solutions to avert long-term hardship for competing users. Further,

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[8] *Groundwater Update 2003*, *supra* note 3, at 27-29; C-WIN, *supra* note 4.

[9] STEVE BACHMAN ET AL., *Groundwater Resources Association of California, California Groundwater Management: A Resource for Future Generations*, 29 (2nd ed. 2005).

[10] DAVID BROOKS ET AL., WATER DEMAND MANAGEMENT RESEARCH SERIES. WATER DEMAND MANAGEMENT: DEFINITIONS, CRITERIA & NOTIONS OF SOCIAL INNOVATION & POLITICAL ECONOMY. (December 2007). http://www.idrc.ca/uploads/user-S/12186450401RS_1,_WDM_Criteria_and_definition_ENG.pdf.

[11] *See* ARCHIBALD, *supra* note 5, at 34-36.

[12] *Id.* at 47.

[13] *See generally id.* at 48.

this Comment describes prioritization of existing rights by examining how those rights are acquired, including overlying land ownership, appropriation, and adjudication. The next section summarizes existing groundwater regulation, or non-regulation, as developed by lawmakers and courts. The final section weighs the benefits and detriments of regulatory schemes; it also proposes integrated water regulation and data collection to promote sustainability and accountability for future use allocations utilizing the State Water Board Authorities as trustees of California's public resources.[14]

II. CONDITIONS IN CALIFORNIA DEMAND REGULATION

A. The Impact of the Population Boom

California's Central San Joaquin Valley is one of the largest agricultural centers in the United States with exports throughout the world.[15] As the Valley's cityscape expands, the surrounding useable croplands recede to make way for urbanization.[16] Fewer agricultural acres ultimately leads to lower food production and higher costs to consumers.[17] Current planning and development laws take farmland acreage demands into consideration when approving projects and urban expansion.[18] Developers must also incorporate plans for sustainable water sources for their developments as well as adjacent agricultural enterprises.[19] Conversely, agribusiness, as an appropriator of water rights, must also be mindful of the advancing competition for land and water by those who purchase adjacent parcels for development. Under some circumstances, they may also

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[14] CAL. WATER CODE §§ 1243, 1253 (2007); Nat'l Audubon Soc'y v. Superior Court of Alpine County, 33 Cal.3d 419, 441 (1983).

[15] AG HIGHLIGHTS, *supra* note 2.

[16] *See* AMERICAN FARMLAND TRUST, ALTERNATIVES FOR FUTURE URBAN GROWTH IN CALIFORNIA'S CENTRAL VALLEY: THE BOTTOM LINE FOR AGRIC. AND TAXPAYERS SUMMARY REPORT 11, i (1995). [hereinafter AMERICAN FARMLAND TRUST].

[17] *Id.* at 12.

[18] PETER GLEICK ET AL., *California Water Plan Update 1995, California Water 2020: A Sustainable Vision*, Pacific Institute for Studies in Development, Environment, and Security, 27 (May 1995). [hereinafter *Sustainable Vision*]. *see also*, 102 PUBLIC POLICY INSTITUTE OF CALIFORNIA. *Does California have Water to Support Population Growth?* Research Brief 2005 (July 2005), http://www.ppic.org/pubs/rb/RB_705EHRB.pdf; *See also*, CAL. DEP'T. OF WATER RESOURCES, *California's Groundwater: Bulletin 118*, 14 (Oct. 2003) http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/Bulletin118_Entire.pdf (last visited Sept. 22, 2008). [hereinafter *Bulletin 118*].

[19] *Population Growth*, *supra* note 18, at 1.

be required to yield to that landowner's rights.[20] Over time, the reliability of agricultural water sources has declined in favor of municipal needs.[21] Urbanization has thus been the greatest threat to agriculture water sources.[22] As the demand for surface supplies drives up the value of imported appropriated water, agri-business turns to alternative sources such as groundwater.[23] Based on the California Department of Water Resources ("DWR") groundwater use calculations, as much as thirty-percent of California's agricultural water needs are met by pumping groundwater in a non-drought year and up to sixty-percent in a drought year.[24] Yet, population will continue to increase to an estimated sixty-million people in California alone by the year 2050.[25] It must be expected that water use will increase accordingly. Unfortunately, water sources are limited and unless management improves, existing sources will soon be insufficient to support the increasing population, industry, agriculture, wildlife, or recreational needs of the State.[26]

B. Depleting the Resource

Under normal conditions, underground water will naturally recharge itself through precipitation, saturation from overlying runoff, seepage from canals, urban storm runoff, septic systems, and leaky water supply systems.[27] As with any resource, use exceeding availability and replenishment depletes the resource. When existing groundwater basins are depleted at a greater rate than can be recharged, the condition is called "overdraft."[28] Continued overdraft ultimately renders the source unus-

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[20] *See* City of Barstow v. Mojave Water Agency, 23 Cal.4th 1224, 1245 (2000); *See also* City of Pasadena v. City of Alhambra, 33 Cal.2d 908, 925-926 (1949).

[21] Water Coalition Letter to Deputy Director of Cal. Dep't. of Water Resources. (Sept. 23, 2003). *available at* http://www.waterplan.water.ca.gov/docs/public_comments/2003comments/AgCaucusLetterFinal.pdf.

[22] *Id.*

[23] CAL. DEP'T. OF WATER RESOURCES, *California Water Plan Bulletin 160-93* (Oct. 1994), *available at* http://www.waterplan.water.ca.gov/previous/b160-93/b160-93v2//v2sum.cfm (last visited Sept. 22, 2008). [hereinafter *Bulletin 160-93*].

[24] *Bulletin 118*, *supra* note 18.

[25] Posting of Aqua Blog Maven to AQUAFORNIA, The California Water News Blog, *California's Water Crisis*, http://aquafornia.com/californias-water-crisis (Dec. 31, 2007, 7:35 p.m. PST) [hereinafter AQUAFORNIA].

[26] Doug Mosebar, President, California Farm Bureau Federation, *Ag Alert: Commentary: California Must Continue To Seek Solutions To Water Crisis*, CFBF.com, Sept. 10, 2008, *available at* http://www.cfbf.com/agalert/AgAlertStory.cfm (last visited Oct. 22, 2008). [hereinafter Mosebar].

[27] BACHMAN, ET AL., *supra* note 9, at 33.

[28] *Id.* at 39.

able.[29] An underground water source which drops too far is likely to become unusable, not only because its contents are depleted, but also because salt water may migrate into the freshwater aquifer when the interface between the two bodies becomes unbalanced.[30] This salination of groundwater may take years to recover to a usable level if it recovers at all.[31]

The State has authorized local governing bodies to declare states of emergency in the event of severe groundwater shortages.[32] The California Water Code defines groundwater emergencies as overdraft exceeding the safe yield and authorizes the local Board of Supervisors to take action to prevent further depletion and degradation of water resources when the public health, safety and welfare of the community is threatened.[33] The Board is authorized to declare a "state of emergency" until the water supply has been adequately replenished."[34] Although these mechanisms help endure brief shortages, without clear and appropriate regulation of underground water extraction, chronic overdraft will have long-term adverse effects.[35] Groundwater sources may be rendered unreliable and a greater burden will be placed on surface sources for a potentially prolonged period.[36] Groundwater emergencies will become more frequent as sources are depleted or contaminated.[37]

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[29] *Id.* at 145. (explaining the safe yield of the basin is determined by subtracting the diversion or extractions from the aquifer from the volume of recharge. Where the diversion exceeds the recharge to the basin, the safe yield is being exceeded resulting in overdraft). *Bulletin 118*, *supra* note 18, at 29; ARCHIBALD, *supra* note 5, at 141.

[30] *Id.* at 145; *Sustainable Vision*, *supra* note 18, at 45; *Bulletin 118*, *supra* note 18, at 29.

[31] *Bulletin 118*, *supra* note 18, at 29.

[32] CAL. WATER CODE § 350 (2007).

[33] *Id.*

[34] CAL. WATER CODE § 350, §355 (2007).

[35] *See Bulletin 118*, *supra* note 18, at 29.

[36] NATIONAL GROUNDWATER ASSOCIATION, GROUNDWATER SUSTAINABILITY: A WHITE PAPER 4, *available at* http://www.ngwa.org/ASSETS/0E581DE6A9C145C1852F878F36FA53D7/sustainwhitepaper.pdf (last visited Nov. 2, 2008).

[37] *See,* CAL. DEP'T. OF WATER RESOURCES, OFFICE OF WATER USE EFFICIENCY AND TRANSFERS, *Urban Drought Guidebook 2008 Updated Edition*, 40 (2008), *available at* http://www.owue.water.ca.gov/docs/UrbanDroughtGuide.pdf. (last visited Dec. 18, 2008); *see generally* CAL. WATER CODE §350, 357 (2007); *Bulletin 118*, *supra* note 18, at 68.

C. The Impact of Climate Change

In 2006, the Department of Water Resources issued a report on climate change as it relates to California's water resources.[38] It concluded that climate change is likely to have significant effects on the State's water supply projects.[39] Therefore, the DWR recommends including considerations of climate change when preparing impact reports and in development of water management plans.[40] Lawmakers have only recently begun addressing climate change in policy decisions acknowledging that scientific evidence of the long-term impacts on water resources can no longer be ignored.[41] In 1993, California first acknowledged potential impacts of climate change on water resources in the state-wide water plan.[42] Also, the United States Supreme Court recently acknowledged the impact of high concentrations of greenhouse gases on the environment.[43] Although the Supreme Court did not explicitly decide if it is true or untrue that man-made carbon dioxide emission causes global warming, it did find that greenhouse gases fit within the definition of "air pollutant" under the Clean Air Act and that the Environmental Protection Agency must regulate emissions creating these gases.[44] The correlation between greenhouse gases and global warming is a matter of established science.[45] Controlling emissions is only part of a solution to an increasing problem with resource management in California. We must also prepare for drastic changes to the hydrological dynamics of our terrain.

California's natural reservoir, the Sierra-Nevada mountain range, currently provides winter storage for massive amounts of water in the form of snow pack.[46] During Spring melts, water runs gradually into our lower elevation reservoirs and waterways to be delivered to users throughout the State.[47] However, to be effective, the snow must melt over a long period of time to prevent flooding and watershed problems.[48] Greater

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[38] MICHAEL KIPARSKY & PETER GLEICK, *California Water Plan Update 2005, Climate Change and California Water Resources: A Survey and Summary of the Literature*, Pacific Institute for Studies in Development, Environment, and Security, Vol 4, 554 (August 2005). [hereinafter Climate Change].

[39] *Id.* at 558.

[40] *Id.*

[41] *Id.*

[42] CAL. WATER CODE §§ 10000-10013 (2007).

[43] Massachusetts v. Environmental Protection Agency, 127 S. Ct. 1438, 1446 (2007).

[44] *Id.* at 1459.

[45] Climate Change, *supra* note 38, at 564-565; *supra* note 43, at 1446.

[46] Climate Change, *supra* note 38, at 564.

[47] *Groundwater Update 2003*, *supra* note 3 at. 26.

[48] *Id.*

runoff volume over shorter periods cannot be effectively captured in existing storage.[49] Scientific evidence confirms that global warming not only affects precipitation quantities, but also the duration of the snow season in the Sierras.[50] Therefore, it becomes imperative that California water boards, legislators, and end-users collaborate to provide long-range plans to preempt natural shortages and floods as well as the impact of limited water availability on consumers.

D. Water as a Common Resource

Garret Hardin called the unlimited access to a natural resource, in which everybody can use the resource, but where no one is responsible for managing it, the "tragedy of the commons."[51] The result of the tragedy of the commons is that each party acts in their personal interest to maximize the use of the resource, thus causing depletion of the resource.[52] Groundwater is one such resource.[53] An affirmative groundwater management plan enforced under the authority of an appropriate regulatory agency will avert the tragedy through aggressive conservation and storage strategies. The State must also consider which agency will have this authority.

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[49] *Id.*

[50] *Id.*; *See generally* CAL. DEP'T. OF WATER RESOURCES, *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water,* 3-5 (October 2008). *available at* http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf . (last visited Nov. 2, 2008). [hereinafter *Uncertain Future*]. (explaining that higher temperatures will increase the ratio of rain to snow shifting peak water runoff volume toward the period of time when flood risk is already highest. Higher temperatures will delay the onset of the snow season, accelerate the rate of Spring snowmelt, and shorten the overall snowfall season, leading to more rapid and earlier seasonal runoff).

[51] GARRETT HARDIN, *The Tragedy of the Commons.* Science, Vol. 162, No. 3859, 1243-1248 (December 13, 1968). (Ecologist Garrett Hardin's *Tragedy of the Commons* has proven useful for understanding how we have come to be at the brink of numerous environmental catastrophes. His theory is that such catastrophes are created by the innocent acts of many individuals acting alone. Hardin's parable involves a grazing pasture used in common in which each single animal added degrades the common field a small amount. Although each individual degradation is minute, cumulatively, the pattern will destroy the resource.). *See also* ROBERT GLENNON, WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS 209 (Todd Baldwin ed., Island Press 2002); ARCHIBALD, *supra* note 5, at 143-144.

[52] HARDIN, *supra* note 51.

[53] ARCHIBALD, *supra* note 5, at 143.

III. EXISTING AUTHORITY TO MANAGE WATER RESOURCES

A. State Authority Through the Public Trust Doctrine

As trustee of public resources for Californians, the State is responsible for the protection and conservation of water.[54] In 1983, the California Supreme Court concluded that the public trust is an affirmation of the duty of the State to protect the people's common heritage of streams, lakes, marshlands, and tidelands.[55] Such protection is only surrendered in rare cases when the abandonment of that right is consistent with the purposes of the trust.[56]

As the State's water needs grow, State water policy emphasizes efficient use of the resource, certainty of water as property rights, and transferability of such rights.[57] However, most State water statutes apply to surface water rather than groundwater.[58] The State is obligated as trustee for public resources to institute policies and programs to protect trust resources and must, therefore, allocate those resources in the public's best interest. Nevertheless, the State is limited in those allocations by pre-existing vested interests in water.[59] As the major regulatory authority of California water, the State Water Board has broad discretion to appropriate water rights through local control boards which also serve as the permitting agencies for certain groundwater extraction or surface water removal.[60]

Currently, not all underground water qualifies as "groundwater" that is subject to agency regulation.[61] Hence, the State is not authorized by the Water Code to regulate all groundwater.[62] The California Water Code specifies water subject to appropriation and regulation by the State Water Resources Control Board ("SWRCB") as "surface waters, and subterranean streams flowing through known and definite channels."[63] By definition, this excludes water which exists in non-definite channels.[64] Addi-

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[54] Nat'l Audubon Soc'y, 33 Cal.3d at 441; CAL. WATER CODE §§ 1243, 1253 (2007).

[55] Nat'l Audubon Soc'y,, 33 Cal.3d at 441.

[56] *Id.*

[57] CAL. WATER CODE §109 (2007).

[58] GARY SAWYERS, ESQ., *A Primer on California Water Rights* (2005), *available at* http://aic.ucdavis.edu/events/outlook05/Sawyer_primer.pdf. (last visited Oct. 22, 2008).

[59] Nat'l Audubon Soc'y, 33 Cal.3d at 441; CAL. WATER CODE §§1201, 1202 (2007).

[60] CAL. WATER CODE § 174 (2007).

[61] CAL. WATER CODE § 1200 (2007).

[62] CAL. DEP'T. OF WATER RESOURCES, *Water Facts No. 3* (April 2004) *available at* http://www.dpla2.water.ca.gov/publications/waterfacts/water_facts_3.pdf. (last visited Oct. 22, 2008).

[63] CAL. WATER CODE § 1200 (2007).

[64] CAL. WATER CODE § 1200 (2007). *See also*, CAL. WATER CODE § 2500 (2007).

tionally, water in identifiable underground basins may be regulated by court adjudication or by the SWRCB.[65] The United States Geological Survey has mapped ten hydro-geologic provinces within the State based on geology, hydrology, climate, and landforms which identifies boundaries of groundwater basins in California.[66] Within these provinces, user rights to twenty groundwater basins have been adjudicated.[67] Besides surface water, other classifications of groundwater include those occurrences of percolating water not existing within defined channels or identifiable basins not otherwise subject to regulation by the SWRCB.[68] However, under the State Water Code, the SWRCB is empowered to exercise broad regulatory functions in managing the State's water resources.[69] The State Water Code itself provides no generic provision for State regulation of groundwater.[70] Thus, groundwater in California is relatively unregulated except where local water plans have been instituted pursuant to the State Water Code or by court decree.[71]

B. Appropriative Rights

Property ownership also carries a use right for groundwater beneath the property.[72] However, the Water Code requires such use to be "reasonable and beneficial."[73] Property owners do not have unlimited use of the

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[65] Environmental Defense Fund v. East Bay Utility District, 26 Cal.3d 183, 200 (1980).

[66] U.S. Geological Service, Framework for a ground-water quality monitoring and assessment program for California, USGS Water Resources Investigation Report 03-4166 (2003).

[67] *Water Facts 3*, *supra* note 62.

[68] JOSEPH SAX, Review of the Laws Establishing the SWRCB's Permitting Authority Over Appropriations of Groundwater Classified as Subterranean Streams and the SWRCB's Implementation of those Laws SWRCB No. 0-076-300-0 by Joseph L. Sax (2002). [hereinafter The Sax Report].

[69] CAL. WATER CODE § 174 (2007).

[70] CAL. DEP'T. OF WATER RESOURCES, *Water Facts No. 4* (January 1996), *available at* http://www.dpla2.water.ca.gov/publications/waterfacts/water_facts_4.pdf. (last visited Oct. 22, 2008); ARCHIBALD, *supra* note 5, at 145.

[71] CAL. WATER CODE §§ 1201, 1202 (2007); Environmental Defense Fund, 26 Cal.3d 183 at 200.

[72] Katz v. Walkinshaw, 141 Cal. 116, 135 (1902). (The Court held the right of use on the overlying land is paramount, but such right "extends only to the quantity of water that is necessary for use on his land, and the appropriator may take the surplus."); Burr v. Maclay Rancho Water Co., 154 Cal. 428, 436 (1908). (the Court provided the basis for future appropriative rights and held that the appropriation for distant lands is subject to the reasonable use of the water on lands overlying the supply.")

[73] CAL. WATER CODE § 1240 (2007); Burr, 154 Cal. 428 at 436. (The Court notes beneficial use is that which does not constitute waste. Specifically, domestic use, recreation, agricultural irrigation, wildlife, and public safety are considered non-waste uses.)

water.[74] They are limited somewhat by the rights of those adjoining landowners or appropriators.[75] Land may overlie more than one source of groundwater and therefore, rights to that groundwater depend on the location of the aquifer.[76] Specifically, where the aquifer lies under the land occupied, rights are correlative or overlying.[77] However, if the aquifer lies beyond the land occupied, the rights thereto are appropriative.[78] Under the appropriation doctrine, a person may acquire a right from the State to divert, store, and use water regardless of whether the land on which it is used is adjacent to a stream or within its watershed.[79] Generally, the rule of priority between appropriators is chronologically based so that the person with the most senior appropriation has the greatest right to the water.[80] In times of shortage, junior appropriators may be cut off entirely before senior appropriators lose any water at all.[81] All other surface water and groundwater existing in known channels within the State is subject to appropriation and management by the SWRCB and State Regional Water Districts.[82]

C. Constitutional and Statutory Authority to Manage Water Resources

The California Constitution grants police powers to the local governments to exercise authority over the State's water resources to the extent of which they are capable of being put to beneficial use for the public welfare.[83] However, the State retains the authority to determine "what water of the State, surface and underground, can be converted to public use or controlled for public protection."[84] Presently, the State of California has no authority to manage the extraction of groundwater, but under the Water Code, local agencies are encouraged to manage local water

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[74] Katz, 141 Cal. 116 at 135; WELLS HUTCHINS, The California Law of Water Rights, U.S. DEP'T. OF AGRIC., AGRICULTURE RESEARCH SERVICE 132 (1956).

[75] Katz, 141 Cal. 116 at 135; HUTCHINS, *supra* note 74; Burr, 154 Cal. 428 at 434-435.

[76] CAL. DEP'T. OF WATER RESOURCES, *Groundwater Glossary*, 2008. *available at* http://www.groundwater.water.ca.gov/groundwater_basics/gwb_glossary/index.cfm (last visited Nov. 2, 2008).

[77] *Id.*

[78] *Id.*

[79] HUTCHINS, *supra* note 74, at 40.

[80] CAL. CIVIL CODE § 1414. (2007); ARCHIBALD, *supra* note 5, at 51. (The chronology of appropriation is often referred to as "first in time is first in right" which describes the greater right of a senior appropriator over junior appropriators in decreasing sequence); Pasadena, 33 Cal.2d 908 at 926.

[81] HUTCHINS, *supra* note 74, at 132; Pasadena, 33 Cal.2d 908 at 926.

[82] CAL. WATER CODE §§ 123, 174 (2007).

[83] CAL. CONST. art. X, § 2; CAL. WATER CODE § 100 (2007).

[84] CAL. WATER CODE § 104 (2007).

resources cooperatively with other agencies.[85] State law formerly required agricultural water suppliers that deliver more than 50,000 acre-feet of water annually for agricultural purposes to develop agricultural water management plans by 1992, but that law expired on January 1, 1993.[86] Today, California's Water Code provides guidance for the development of local water plans which may be overseen by regional water control boards.[87] Although groundwater management in California is at a stage which can best be described as "monitoring and reporting," the State Water Code itself authorizes local governments to establish and follow a water management plan consistent with the State's Water Plan.[88] However, when it comes to agricultural water needs, the State provides little guidance except to note that domestic use has greater priority over agricultural irrigation.[89] Efficient management of water is left mostly to nine semi-autonomous Regional Water Boards.[90]

California distinguishes groundwater regulation from surface water regulation.[91] Although the State sets standards for regulating generally how water is used, groundwater regulation falls primarily within appropriations doctrines or overlying landowner rights.[92] A property owner or legal lessee may pump groundwater without a permit or consideration of adverse consequences to the source.[93] They are subject only to the reasonable use doctrine.[94] Under the State Water Code, the Water Control Board has limited authority to regulate groundwater.[95] Board regulatory authority is limited to surface water and subterranean streams.[96] Local areas may either regulate groundwater extraction by county ordinance or

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[85] CAL. WATER CODE §§ 10750 (2007).

[86] CAL. WATER CODE §§ 10816, 10855 (West 2007).

[87] CAL. WATER CODE § 10540 (2007).

[88] CAL. WATER CODE §§ 380, 10820, 10753.7, 10753.8, 10631, 10004.6, 13001, 10000 (2007).

[89] CAL. WATER CODE § 106 (2007).

[90] California Water Boards, *Working Together to Protect California's Water Resources*, (July 25, 2008) *available at* http://www.waterboards.ca.gov/publications_forms/publications/factsheets/docs/boardoverview.pdf. (last visited Nov. 2, 2008).

[91] The Sax Report, *supra* note 68, at 5.

[92] CAL. CONST. art. X, § 2; *see*, Pasadena, 33 Cal.2d 908 at 919; HUTCHINS, *supra* note 74, at 40.

[93] Pasadena, 33 Cal.2d 908 at 926; *See* Bureau of Land Management (BLM), National Science & Technology Center, Western States Water Laws, California Water Rights Fact Sheet (August 15, 2001) http://www.blm.gov/nstc/WaterLaws/california.html. (last visited Nov. 2, 2008).

[94] CAL. WATER CODE § 1240 (2007); BLM, *supra* note 93.

[95] BLM, *supra* note 93.

[96] *Id.*

by the formation of a special management board.[97] Only recently has California recognized the significant impacts from groundwater aquifer overdraft.[98] To deal with the environmental and management issues, the State formed thirteen water sub-districts to supervise surface and some groundwater allocations.[99] These agencies have authority to establish water management plans and may institute restrictions on pumping basin groundwater for agricultural use.[100] The plan also contains provisions allowing the local agencies to charge and collect fees from users to fund other aspects of water management.[101] However, to date, California still lacks an integrated ground and surface water permit program and Groundwater Management Plans have no legally required components.[102]

IV. LEGISLATIVE AND JUDICIAL GROUNDWATER REGULATION

A. Water Plan Updates

The Groundwater Management Act, commonly referred to as Assembly Bill 3030 ("AB 3030"), updated the California Water Code in 1992 to provide a systematic procedure for an existing local agency to develop a Groundwater Management Plan.[103] This section of the code provides such an agency with the powers of a water replenishment district to raise revenue to pay for facilities to manage extraction, recharge, conveyance, and quality in the basin.[104] Although participation is voluntary, a total of 156 agencies have adopted Groundwater Management Plans in accordance with AB 3030.[105] When Senate Bill 610 ("SB 610") was enacted in 2001, it updated the Water Code to provide a mechanism by which land use agencies, in cooperation with water suppliers, coordinate to plan

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[97] CAL. WATER CODE §§ 10753, 10755.3 (2007); *See Bulletin 118*, *supra* note 18, at 34.

[98] *Bulletin 118*, *supra* note 18, at 26.

[99] *Id.* at 34.

[100] CAL. WATER CODE §§ 10755.2, 10755.3 (2007).

[101] CAL. WATER CODE §§ 1551, 10754 (2007).

[102] SCHLUMBERGER WATER SERVICES, Prepared for the Sonoma County Water Agency, *Work Plan for a Groundwater Management Plan for the Sonoma Valley, California* (March 2006), *available at* http://www.scwa.ca.gov/_pdf/Work%20Plan%20March%202006.pdf (last visited Nov. 2, 2008).

[103] CAL. WATER CODE §§ 10750-10755 (2007); *Bulletin 118*, *supra* note 24, at 35.

[104] CAL. WATER CODE § 10754 (2007).

[105] Central Sacramento County Groundwater Forum, *Groundwater Digest*, (September 2003) *available at* http://www.groundwater.water.ca.gov/cwm/images/SacGWdigest_4_GovOpts.pdf. (last visited Nov. 2, 2008) [hereinafter *Groundwater Digest*].

the availability and projected use of available water.[106] Together, with Senate Bills 221 and 901, SB 610 ensures the availability of regulated water to a planned project.[107] Regardless of these updates to the Water Code, percolating groundwater management remains largely unaffected by statutes.[108]

B. Court Authority to Regulate Groundwater

Groundwater rights are often determined by the court upon a challenge by one user against another.[109] Certain basins across California are managed by court decree where stakeholders cannot agree about hydrogeologic operations or when the resource is so limited that the parties are not able to take their entire appropriation.[110] In such areas, the stakeholders, developers, agriculture industries, municipalities, and private landowners compete for the water within the source.[111] In basins where a lawsuit is brought to settle priorities of rights to the water, the groundwater rights of all the overlying landowners and appropriators are determined by the court.[112] Aside from priority of rights, the court also decides who has a right to extract water and how much each appropriator may take.[113] The Court will then designate a "Watermaster" to ensure that the basin is managed in accordance with the court's decree and who periodically reports to the Court.[114]

This court process to determine groundwater rights is one of the most prevalent forms of groundwater management in the state.[115] Unlike surface water, which is regulated by statute, groundwater law in the State is

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[106] CAL. WATER CODE §§ 10631, 10656, 10910, 10911, 10912, 10915 (2007); CAL. DEP'T. OF WATER RESOURCES, *Recent Actions Related to Groundwater Management* 68 (2003).

[107] *Recent Actions*, *supra* note 106.

[108] The Sax Report, *supra* note 68, at 1.

[109] HUTCHINS, *supra* note 74, at 494.

[110] City of Pasadena, 33 Cal.2d 908 at 925-926.

[111] ANDREW STONE, American Ground Water Trust. *Competition for America's Ground Water Resources – The Public Perception.* (1998). *available at* http://www.agwt.org/events/Education_Papers/Perception&WaterUse.pdf (last visited Nov. 2, 2008) [hereinafter *Public Perception*].

[112] *See* BACHMAN, ET AL., *supra* note 9, at 173.

[113] *Id.*

[114] *Id.* at 174 (the Watermaster is court-appointed and has powers similar to those of a management district. The Watermaster can levy special assessments against groundwater producers to cover the costs of administering the judgment or the purchase of replacement water.)

[115] *See generally* CAL. WATER CODE § 1200 (2007); *Groundwater Digest*, *supra* note 105.

based mainly upon common law concepts.[116] Though the SWRCB has concurrent jurisdiction with the courts with regard to surface water and water in "definite channels," the State Board has no statutory authority to determine the rights to percolating groundwater.[117] The procedures for adjudication of water rights have left most groundwater basin management to the courts.[118] No other western state has such a disjointed, multi-faceted system to manage such a vital resource.[119]

C. Water Management in the Western States

Ten states have some form of integrated management plan to regulate both surface water and groundwater in the same system.[120] California alone has a system which combines appropriative rights, riparian rights, the public trust doctrine, and court adjudication to address the range of water issues that arise.[121] Many other western states have already discovered the benefits of a united system, but they have also learned that water source sustainability is critical.[122] When groundwater is not managed in totality, overdraft of groundwater sources tends to occur.[123] For example, in 1935, Utah incorporated groundwater regulation into its system of appropriative rights and later determined that this was not enough.[124] After a number of serious land subsidence problems and safe yield reviews, Utah granted greater authority to the State Engineer to limit pumping and to require Groundwater Management Plans.[125] In other states, combinations of requirements for sustainability certifications, pumping limitations, strict safe-yield adherence, recharging groundwater sources, creating and using water storage facilities, and monitoring by

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[116] MARTHA BURCH, ESQ., *Water Rights: Supply Issues for Local Agency Formation Commissions*. (2005) available at www.calafco.org/docs/Water_Rights_for%20LAFCo.doc. (last visited Nov. 2, 2008).

[117] Environmental Defense Fund, 26 Cal.3d 183 at 200; HUTCHINS, *supra* note 74, at 494.

[118] *Groundwater Digest*, *supra* note 105.

[119] TROUT UNLIMITED. *Western Water Project: Gone to the Well Once too Often, the Importance of Groundwater to Rivers in the West.* 8 (April 2007), *available at* http://www.tu.org (Colorado, New Mexico, Nevada, Washington, Utah, Wyoming, Idaho, Montana, Oregon, and Arizona have integrated water management plans.) (last visited Oct. 22, 2008). [hereinafter TROUT UNLIMITED].

[120] *Id.*

[121] *Id.* at 12.

[122] *Id.* at 10.

[123] *Id.* at 8-12.

[124] *Id.* at 10.

[125] *Id.*

permit has effectively reduced overdraft problems.[126] In California, managing the surface water separately from groundwater has disjointed the entire system.[127]

V. WEIGHING THE REGULATORY OPTIONS

A. Market Approach

Water as a marketable commodity would initially meet significant opposition by landowners, and possibly drive the small farmer out of business due to high production costs.[128] However, as allocations are redistributed competitively, provisions for existing landowners must be made whereby one who holds a water right may seek compensation to temporarily transfer use rights to another or to contribute to public water allocations for credit.[129] Revenues generated may be used to fund research and development of reclamation technology, underground measurement technology, administrative costs, land management and preservation.[130] This is similar to the funding of research and conservation of wetlands and wildlife in the state.[131]

Since participation in the water allocation market would be voluntary, a landowner might have concerns of losing future entitlement. However, clear identification of a property owner's volume share of the basin or table would help the user manage his or her own supply. Even so, most consumers do not take conservation seriously until it becomes a serious economic burden.[132] Conservation may not only reduce consumption in all sectors, but also maintain affordability by reducing demand. Unfortunately, those who can afford to pay more will ultimately control the product.

Measuring surface water as well as groundwater with any accuracy is the primary obstacle to establishing a workable water market with clear

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[126] *Id.* at 18-19.

[127] *Id.* at 12.

[128] *See generally*, *Public Perception*, *supra* note 111.

[129] CAL. WATER CODE §§ 1810, 1811, 475 (2007).

[130] CAL. DEP'T. OF WATER RESOURCES, *California Water Plan Update 2005*, Vol. 1, Ch. 5, Implementation Plan; Vol.4, Financing Strategies and Guidelines for Funding Water Resource Projects. *available at* http://www.waterplan.water.ca.gov/previous/cwpu2005. (last visited Nov. 2, 2008) [hereinafter *Update 2005*].

[131] CAL. WATER CODE § 12912.5 (2007).

[132] GALLUP NEWS SERVICES, *High Gas Prices Causing Consumer Spending Cuts.* (May 24, 2006), *available at* http://www.gallup.com/poll/22918/High-Gas-Prices_Causing-Consumer-Spending-Cuts.aspx. (last visited Sept. 22, 2008).

accountability.[133] Once rights are clearly defined and inventory can be sufficiently measured, water management would become more precise. As with other commodities, price demands conservation measures and the domestic user as well as the industrial user will undoubtedly implement their own water saving systems. Treating water as a commodity may change the common perception that water is cheap and plentiful.[134] Once it has a quantifiable dollar value, the resource becomes precious. Under this approach, the market answers the needs of competing interests, for a price. Taxable revenue benefits the public as a whole and the costs will be dispersed over a larger percentage of the public. Revenue raised could be reinvested into advancing technology to conserve and create new water sources.[135]

B. A Uniform State-Wide Management Plan

Perhaps the better approach to groundwater management is to unite the appropriative system, landowners rights, regulatory statutes, and court adjudication systems into one integrated administrative system as instituted in most other western states.[136] A comprehensive system of conservation, conjunctive management, recharge, and storage may prevent long-term overdraft problems.[137] Effective administration of these components is well within the authority of the State Water Boards.[138] Further, the State has statutory preemption powers in the event of a serious shortage to subordinate appropriations in favor of the priority uses for public safety and domestic consumption.[139] State authorities must enforce regulations which would apply to all surface and groundwater extractions to ensure an adequate supply to priority users. Allocations must

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[133] WILLIAM ALLEY, *Information Needs for Integrated Water Management.* Presentations on The Role of Groundwater in Integrated Water Management 24th Biennial Groundwater Conference and 12th Annual Meeting of the Groundwater Resources Association of California. (Oct. 28-29, 2003). *available at* http://www.lib.berkeley.edu/WRCA/WRC/pdfs/GWAbstract03.pdf. (last visited Nov. 2, 2008); ALLEY ET AL., *Flow and Storage in Groundwater Systems.* Science 14, Vol. 296. No. 5575. 1985-1990. (June 2002).

[134] Wikipedia, *Water in California. available at* http://www.en.wikipedia.org/wiki/Water_in_California (last visited Nov. 2, 2008).

[135] *Update 2005*, supra note 130.

[136] TROUT UNLIMITED, *supra* note 119.

[137] *Uncertain Future, supra* note 49, at 23.

[138] CAL. WATER CODE § 100 (2007).

[139] CAL. WATER CODE § 174 (2007).

be restricted to actual, existing supplies to prevent over-allocating phantom water to future users.[140]

1. An Ecological Component Within the Uniform State Plan

Conservation does not only include use reduction. It involves recycling and reusing. California is one the top three recycling states in the nation[141] and claims a multitude of government sanctioned conservation programs.[142] Advances in hydro-technology and biochemistry may streamline brackish water de-salination processes to bring affordability to treating sea water for human consumption.[143] Funding for storage and groundwater recharge facilities would improve supply reliability.[144] Recharging the aquifers to replenish groundwater is also ecologically sound as long as the recharge water itself is not contaminated.[145] In the future, California's water quality regulations should include further conservation measures or institute fixed pumping limits to prevent overdraft to the point of contamination.

2. Managing Private Use

Percolating water should fall within the same category as other groundwater that the SWRCB manages.[146] It may then be fully subject to permitting and managed allocation under the appropriative rights doctrine.[147] Fundamentally, percolating waters are similar to underground streams.[148] Both are vulnerable to overdraft and contamination.[149] The

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[140] State Water Contractors Press Release. *Grim Water Supply Forecast for 2009 Reinforces Need for New Water Delivery System.* (Oct. 30, 2008) *available at* http://www.swc.org (last visited Dec. 12, 2009).

[141] Phil Simmons et al., *The State of Garbage in America*, BioCycle, April 2006, at 26, *available at* http://www/jgpress.com/archives/_free/000848.html (last visited Sept. 22, 2008).

[142] U.S. DEP'T. OF AGRIC., NATURAL RESOURCES CONSERVATION SERVICE, *Programs,* (2008) *available at* http://www.ca.nrcs.usda.gov/programs/ (last visited Sept. 22, 2008).

[143] NATIONAL ACADEMIES PRESS. *Review of the Desalination and Water Purification Technology Roadmap.* (2004). *available at* http://www.nap.edu/openbook.php?isbn=0309091578.

[144] CAL. DEP'T. OF WATER RESOURCES, *Near Term Actions Related to Water Supply Reliability* (Oct. 23, 2007) *available at* http://www.waterplan.water.ca.gov/docs/misc/Near-TermActionsSupplyReliability.10-30-2007.pdf

[145] TROUT UNLIMITED, *supra* note 119, at 18.

[146] The Sax Report, *supra* note 68.

[147] CAL. WATER CODE § 1250 (2007).

[148] The Sax Report, *supra* note 68.

State and Regional Water Boards may institute uniform appropriation permitting processes applicable to all users. Overlying landowners already enjoy permit-free use of their groundwater.[150] In effectuating the uniform state water regulation system, private wells might be exempted, while remaining subject to reasonable use to ensure some measure of private conservation. As a practical matter, the State Water Boards would have some difficulty monitoring private use, nevertheless, in an environment of strict regulation, landowners may become self-policing of water waste. Preventing the "tragedy of the commons" would become the shared responsibility of the users themselves.

3. Continuous Data Collection as a Management Tool

California has very little data regarding surface and groundwater interaction.[151] Although the State has extensive statutory provisions to measure water quality and water transfers, it must also institute measurement programs for groundwater well as surface water.[152] The State must have reliable data on which to base any resource allocation program. Without accurate accounting of availability for appropriation, allocations are inaccurate and uncertain.[153] This is due in large part to exaggerated claims or erroneous estimates of water deliveries needed by appropriators.[154] It appears that the "race to the well" continues though it is disguised as a legal appropriative right which some users will exploit to prevent falling short of their actual need.[155] Prediction models, sub-surface mapping technology, and sophisticated measuring tools are necessary to determine regulatory parameters. If the State does not know what it has, it cannot allocate it with any precision or reliability.[156] Without such data, the "tragedy of the commons" is perpetuated without mitigation.[157]

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[149] THE GROUNDWATER FOUNDATION, *Sources of Groundwater Contamination, available at* http://www.groundwater.org/gi/sourcesofgwcontam.html (last visited Dec. 12, 2008).

[150] CAL. DEP'T. OF WATER RESOURCES. *Water Facts No. 8* (August 2000) *available at* http://www.dpla2.water.ca.gov/publications/waterfacts/water_facts_8.pdf

[151] TROUT UNLIMITED, *supra* note 119, at 19.

[152] CAL. WATER CODE §§ 520, 523, 531 (2007).

[153] C-WIN, *supra* note 4.

[154] *Id.*

[155] HUTCHINS, *supra* note 74.

[156] ALLEY ET AL., *supra* note 133.

[157] HARDIN, *supra* note 51.

VI. CONCLUSION

Water supplies in California have been an ongoing problem perpetuated by an inefficient management system. The problem will continue to grow with increased population, pollution, urbanization of agricultural land, reduced snow pack from global warming, and fluctuating precipitation patterns.[158] Lawmakers have recognized the need to address these concerns and have already begun to reshape the systems for managing our state resources.[159] As water supplies are threatened, so are industries that rely upon water.[160] Agricultural businesses suffer tremendous losses during severe droughts, and if water becomes more scarce, the State could remain in perpetual drought-like conditions.[161] The best way to preempt this emergency is by taking a uniform approach to water regulation. California must reconsider its multi-faceted system and reform its policies in favor of a more sensible approach under one regulatory agency. Maintaining current water policies will continue to drain the State's vital agriculture industry.[162]

Although a market approach has the advantage of drawing attention to much needed conservation, it has the detriment of potentially becoming a resource held and controlled by the deepest pockets.[163] Quantities of allocations would be difficult to monitor and prior rights holders would suffer unnecessary intrusion into their inherent rights as prior appropriators.[164] In effect, the State would not gain any advantage under this approach, but would leave the resource to manage itself. Under deregulated private management, prices could soar extremely high.

In the alternative, a uniform system of surface and groundwater regulation has been successful in many other western states.[165] Mistakes have been made and lessons have been learned.[166] California is now in a position to model the best of those other states' regulatory schemes and preempt the otherwise inevitable shortage of water. It is within the State's

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[158] *Climate Change*, *supra* note 38, at 10; AMERICAN FARMLAND TRUST, *supra* note 16, at i.

[159] *Groundwater Update 2003*, *supra* note 8, at 29.

[160] AQUAFORNIA, *supra* note 25.

[161] *Uncertain Future*, *supra* note 49, at 5.

[162] *Id.* at 14.

[163] ELLEN HANAK, *California's Emerging Water Market: Should Counties Play a Role?* Public Policy Institute of California Commentary, http://www.ppic.org/main/commentary.asp?i=45

[164] *See generally*, City of Barstow, 23 Cal.4th 1224 at 1245.

[165] TROUT UNLIMITED, *supra* note 119, at 8-12.

[166] *Id.*

authority to revise this flawed system.[167] Indeed, under the public trust doctrine, it is the State's obligation to preserve resources in a manner which best serves the public interest.[168] An integrated water regulatory system will resolve administration ambiguities if coordinated by one agency with broad authority. "Paper" water rights would pose less of a problem under an effective system of data collection to ensure a closer approximation of the quantity allocated. Enforceable plans ensure that no one user's rights are injured, but that each user receives a broader benefit because shortages will cease to require subordination of those rights.[169] California must address the sustainability problem now by implementing sensible plans enforced by the State Water Boards and policed by the permit process or adjacent users. Common sense water reform is imperative to protect our ecology, our industry, and the people who depend on them.

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[167] CAL. WATER CODE § 174, 10753 (2007).
[168] CAL. WATER CODE §§ 1243, 1253 (2007); Nat'l Audubon Soc'y, 33 Cal.3d at 441.
[169] ARCHIBALD, *supra* note 5.