

Water Scarcity, Marketing, and Privatization

Robert Glennon *

I. Prelude

Most Americans take water for granted. Turn on the tap and a limitless quantity of high quality water flows for less money than it costs for cable television or a cell phone. The current drought has raised awareness of water scarcity, but most proposals for dealing with drought involve quick fixes—short-term palliatives, such as bans on washing cars or watering lawns except on alternate days. It is assumed that things will return to normal, and we will be able to wash our cars whenever we wish. But the nation's water supply is not inexhaustible. A just-released report of a White House subcommittee ominously begins: "Does the United States have enough water? We do not know."¹ In a survey of states conducted by the U.S. General Accounting Office, only 14 states reported that they did not expect to suffer water shortages in the next 10 years.²

Is the sky falling? Not yet, but the United States is heading toward a water scarcity crisis: our current water use practices are unsustainable, and environmental factors threaten a water supply heavily burdened by increased demand. As the demand for water outstrips the supply, the stage is set for what Jared Diamond would call a collapse.³ How will we respond? When we needed more water in the past, we built a dam, dug a canal, or drilled a well. With some exceptions, these options are no longer viable due to a paucity of sites, dwindling supplies, escalating costs, and environmental objections. Instead, we are entering an era in which demand for new water will be satisfied by reallocating and conserving existing sources. The current water rights structure is the outcome of historical forces that conferred great

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1. SUBCOMM. ON WATER AVAILABILITY & QUALITY, NAT'L SCI. & TECH. COUNCIL COMM. ON ENV'T & NAT. RESOURCES, SCIENCE AND TECHNOLOGY TO SUPPORT FRESH WATER AVAILABILITY IN THE UNITED STATES (2004).

2. UNITED STATES GENERAL ACCOUNTING OFFICE, REPORT NO. GAO-03-514, REPORT TO CONGRESSIONAL REQUESTERS, FRESHWATER SUPPLY: STATES' VIEWS OF HOW FEDERAL AGENCIES COULD HELP THEM MEET THE CHALLENGES OF EXPECTED SHORTAGES 8 (2003). And this assumed average water conditions; under drought conditions, 46 states expect shortages.

3. See JARED DIAMOND, COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED 3 (2005) (defining "collapse" as "a drastic decrease in human population size and/or political/economic/social complexity, over a considerable area, for an extended time").

wealth and power along with the water. The solution to tomorrow's water shortages will require creative answers to challenging issues of equity, community, and economics.

II. Supply and Demand

In 2000, Americans used a staggering 408 billion gallons of water each day.⁴ In many parts of the country, fresh water reserves have been depleted; diversions have dried up rivers and pumping has exhausted aquifers.⁵ Industrial solvents have contaminated thousands of groundwater basins, and ocean water has percolated into countless coastal aquifers, rendering them too saline for human consumption. We still have an abundance of potable groundwater, but we are pumping it faster than Mother Nature replenishes it. Additional diversions from our rivers and streams would come at a high environmental cost. In short, our existing use of water is unsustainable.

Moreover, climatic factors threaten the water supply. The recent drought, of historic proportions in some sections of the country, has caused cities, farms, and mining companies to scramble in search of new sources. And global climate change threatens profound (though currently uncertain) implications for the world's water. Notwithstanding the rantings of Fox News,⁶ credible scientists no longer doubt the reality of global warming.⁷ The release of carbon dioxide gases, a by-product of fossil fuel use, increases the ability of the sun's rays to penetrate our atmosphere, thus raising the earth's temperature.⁸ Higher temperatures produce a shorter snow season (more precipitation falls in the form of rain), faster snow melt, and increased runoff. These changes have significant implications for our water supply. Think of a mountain's snow pack as a gigantic water storage reservoir.

4. SUSAN S. HUTSON ET AL., DEP'T OF THE INTERIOR, U.S. GEOLOGICAL SURVEY CIRCULAR 1268, ESTIMATED USE OF WATER IN THE UNITED STATES IN 2000, at 1 (2004).

5. See ROBERT GLENNON, WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS 3 (2002) (noting that groundwater pumping has depleted natural freshwater supplies and may exhaust aquifers).

6. FOXNews.com publishes editorials by Steven Milloy who has his own global-warming-doubting website. Steven Milloy, *Junk Science: Global Warming Tax*, FOXNEWS.COM (Apr. 8, 2005), at <http://www.foxnews.com/story/0,2933,152801,00.html> (referring to "global warming hysteria"); Steven Milloy, *Junk Science: Second Global Warming Treaty Makes Less Sense Than First*, FOXNEWS.COM (Mar. 23, 2005), at <http://www.foxnews.com/story/0,2933,150786,00.html> (noting the "scientific shortcomings of global warming hysteria"). See also *Special Report with Brit Hume* (Fox News Channel television broadcast, Jan. 13, 2005) (prompting interviewee Patrick Michaels with the following question: "Your view is that all of this global warming alarm is about [the] environmental movement's needs to keep people worried, so they'll get money, and pass their bill . . .").

7. David A. King, *Climate Change Science: Adapt, Mitigate, or Ignore?*, 303 SCIENCE 176, 176 (2004).

8. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, THIRD ASSESSMENT REPORT, CLIMATE CHANGE 2001: SYNTHESIS REPORT 4-6 (2001) (arguing that an increase in global temperature since the pre-industrial era is due at least in part to human-created anthropogenic greenhouse gases such as carbon dioxide), available at <http://www.ipcc.ch/pub/reports.htm>.

Global warming reduces the amount of water in the reservoir, creating a need to find an alternative means of storage. Global warming also creates higher evaporation losses from the surfaces of lakes, reservoirs, and rivers. According to one recent report, global warming may reduce the Colorado River's reservoir level by one-third by mid-century.⁹

Demands on our water resources are increasing. Increased demands result from one simple fact: population growth. Since 2000, the population of the United States has surged from 285 to 295 million, with the Southwest leading the way. Demographers expect California alone to add 400,000 new residents per year—increasing its population from 36 million to 51 million by 2040.¹⁰ And that number does not include undocumented immigrants, whose current population is estimated at 2.4 million¹¹ and growing by approximately 180,000 each year.¹² To put this population growth in perspective, consider that California adds one new resident per minute, and that California's rate of growth lags behind that of both Nevada and Arizona.¹³

Fights over water in the United States, no longer confined to the West, illustrate the ramifications of this country's increasing demands for water. The Great Lakes contain 20% of all the fresh water on earth, yet Canada and the eight Great Lakes states have negotiated Annex 2001, an agreement to prevent the bulk exportation of water from the Great Lakes.¹⁴ Bottled water

9. Niklas S. Christenson et al., *The Effects of Climate Change on the Hydrology and Water Resources of the Colorado River Basin*, 62 *CLIMATIC CHANGE* 337, 353 (2004); see also Tim Barnett et al., *The Effects of Climate Change on Water Resources in the West: Introduction and Overview*, 62 *CLIMATIC CHANGE* 1, 6 (2004) (discussing results of climate-change simulations conducted as part of the Accelerated Climate Prediction Initiative supported by the U.S. Department of Energy's Office of Science). Also, deeper, longer droughts and more intense floods may also occur.

10. See DALE PONTIUS, *COLORADO RIVER BASIN STUDY: REPORT TO THE WESTERN WATER POLICY REVIEW ADVISORY COMMISSION* 26 (1997) (noting that California's population may gain more than 16 million people from 1996 to 2025); Darryl Kelley, *California Cuts Its Population Project: The State is Reconsidering the Demands for New Schools and Other Services Primarily Because of an Unexpectedly Large Decline in the Latino Birthrate*, L.A. TIMES, Oct. 4, 2004, at A1 (noting that demographics experts project that California's population will increase from 36 million to 51 million by the year 2040).

11. JEFFREY S. PASSEL, PEW HISPANIC CENTER, *ESTIMATES OF THE SIZE AND CHARACTERISTICS OF THE UNDOCUMENTED POPULATION* 6 tbl.1 (2005), available at <http://pewhispanic.org/topics/index.php?TopicID=16>.

12. *Id.* at 2 (estimate based on approximate yearly undocumented immigration to the United States and percentage of these immigrants in California).

13. NPG State Facts, California, at <http://www.npg.org/states/ca.htm>.

14. See COUNCIL OF GREAT LAKES GOVERNORS, *THE GREAT LAKES CHARTER ANNEX: A SUPPLEMENTARY AGREEMENT TO THE GREAT LAKES CHARTER* (June 18, 2001) (in order to protect the Great Lakes ecosystem the parties agreed to "commit to develop and implement a new common, resource-based conservation standard and apply it to new water withdrawal proposals from the Waters of the Great Lakes Basin"), available at <http://www.cglg.org/projects/water/links.asp>. However, scholars have noted that the Annex lacks enough detail to know if its goal will be achieved. See, e.g., Jeffrey E. Edstrom et al., *An Approach for Identifying Improvements Under the Great Lakes Charter Annex 2001*, 4 *TOL. J. GREAT LAKES' L. SCI. & POL'Y* 335, 336–37 (stating

companies have incurred the wrath of citizens' groups in Wisconsin, Michigan, and New Hampshire. Maryland, Virginia, and Washington, D.C. have crossed swords over the Potomac River.¹⁵ New York, New Jersey, Delaware, and Pennsylvania entered an interstate compact that created the Delaware River Basin Commission to manage and allocate the waters of the Delaware River.¹⁶ When municipalities in Massachusetts sought additional water for burgeoning growth, they faced challenges from environmental organizations.¹⁷

Even the humid Southeast is not immune: Georgia, Alabama, and Florida are squabbling over the Apalachicola-Chattahoochee-Flint River Basin.¹⁸ Virginia and North Carolina are struggling over the Roanoke River. Tennessee and South Carolina are trying to prevent the city of Atlanta from diverting water from the Tennessee and Savannah Rivers. Meanwhile, South Carolina faces a threat as North Carolina has taken water from the Pee Dee River for power plants, other industrial users, and Myrtle Beach's half-million people.¹⁹

III. Options

As the nation's water use spirals upward, where will the water come from to satisfy new demands? We have five options. First, we could simply continue to exploit the resource by diverting more water from rivers and pumping additional water from underground aquifers. But in many sections of the country our current water use is unsustainable. Our diversions of surface water have completely dried up some rivers and reduced the flow in others to a trickle. It was once thought that water left in a river was wasted, but we now know—thanks to the development of the fields of biohydrology

that "[t]he implications of the [Annex] standard[s] are not fully known because many of the details of the new system will be subject to a binding agreement among the States and Provinces by 2004").

15. *Virginia v. Maryland*, 540 U.S. 56 (2003) (holding that Virginia, its governmental subdivisions, and its citizens may withdraw water from the Potomac River and construct improvements appurtenant to the Virginia shore of the Potomac River free of regulation by Maryland).

16. Josh Clemons, *Interstate Water Disputes: A Roadmap for States*, 12 SOUTHEASTERN ENVTL. L.J. 115, 132–33 (2004). This watershed served over 20 million people by 1961, including New York City and Philadelphia. The water will serve an estimated 40 million people by 2010. States operated as separate entities with competing interests until they signed the Delaware River Basin Compact. *Id.*

17. See GLENNON, *supra* note 5, at 99–111 (discussing the effects of suburban sprawl on the Ipswich River Basin, the need for more freshwater to support such population growth, and the barriers to increasing the water supply imposed by environmental organizations and government agencies).

18. See *id.* at 183–94 (describing the need for water diversion to support population growth and irrigation on the one hand and the need for natural water flows to support the ecological balance of the basin on the other).

19. Douglas Jehl, *A New Frontier in Water Wars Emerges in East*, N.Y. TIMES, Mar. 3, 2003, at A1.

and ecohydrology—that fresh water flows are critical to the survival of riverine species and spawning habitats, and that they allow for intermittent floods which scour sediment, nourish habitat, and impede the encroachment of invasive species.²⁰ Additional diversions of surface water would come at a high cost to the environment.

Groundwater was once thought to be as inexhaustible as the air we breathe. We now know better. In the 19th century, when the science of hydrology was in its infancy, and American judges were perplexed as to how to divvy up rights to pump groundwater, they threw up their hands and proclaimed, “If you can get it out of the ground, it’s yours.” And then the free-for-all began. Since then, the science of hydrology has matured into a sophisticated science, but the legal rules have not kept pace. In most American states, groundwater law is governed by the “reasonable use” doctrine—an oxymoron—that allows a person to pump as much groundwater as she desires so long as it is used beneficially. Technological breakthroughs in the 1940s and 1950s vastly expanded the capacity to pump huge quantities of water from extraordinarily deep areas beneath the earth’s crust. Large-scale commercial irrigation wells can now pump thousands of gallons per minute. Because the legal rules were so permissive, farmers installed millions of wells and began pumping feverishly. The net effect was a disaster.

Think of an aquifer as a giant milkshake glass, and think of each well as a straw in the glass. The water in the glass is limited, but access to it is not. The reasonable use doctrine epitomizes what Garrett Hardin called “the tragedy of the commons”²¹—limitless access to a finite resource. Anyone can pump as much water as he wishes. There is no incentive to husband groundwater because pumpers do not own the resource. Instead, the system encourages willy-nilly development. In many sections of the country groundwater tables are plummeting. Excessive groundwater pumping has caused the ground to collapse; rivers, lakes, and springs to dry up; and riparian habitat to die.²² If we continue to exploit our groundwater resources in this way we will eventually run out of water. In the meantime we face

20. See GLENNON, *supra* note 5, at 186 (describing the necessity of natural fresh water flows in Apalachicola Bay to sustain oyster estuaries); NAT’L SCIENCE AND TECH. COUNCIL COMMITTEE ON ENV’T AND NATURAL RESOURCES, SCIENCE AND TECHNOLOGY TO SUPPORT FRESH WATER AVAILABILITY IN THE UNITED STATES 3–5 (2004) (noting that an adequate supply of fresh water is necessary to support an increasing human population, to sustain aquatic populations, and to control the cost of water access), available at http://www.ostp.gov/html/_reportfacts.html; SANDRA POSTEL & BRIAN RICHTER, RIVERS FOR LIFE: MANAGING WATER FOR PEOPLE AND NATURE 42–78 (2003) (arguing that rivers require a full spectrum of flows to maintain ecological health and to serve human needs).

21. Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244–45 (1968) (introducing the term).

22. See GLENNON, *supra* note 5, at 3 (“[G]roundwater pumping has caused rivers, springs, lakes, and wetlands to dry up, the ground beneath us to collapse, and fish, birds, wildlife, trees, and shrubs to die.”).

higher costs, a decrease in water quality, salt-water intrusion into coastal aquifers, land subsidence, and further environmental degradation.

The second option for satisfying new water demands is expanding our available supply. Dams function essentially as storage reservoirs which ensure that water is available at a time when Mother Nature does not. In the American West, most water comes from winter snowfall in the mountains. During the spring thaw, the snowmelt creates cascading rivers that provide more water than farmers or cities need for that season. During the summer, when the water needs of farmers and cities increase, dams function to smooth out the supply.

Beginning with the construction of Hoover Dam in the 1930s, the American West embarked on a dam-building frenzy. The remarkable construction of Hoover Dam symbolized how the United States could do anything, even harness the mighty Colorado River. To a nation in the throes of the Great Depression, it was a welcome boost, personifying an ambition that promised a bright economic future. And the power for that future would come from dams, lots of them, each producing hydroelectric energy. The water aided western farmers, and the power enabled American companies, such as Boeing, Lockheed, and Martin Marietta, to become aerospace giants. By the end of the dam-building era in the 1960s, most major western rivers had been dammed, some repeatedly.²³ Indeed, in the United States as a whole, there are 75,000 dams six feet or higher and as many as 2.5 million smaller dams.²⁴ Fewer than 60 American rivers are free-flowing.²⁵

In the mid-20th century, it seemed inconceivable that there might be a downside to building dams. But there was. Decades later, we came to realize how profoundly dams alter watersheds. Dam construction inundated some of the most beautiful canyons in the West, such as Hetch Hetchy and Glen Canyon, and transformed the rivers below the dams. Water flowing from a dam has a constant temperature as opposed to one that fluctuates with the seasons. Most dams increase water temperatures, but some decrease temperatures as they release cold water from the bottom of the reservoir.²⁶ The flow itself depends on the decisions of engineers, not on a natural rhythm. Native fish and other aquatic species suffer from these changes when the nutrients that formerly sustained the downstream aquatic habitat

23. See MARC REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* 165 (1986) ("The age of dams reached its apogee in the 1950s and 1960s, when hundreds upon hundreds of them were thrown up, forever altering the face of the continent . . .").

24. MARGARET BOWMAN ET AL., *AMERICAN RIVERS & TROUT UNLIMITED, EXPLORING DAM REMOVAL: A DECISION-MAKING GUIDE* 1 n.1 (2002).

25. See Daniel McCool, *The River Commons: A New Era in U.S. Water Policy*, 83 *TEXAS L. REV.* 1903 (2005) (citing Martin Doyle et al., *Dam Removal: Physical, Biological, and Societal Considerations*, in *AMER. SOC'Y CIV. ENGINEERS, PROCEEDINGS OF THE 2000 JOINT CONFERENCE ON WATER RESOURCE ENGINEERING AND WATER RESOURCE PLANNING MANAGEMENT 1* (R.H. Hotchkiss & N. Glade eds., 2000)).

26. American Rivers, *Ten Ways Dams Damage Rivers*, at http://amr.convio.net/site/PageServer?pagename=AMR_content_a9ae.

become trapped in the quiet lakes upstream. Anadromous fish—Pacific salmon and steelhead on one coast, and Atlantic salmon and shad on the other—found the paths to their spawning grounds blocked by impassible edifices. Some species became extinct; others merely suffered. Dams also decrease the level of oxygen in reservoir water. The release of this oxygen-deprived water can kill fish downstream.²⁷

Today, opposition to building new dams is quite substantial. Having witnessed the profound alteration of the hydrologic regime of dammed rivers, the environmental community is adamant that new dams are not an environmentally acceptable solution to problems of water shortage. Apart from environmental concerns, dams face two other obstacles: enormous costs and a paucity of good dam sites. Therefore, both option one—diverting more water from rivers—and option two—building new dams—prove to be problematic alternatives for increasing water supplies.

A few smaller dams are still being built, such as the controversial Animus La Plata in Colorado, but the movement in the United States is in the opposite direction. We have begun to decommission dams. Since Edwards Dam in Maine was taken out in 1999, 140 other dams have been removed, restoring miles of free-flowing rivers.²⁸ There is traction to this movement, as communities have realized the considerable economic and environmental value in removing aging dams that generate little hydropower. And it is not just small dams on small rivers that are being targeted. A major debate is raging about removing four substantial dams on the Snake River that block salmon migration. The year 2004 saw a renewed focus on restoring Hetch Hetchy Valley by removing the dam.²⁹ And Glen Canyon Dam on the Colorado River is under attack as wasteful and environmentally destructive.³⁰

27. *Id.* See also ELIZABETH GROSSMAN, *WATERSHED: THE UNDAMMING OF AMERICA* (2002) (examining the implications of dam removal for American rivers and their surrounding communities).

28. American Rivers, *Dam Removal Toolkit: Dams slated for removal in 2004 and Dams removed from 1999–2003*, at http://www.americanrivers.org/site/PageServer?pagename=AMR_content_db25.

29. See Cary Pitzer, *Hetch Hetchy Restoration Proposal Sparks Debate*, *WESTERN WATER*, Nov.–Dec. 2004, at 3 (reporting that recent studies show the now-flooded Hetch Hetchy Valley could be drained with little impact on the local water supply), available at <http://www.water-ed.org/novdec04.asp>.

30. See David L. Wegner, *Environmental Restoration: Challenges for the New Millennium: Looking Toward the Future: The Time Has Come to Restore Glen Canyon*, 42 *ARIZ. L. REV.* 239, 248, 250 (2000) (discussing water loss in the Glen Canyon Reservoir due to evaporation and seepage, and stating that the dam's construction "compromised the ecological integrity of the Grand Canyon and the Colorado River"). *But cf.* Steven W. Carothers & Dorothy A. House, *Environmental Restoration: Challenges for the New Millennium: Decommissioning Glen Canyon Dam: The Key to Colorado River Ecosystem Restoration and Recovery of Endangered Species?*, 42 *ARIZ. L. REV.* 215, 230 (2000) (questioning whether a return to pre-dam ecological conditions is desirable). See also Tim Westby, *Do or Dry: With New Studies Bolstering Glen Canyon Revivalists, the Battle Over Lake Powell Reservoir Heats Up*, *SALT LAKE CITY WEEKLY*, Jan. 13,

Are there other options to expand our water supply? Desalination of ocean water offers the prospect of solving the lament of Samuel Taylor Coleridge's ancient mariner: "Water, water, everywhere" but not "a drop to drink."³¹ Removing salt from ocean water to make it potable offers a tantalizing possibility of an abundant new source of water. Some middle eastern countries and Caribbean Islands have obtained drinking water from desalination plants for a long time. In 2001, Tampa Bay Water began construction of the largest desalination plant in the Western Hemisphere.³² The \$110 million plant came online in March 2003 and was expected to produce 25 million gallons of potable water per day. Alas, the plant only operated for two weeks before problems cropped up. The intake pipes sucked in Asian green mussels—an invasive species creating headaches up and down the East Coast. Sediments quickly clogged the expensive membranes, requiring their immediate replacement. In November 2004, amidst one bankruptcy and a flurry of lawsuits, Tampa Bay Water agreed to pay a California engineering firm an additional \$29 million to fix the pretreatment system.³³ These troubles prompted the board chairman of Tampa Bay Water to note wryly: "[B]eing on the cutting edge is not a very comfortable position . . ."³⁴

Even if Tampa Bay Water resolves these problems, desalination must surmount other problems before it becomes a widely-available, cost-effective, environmentally-friendly source of potable water. The desalination process incurs large costs due to the high-tech membranes used to filter out the salt and the immense amount of energy required to run the plant. Also, various methods of desalination, including reverse osmosis and nanofiltration, generate streams of waste: every 100 gallons of seawater will yield between 15 and 50 gallons of potable water, leaving 50 to 85 gallons as a super-saline byproduct.³⁵ Disposing of this brine poses significant engineering and environmental challenges. In Florida, fishery ecologists fear that the release of this super-saline water into sensitive estuaries off the West

2005 (detailing the disagreement over Glen Canyon Dam's proposed decommissioning), available at http://www.slweekly.com/editorial/2005/feat_2005-01-13.cfm.

Southern California has available a storage alternative to dams. Over-pumping of groundwater from aquifers has created space that could be used to store water. In years of heavy rain and snowfall, excess surface water could be recharged to aquifers and then made available for use in the future. Unfortunately, the current severe drought there has not produced a surfeit of surface water for recharging the state's aquifers. Groundwater storage nevertheless remains a part of a balanced portfolio of water supply options.

31. Samuel Taylor Coleridge, *The Rime of the Ancient Mariner*, in THE OXFORD BOOK OF ENGLISH VERSE, 1250–1918, at 645, 649 (Arthur Quiller-Couch ed., 2d ed. 1961).

32. GLENNON, *supra* note 5, at 81–82.

33. See Jim Waymer, *Tampa Troubles Raise Desalination Concerns; Brevard Plans Similar Facility Along Lagoon*, FLORIDA TODAY, Jan. 10, 2005, at A1 (discussing the Tampa desalination plant project and other proposed desalination projects).

34. *Tampa Bay Water to Hire Group to Fix Desalination Plant*, U.S. WATER NEWS, Oct. 2004, at 18.

35. CAL. COASTAL COMMISSION, SEAWATER DESALINATION AND THE CALIFORNIA COASTAL ACT 31 (2004).

Coast will adversely impact the reproduction of clams and other marine organisms.³⁶ In California, the Schwarzenegger Administration is enthusiastic about desalination, but the California Coastal Commission is quite concerned about the environmental consequences.³⁷ The March 2004 report of the California Coastal Commission notes: “Seawater is not just water, but habitat. It provides the matrix within which innumerable organisms live, and serves a critical role in everything from the food web to the climate.”³⁸ The discharge from a desalination plant may double the normal salinity level for local seawater. Such a sharp spike in salinity may kill or have sublethal effects on marine species and other organisms, particularly in the egg, larvae, or juvenile life stages.³⁹ Finally, the Coastal Commission report raises a basic question about desalination projects proposed by private, for-profit corporations: “Should seawater, a public resource held in common for the benefit of current and future generations, be allowed to be expropriated by private business for profit?”⁴⁰ Desalinated water has a current place in the water portfolios of some American municipalities. But it is an emerging technology—not a quick-fix solution to the problem of water scarcity.

The third option for satisfying new water demands, one that is technically viable today, is the reuse of municipal effluent. Historically, cities dumped raw sewage into our rivers. Today, most household wastewater, whether from toilets or showers, ends up at the municipal wastewater treatment facility. Until recently, this facility would filter the water under the standards mandated by the federal Clean Water Act and then discharge it into a nearby river. From the city’s perspective, the point was to get rid of it as cheaply as possible without generating litigation or complaints about odors. Now, ironically, effluent has economic value. Many industrial users realize that effluent provides a perfectly adequate water supply, joining farmers who have used effluent for crops and cities that have used it for golf courses, municipal parks, cemeteries, and roadway medians. Indeed, wastewater treatment technology can take sewer water and clean it up to drinking water quality, though most Americans would rather not dwell on this prospect. In 1998, San Diego floated a trial balloon along these lines, but the program—dubbed, by some, the “Toilet to Tap” proposal—was dead on arrival. Squeamishness aside, astronauts have lived with total water-recycling programs since the beginning of the space program. In any event, using municipal effluent for purposes other than drinking water would expand our water supply. Yet the treatment process is quite expensive and

36. GLENNON, *supra* note 5, at 81; Waymer, *supra* note 33.

37. CAL. COASTAL COMMISSION, *supra* note 35, at 66–67 (discussing the potential consequences of desalination on the marine life and water quality of the California coast).

38. *Id.* at 66.

39. *Id.* at 76.

40. *Id.* at 47.

delivery of effluent for nonpotable purposes requires a completely separate set of pipes and valves—a daunting financial prospect for cash-strapped American cities. Effluent reuse will help, but not solve, the problem of finding an adequate quantity of water to supply the increasing demands of a larger population.

As a fourth option, we could make our existing supply last longer by using water wisely and efficiently. The impetus for water conservation might come from two directions: government rules and regulations or market-based price signals. An example of government rules and regulations is Arizona's Groundwater Management Act, which imposes on all users—cities, farms, and mines—conservation standards that are phased in over 45 years.⁴¹ In each successive ten-year period, the standards tighten like a ratchet, requiring more effort from the users to comply. After 25 years of experience, the results are mixed. Some progress has been made, especially in communities like Tucson that have an ethic of water conservation. Public service messages and programs reinforce the idea of contributing to the community's best interest by "Beating the Peak" usage in the city's hot summer days. Yet Tucson's population continues to swell, and, while it is nice to boast that per capita per day consumption rates have declined, the higher population has resulted in increased total consumption. Just as it is easier to pick low-hanging fruit, Arizona achieved initial success with no-brainer programs that targeted obvious waste, such as apartment complexes whose sprinkler systems sprayed as much water on streets as on lawns and shrubs. Now the State is in the later stage of reaching for the higher fruit. The cornerstone of the Act is a program that requires developers to demonstrate an "assured water supply" before getting their subdivision plats approved.⁴² Developing regulations to implement that program has been vexing for the Arizona Department of Water Resources. Countless public meetings and innumerable drafts—with debates over every comma and semicolon—finally yielded rules totaling 36 pages of single-spaced fine print.⁴³ Conservation standards fraught with complexity, thereby requiring elaborate monitoring programs, may prove to achieve neither cost effectiveness nor meaningful results.

Still, state and local governments have a critical role to play in developing water conservation programs. One spectacularly successful program has created financial incentives for homeowners to replace toilets and showerheads with low-flow fixtures.⁴⁴ Water conservation standards for new development are even easier and cheaper to implement than incentives for retrofitting existing structures. Housing developers do not care whether they

41. ARIZ. REV. STAT. ANN. §§ 45-563 to -569 (West 2003).

42. ARIZ. ADMIN. CODE R12-15-703(B) (2002).

43. ARIZ. ADMIN. CODE R12-15-701 to -725 (2002).

44. See generally PETER H. GLEICK ET AL., WASTE NOT, WANT NOT: THE POTENTIAL FOR URBAN WATER CONSERVATION IN CALIFORNIA (2003) (discussing the California programs).

instruct their plumbers to install toilets that use 1.6 gallons or 6.0 gallons per flush. Peter Gleick has recently demonstrated the tremendous potential for water conservation programs in California to help alleviate water shortage problems.⁴⁵ He calculates that if the state funded a program to replace all remaining high-water-use toilets with low-flow ones, it would save 410,000 acre-feet of water per year.⁴⁶ This is serious savings.

An alternative water conservation strategy would gain people's attention about their water use through their pocketbooks. If the price of water rose, people would carefully examine how they use water, for what purposes, and in what quantity.⁴⁷ Alas, the price of water in the United States is ridiculously low. Many Americans pay more for their cell phones and cable television each month than they pay for water. Whether a consumer receives water from a municipal water department or from a private company regulated by the state public utility commission, the bill that she receives is only for the "cost of service"—those costs associated with delivering the water. There is no commodity charge for the water; it is literally free because water departments and utilities do not pay for the water themselves, and they pass that benefit along to consumers. This will change when cities are forced to acquire new supplies by entering the market to purchase water rights from willing sellers at market rates. But for the moment, existing water bills do not reflect these new costs.

Indeed, residents of some cities do not even pay for the cost of delivering the water. The municipality, as a service, provides water to all residents who may use as much water as they wish. Some communities do not have residential water meters, and millions of apartment complexes lack individual meters for each apartment. In Fresno, California, a controversy erupted in 2003 as to whether meters should be installed in people's homes. In the end, the state legislature passed a bill requiring the installation of meters—by the year 2025.⁴⁸ Meters enable a city to insist that residents be responsible in their water use, or pay financial consequences. The absence of meters has significance for water use. In Fresno, a city without meters, per capita use hovers around 300 gallons per day; in neighboring Clovis, which has meters, use is approximately 200 gallons per day.⁴⁹

Water rates are politically controversial, yet we must begin to confront the perversity of encouraging wasteful water use. Presently, over half of California's water providers use a flat rate or a declining block-rate structure, which rewards the highest water users with the lowest rates. We must reverse that. Sensible water policy should create incentives to conserve by

45. *Id.*

46. *Id.* at 46.

47. See Robert Glennon, *The Price of Water*, 24 J. LAND RESOURCES & ENVTL. L. 337 (2004) (analyzing the economic efficiencies of water).

48. CAL. WATER CODE § 527 (West 2004).

49. Marc Benjamin, *Arguments Flow Over Water Meters*, FRESNO BEE, Apr. 21, 2003, at B1.

imposing an inverted block-rate structure that targets the heaviest consumers and makes them pay considerably more for their excessive use. The heaviest residential consumers use a disproportionate percentage of their water outside the home for swimming pools and lush landscaping, two quite discretionary uses. As we raise water rates, we must be sensitive to the impact on families of modest means. A threshold that eliminates, for example, the first 5,000 gallons each month from any charge would address this question. Targeting rates based on the differential between winter and summer usage would work as well. Those consumers whose water consumption jumps 50% between the seasons are using water for lawns and swimming pools. People do not use more water for toilets, showers, or washing machines in the summer than they do in the winter. In short, water conservation standards and appropriate water rates offer significant opportunities for stretching our current water supplies.

Desalination, effluent reuse, water conservation, and water pricing will help secure additional supplies and reduce demand in the future. But the pressure to find more water continues. Where will the water come from? We cannot make more water because the hydrologic cycle is a closed one. That leaves a fifth option for satisfying new demands: we can reallocate water from current uses to new ones. We are about to enter an era of water reallocation.⁵⁰ How will this reallocation take place? The government could mandate transfers from one user to another, except that would generate bitter political controversy and litigation over whether the government has the authority to act so cavalierly and whether the Constitution prevents the confiscation of water rights.

IV. The Promise and Prospects of Water Markets

It would be far better to encourage voluntary transfers between willing sellers and buyers. Let them decide what the water is worth to each of them. Water markets would facilitate the movement of water from low-value activities to higher-value ones, thus resulting in a more efficient deployment of the resource. In the United States, we waste an immense amount of water growing cotton and alfalfa to feed cattle. In California, farmers grow cotton on 750,000 acres, heavily subsidized by the federal government.⁵¹ Irrigation systems are often primitive earthen canals that lose 40% to 50% of the water diverted into them through seepage into the ground. Once the water arrives at a farm, many farmers use highly inefficient flood irrigation or sprinkler irrigation with nozzles directing the water into the air where much of it

50. This is a key principle of the Department of the Interior's 2025 Plan for the Future. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, WATER 2025: PREVENTING CRISES AND CONFLICT IN THE WEST 16–17 (2003), available at <http://www.doi.gov/water2025/water2025.pdf>.

51. Timothy Egan, *For Farmers, Subsidies Are a Matter of What Kind of Row You Hoe*, N.Y. TIMES, Feb. 18, 2005, at A12.

evaporates. By one measurement, almost one million acre-feet of the three million acre-feet diverted by the Imperial Irrigation District in southern California ends up as wastewater flowing into the Salton Sea.⁵² In the United States, farmers irrigate millions of acres of marginal land, not because they produce high yields or generate substantial profits—in fact they do not—but because the farmer has the right to irrigate. Indeed, failure to do so may result in losing the water right through the doctrines of abandonment or forfeiture.⁵³ Although some farmers have adopted water-saving technologies, agricultural subsidies and water subsidies combine to distort the economics of agricultural production. As a result, many farmers persist in growing low-value crops and fail to reduce the waste of artificially devalued water resources.

This byzantine system needs a major overhaul. Part of this reform should come from government rules and regulations that impose conservation requirements, eliminate subsidies, encourage investment in modernization, and require “full-cost pricing”—the beneficiaries of U.S. Bureau of Reclamation projects should pay the actual cost of the water they receive. But these changes, each desirable in the abstract, would be extraordinarily difficult to execute in the concrete. Several involve very expensive system improvements, such as lining canals with concrete or laser-leveling fields, that can cost hundreds of thousands of dollars for a single farm. Where is this money to come from, given that many farmers operate on razor-thin margins? Because the price of food relative to inflation has remained stable since the 1940s, it is a wonder any farmers can make a go of it. As a sardonic expression about making money in farming puts it, “If you want to make a small fortune in farming, start with a large one.” It is not feasible, reasonable, or equitable to require farmers to undertake massive expenditures in order to make their irrigation systems more efficient. Even if it were reasonable, it will not happen for one very practical reason: farmers yield immense political power. State legislators would act at their peril were they to require their farmer constituents to shoulder the burden of these huge expenses. As the doctrine of public choice instructs, politicians like to remain in office.

52. MICHAEL J. COHEN ET AL., PACIFIC INSTITUTE, HAVEN OR HAZARD: THE ECOLOGY AND FUTURE OF THE SALTON SEA 10–11 (1999), available at http://www.pacinst.org/reports/haven_or_hazard/haven_or_hazard.pdf.

53. See, e.g., *United States v. Alpine Land & Reservoir Co.*, 965 F.2d 731, 738–39 (9th Cir. 1992) (stating that the only requirement to prove forfeiture of water rights under Nevada law is to show a failure to use the water beneficially for five consecutive years); *Beaver Park Water, Inc. v. City of Victor*, 649 P.2d 300, 302 (Colo. 1982) (observing that Colorado law considers nonuse as prima facie evidence of abandonment of a water right and that self-serving statements of intent are not enough to rebut this presumption); *State v. S. Springs Co.*, 452 P.2d 478, 483 (N.M. 1969) (affirming the trial court’s holding that the landowners lost their water rights by abandonment, forfeiture, or nonuse after failing to use the rights for an unreasonable period of time).

Perhaps other constituencies could pressure legislators to impose conservation standards on farmers. The rise of the environmental movement, the growing demands of cities, and the increasing role of recreation on public lands in the West has created groups of voters whose interests in water differ from those of farmers. Even though these constituencies consist of a large number of voters, they are geographically diverse and lack a focus on any particular issue involving farming practices. For example, a politician contemplating how to vote on a bill to require farmers to laser-level their fields would be confident that 100% of the farmers would be strident opponents, but he would be uncertain as to the views of his other constituents. It is the phenomenon of a small number of deeply-committed voters yielding inordinate political influence over the legislature. Politicians listen carefully to the dominant economic interests in the state. Recognizing this political reality, we must accept the fact that state legislators will not impose costly changes on the farming community. The best way to reform agricultural water use in the United States is to give farmers a financial incentive to use less: let them sell water to cities.

Market-based transfers can take many forms, from sales to leases, from forbearance agreements to dry-year options, and from land fallowing to conservation measures that save water.⁵⁴ Each offers the prospect of a win-win result as the seller secures a price that she finds attractive and the buyer

54. There is a large body of literature on water marketing, including TERRY L. ANDERSON & PAMELA SNYDER, *WATER MARKETS: PRIMING THE INVISIBLE PUMP* (1997); BONNIE COLBY & DAVID BUSH, *WATER MARKETS IN THEORY AND PRACTICE* (1987); BRENT M. HADDAD, *RIVERS OF GOLD: DESIGNING MARKETS TO ALLOCATE WATER IN CALIFORNIA* (2000); ELLEN HANAK, *WHO SHOULD BE ALLOWED TO SELL WATER IN CALIFORNIA? THIRD-PARTY ISSUES AND THE WATER MARKET* (2003); CHARLES MEYERS & RICHARD POSNER, *MARKET TRANSFERS OF WATER RIGHTS: TOWARD AN IMPROVED MARKET IN WATER RESOURCES* (1971); NAT'L ACAD. OF SCIENCES, *WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY AND THE ENVIRONMENT* (1992); SHARING SCARCITY: GAINERS AND LOSERS IN WATER MARKETING (Harold O. Carter et al. eds., 1994); Janis M. Carey & David L. Sunding, *Emerging Markets in Water: A Comparative Institutional Analysis of the Central Valley and Colorado-Big Thompson Projects*, 41 NAT. RESOURCES J. 283 (2001); Joseph W. Dellapenna, *The Importance of Getting Names Right: The Myth of Markets for Water*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 317 (2000); Eric T. Freyfogle, *Water Rights and the Common Wealth*, 26 ENVTL. L. 27 (1996); Robert J. Glennon, "Because That's Where the Water Is": *Retiring Current Water Uses to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act*, 33 ARIZ. L. REV. 89 (1991); Thomas J. Graff & David Yardas, *Reforming Western Water Policy: Markets and Regulation*, 12 NAT. RESOURCES & ENV'T 165 (1998); Brian E. Gray, *The Shape of Transfers to Come: A Model Water Transfer Act for California*, 4 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 23 (1996); Charles W. Howe, *Protecting Public Values in a Water Market Setting: Improving Water Markets to Increase Economic Efficiency and Equity*, 3 U. DENV. WATER L. REV. 357 (2000); Richard E. Howitt, *Empirical Analysis of Water Market Institutions: The 1991 California Water Market*, 16 RESOURCE & ENERGY ECON. 357 (1994); Janet C. Neuman & Cheyenne Chapman, *Wading into the Water Market: The First Five Years of the Oregon Water Trust*, 14 ENVTL. L. & LITIG. 135 (1999); Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1 (1991); Joseph L. Sax, *Understanding Transfers: Community Rights and the Privatization of Water*, 1 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 13 (1994); and Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671 (1993).

secures a water supply worth the negotiated price. The case for water marketing rests on the assumption that ownership of an item invests the owner with an incentive to take care of it. While this is surely not a universal proposition—as human beings span a range from the most obsessive-compulsive among us to those who seem oblivious to disarray, and from those who find it difficult to part with a nickel to those who cannot seem to hold on to one—ownership still changes behavior. Consider rental cars and ask yourself whether you would treat a new car that you purchased the same way you treat a rental car. When, for example, was the last time you washed a rental car?⁵⁵ The same point might be made about hotel rooms, public parks, and parking lots. I have never seen a cigarette smoker dump his ashtray out in his driveway, but some smokers do not hesitate to do so in parking lots. That is not to say that all people treat public property recklessly. Some of us pick up trash in parks and on hiking trails, while others tidy up hotel rooms. Whether driven by Kant's categorical imperative,⁵⁶ inner feelings of guilt or shame, concern for chambermaids, or a belief that civility ennobles us as a people and a culture, many Americans take responsibility for public places. Others, alas, habitually trash public spaces. Whether the habit of littering is cultural or rooted in status and class, people act differently toward things they care about.

An ability to transfer ownership creates an incentive to use property more productively. This is the core idea of markets. Owners of property assess the value of it to them and part with it if they will realize a profit. Buyers seek to change the use of property and capture the value added by the new use. In this process, both sellers and buyers make profits, and society benefits from increased efficiency.

Water markets have other benefits. They permit the reallocation of water in response to changes in population and economic development. To take one example, the computer industry in California's Silicon Valley has transformed the American economy and required that we find water for those who work in the information technology field and for the industries that make the chips and routers that fuel the web. In California, 1,000 acre-feet of water generates 9,000 jobs in the semiconductor industry but only 3 jobs producing cotton.⁵⁷ Each acre-foot used by the semiconductor industry produces nearly \$1 million in gross state revenue but only \$60 growing cotton and alfalfa.⁵⁸ At the same time, NAFTA and other international trade agreements have opened American markets to agricultural powerhouses in Latin America and Asia, putting pressure on our farmers who have watched their

55. Borrowed from Lawrence Summers's quip: "In the history of the world, no one has ever washed a rented car."

56. IMMANUEL KANT, *THE MORAL LAW: KANT'S GROUNDWORK OF THE METAPHYSICS OF MORALS* 69–70 (H.J. Paton trans., 3d ed. 1965) (1785).

57. Peter Gleick, *Pending Deal Would Undermine State's Water Solutions*, SACRAMENTO BEE, Feb. 25, 2005, at B7.

58. *Id.*

margins erode. The time is ripe for some farmers to transition out of growing crops whose economic yield does not warrant the time, effort, and money that it takes to grow them. Water markets provide them this option.

Water markets may even encourage water conservation. If a farmer who reduces water loss by lining his ditch with concrete can profit from the sale of water he has conserved, it stimulates the investment in conservation practices and frees up the water saved for other users. The environmental community has also come to recognize the potential benefits of water markets.⁵⁹ The transfer of water from farms to cities lessens the pressure to build new dams, to divert even more surface water, and to pump more groundwater. And it has allowed some environmental groups to purchase water rights from farmers that they then dedicate to in-stream flow rights, thus ensuring minimum flow levels in sensitive rivers and streams.⁶⁰

Let's be clear about one thing: we are talking about transfers from rural farming areas to cities. Most of the water that will sustain the expected 15 million additional Californians is going to come from agriculture. It has to. In California, as in most western states, farmers use between 70% and 80% of the state's fresh water.⁶¹ One cannot seriously address the question of new demands for water without focusing on agriculture.⁶² Another driving factor is money. In many western states, a high percentage of agricultural water is used to grow cotton and alfalfa, crops that return a relatively low value. The economic value of this water to cities dwarfs the value of the same water to the farmers. It makes economic sense to let the water support the higher value activity.

If water markets are to flourish, there must be a system of quantified water rights that are transferable. Water markets can only develop if a farmer has a known and fixed right that she can sell or lease. Without a property right that is quantified and transferable, there will be no voluntary reallocation of water use.

59. See Graff & Yaldas, *supra* note 54, at 166 (arguing that in light of environmental restoration objectives, "needed water reallocations can best be accomplished through the development of water markets").

60. See, e.g., Neuman & Chapman, *supra* note 54, at 136 (describing how an Oregon nonprofit corporation formed by land managers and environmentalists "purchase[d] consumptive water rights and convert[ed] them to instream water rights . . . for enhancement of fish habitat and other instream uses").

61. In Idaho and New Mexico, the figure is 88%; in Wyoming, the figure is 91%; and in Colorado, 90%. See HUTSON ET AL., *supra* note 4, at 7.

62. See Glennon, *supra* note 54, at 90 (arguing that, "[b]ecause agricultural irrigation consumes eighty-five percent of Arizona's annual water use, one must consider equitable and efficient methods for reducing this consumption if one is serious about achieving" equilibrium between groundwater withdrawal and recharge).

V. Community Impacts and Equity Considerations

The state should not give unrestricted permission to transfer water. Water is a public good and a public resource. The transfer of water from agriculture to cities will benefit both farmers and urban interests, but it may harm third parties. Communities have developed around agricultural centers to serve the farms and to provide a pool of labor to maintain the agricultural economy. If a farmer sells water to a city, his decision has implications for his farm workers; his John Deere dealer; his pesticide, fertilizer, and seed suppliers; and his lawyer, accountant, and banker. Also affected are local restaurants, supermarkets, and retailers who provide necessities and small luxuries to low-wage agricultural workers. Even local government will suffer financially from lost or lowered property values, sales, and income taxes, and from the increased need to provide social services to displaced workers. Equity demands that the beneficiaries of the water transfer compensate all those hurt by it.

Government must oversee the transfer process by setting standards regarding who is entitled to compensation, for what, and for how long. The trick will be to ensure fair compensation for those harmed by the transfer without creating a cumbersome hearing and appeal process that would drive up transaction costs and hijack the transfer process.

Government must also ensure that environmental factors receive careful consideration. Market systems have difficulty internalizing environmental costs. Economists expect that a rational owner of private property will protect the environment on his own property. But a water transfer may affect the habitat on someone else's property, such as the land of a downstream neighbor or a state wildlife refuge. For water transfers to become a legitimate tool for water reallocation, they must internalize both third-party and environmental costs. Even then, government may occasionally prohibit water transfers in order to protect valued and unique communities. For example, northern New Mexico's *acequias* are centuries-old subsistence-farming communities of Hispanic Roman Catholics that conceive of water as a community resource. The State of New Mexico has a compelling interest in protecting this rich culture's traditional water use.

Before we rush headlong into water marketing, we must confront a deceptively simple question: Can someone sell water? Is water a public resource, essential for life, not a commodity to be bought and sold like pork-belly futures? In many societies water has spiritual, religious, and cultural aspects. To conceive of water as private property—owned by someone who can unilaterally decide whether to sell it, to whom, for how much, and for what purpose—raises profound philosophical and moral issues as well as troubling political questions about the role of corporations, especially multinational corporations, and about the ability of local communities to be independent, autonomous, self-sufficient, and self-determinative. To critics

of privatization, a society is bankrupt of values if it treats water as simply a marketable commodity, no different than video games or kitchen faucets.⁶³

VI. Privatization of Water

International controversies over water privatization are shaping the debate in the United States. In a world of six billion people, where over one billion lack access to safe, potable, and affordable water,⁶⁴ the issue of privatization of water resources poses an immense challenge to the international community. The context is etched sharply by recent strife in Cochabamba, Bolivia. In 1998, the World Bank insisted that the Bolivian government turn over its public water utility to the private sector, or else the Bank would refuse to guarantee a \$25 million loan for improvement of the water system infrastructure. The Bank required that infrastructure costs be passed on to consumers. At the instruction of the Bank, the company that received the concession, a subsidiary of the Bechtel Corporation, increased water rates by 35%. A series of escalating protests resulted in seven deaths and spurred Bolivian President Hugo Banzer to place the country under martial law.⁶⁵ Other demonstrations have occurred in Argentina, Ecuador, Panama, and South Africa.⁶⁶

To many progressives, these incidents throughout the Third World share one thing in common: multinational corporations exploiting the dire economic situation of poor people. Corrupt political regimes, often bribed by these companies, pay no heed to citizens' complaints. These episodes have led some opponents of privatization, such as Maude Barlow and Tony Clarke, to draw a line in the sand, stating that "[t]he move to commodify depleting global water supplies is wrong—ethically, environmentally, and

63. MAUDE BARLOW & TONY CLARKE, *BLUE GOLD: THE FIGHT TO STOP THE CORPORATE THEFT OF THE WORLD'S WATER* xii–xv (2002). For additional analysis of issues involving privatization of water resources, see PETER GLEICK ET AL., *THE NEW ECONOMY OF WATER: THE RISKS AND BENEFITS OF GLOBALIZATION AND PRIVATIZATION OF FRESH WATER* 4–10 (2002); JEFFREY ROTHFEDER, *EVERY DROP FOR SALE: OUR DESPERATE BATTLE FOR WATER IN A WORLD ABOUT TO RUN OUT* 107–17 (2001); VANDANA SHIVA, *WATER WARS: PRIVATIZATION, POLLUTION, AND PROFIT* 20–30, 137–38 (2002); *THIRSTING FOR EFFICIENCY: THE ECONOMICS AND POLITICS OF URBAN WATER SYSTEM REFORM* (Mary M. Shirley ed., 2002); and David J. Hayes, *Privatization and Control of U.S. Water Supplies*, 18 *NAT. RESOURCES & ENV'T* 19 (2003). For a popular account of these issues, see John Peet, *Priceless*, *THE ECONOMIST*, July 19, 2003, at 3. See also Carol Rose, *Privatization and Democratic Governance* 5 (Mar. 2004) (unpublished manuscript, on file with author) (observing that privatization measures “have proved to be controversial and disruptive in some locations and circumstances”).

64. Vail T. Thorne & William L. Thomas, *Issues of Water Scarcity and Multinational Corporations*, 18 *NAT. RESOURCES & ENV'T* 31 (2003).

65. BARLOW & CLARK, *supra* note 63, at 154–55; William Finnegan, *Leasing the Rain*, *NEW YORKER*, Apr. 8, 2002, at 43.

66. John Tagliabue, *As Multinationals Run the Taps, Anger Rises Over Water for Profit*, *N.Y. TIMES*, Aug. 26, 2002, at A1; Ginger Thompson, *Water Tap Often Shut to South African Poor*, *N.Y. TIMES*, May 20, 2003, at A1.

socially.”⁶⁷ They think privatization of water resources allows allocation decisions to be made by corporations that desire to maximize profits and ignores the environmental and social consequences of water allocation policies. These companies, focused only on the bottom line, are unlikely to invest in new technology or water conservation. To Barlow and Clarke, privatization interferes with citizens’ ability to allocate and manage their own water, concentrates power in the hands of monopolist corporations, and makes it difficult for local governments to reclaim control over the water system.⁶⁸

So is privatization a good thing or a bad thing? As with so many other things in life, it depends. The devil is in the details. To some, what happened in Cochabamba epitomizes what is wrong with privatization. But since the uprising, the cooperative-run water system that replaced Bechtel is in shambles, possessing neither the capital to install or overhaul the infrastructure nor the experience to run a public utility.⁶⁹ To analyze the situation in Cochabamba or elsewhere, one must know the state of affairs before the private company arrived. What was the condition of the infrastructure? Was it decayed and neglected? Did everyone in the community receive water before the company came in? And what exactly did the company do? Did it build, repair, or replace the infrastructure; deliver water to people; charge people for water delivered; respond to the demands of local politicians to divert resources to their pet projects?

How does one judge the profits to be huge? If a company invests tens of millions of dollars in rebuilding a crumbling infrastructure, in restoring and expanding water delivery to poor urban and peri-urban communities, and in putting in place a competent water administration system, it quite justifiably expects the return of its capital and a reasonable profit. So the profit motive alone is not enough to condemn the corporation as exploitative or privatization as a bad idea. The passion generated by water privatization is nicely captured by an exchange between an Argentinean opponent of privatization, who argued that water “is ‘a gift from God,’” and the President of Vivendi Environmental (which supplies water to 100 million people throughout Europe, Asia, Africa, and the Americas) who responded, ““Yes . . . but he forgot to lay the pipes.””⁷⁰

Despite the intense debate, privatization is an elastic concept that embraces many different scenarios involving the transfer of the assets or

67. BARLOW & CLARK, *supra* note 63, at 207.

68. *Id.* at 207–08.

69. See Mort Rosenblum, *As the World Grows Thirsty, a Vital Question: Who Owns Water?*, ASSOCIATED PRESS, Aug. 20, 2002 (noting Maude Barlow’s acknowledgement of the severe problems with Cochabamba’s current water system), *available at* <http://www.waterconserve.info/articles/reader.asp?linkid=14543>.

70. Tagliabue, *supra* note 66 (quoting a conversation between Gilda Pedinoce de Valls and Oliver Barbaroux).

operations of a public water system into private hands.⁷¹ Most water systems in the United States are publicly owned and operated. Things were not always this way. In the early 19th century, most citizens received water from a private water company. At the end of the 19th century, municipalities began to assert control over these services because they recognized that private companies were not providing adequate service to all citizens. Private companies often failed to invest sufficient capital in the system and sometimes supplied water to the wealthier sections of a city and not to the poorer sections. Issues of water quantity and quality took second seat to maximizing the company's profit on its investment.⁷² By the year 2000, private companies served only 15% of the American public.⁷³

Recently, the pendulum has swung back again. The drivers behind water privatization come from several impulses. First, financially strapped municipalities are eager to have a private corporation put forward the huge amount of capital necessary to update the obsolete and decaying infrastructure of municipal water and sewer systems. By one federal estimate, it will require one trillion dollars over the next 20 years to replace aging sewer pipes and treatment plants.⁷⁴ Second, many economists argue that private businesses are more cost-efficient and effective in providing services than the public sector. And third, in some quarters ideology favors downsizing government and outsourcing things to the private sector.⁷⁵

There are several forms of privatization, each with different implications for the debate. A limited, often uncontroversial form of privatization involves a local government contracting with a private water company to operate the municipal water system or the wastewater treatment system. Municipalities regularly request bids from the private sector to design, construct, operate, and maintain public facilities. Even though public employee unions might prefer that the jobs remain in the public sphere, few other people would object if a private company were to administer the billing and revenue collection services or the payroll obligations of a municipal water department. Since 1997, the number of publicly-owned water systems operated by private companies under long-term contracts jumped from 400 to approximately 1,100.⁷⁶ Even still, 94% of water systems in the United States are publicly controlled.⁷⁷

71. See GLEICK ET AL., *supra* note 63, at 21–28 (describing the transfer of water distribution and management from public to private hands as a “process loosely called privatization” and explaining that the process takes on a variety of forms).

72. *Id.* at 23.

73. *Id.*

74. See Douglas Jehl, *As Cities Move to Privatize Water, Atlanta Steps Back*, N.Y. TIMES, Feb. 10, 2003, at A14 (reporting that “some federal estimates of the need for new spending for municipal water systems” are as high as \$1 trillion over the next twenty years).

75. GLEICK ET AL., *supra* note 63, at 22.

76. Jehl, *supra* note 74.

77. *Id.*

A more contentious type of privatization involves selling or transferring the assets—the pumping plants, treatment facilities, headquarters buildings, and distribution systems—of the municipal water system to a private company. Often this exchange is the quid pro quo for the company agreeing to infuse the system with a major dose of new capital. In this situation, the municipality avoids the need to rely on its municipal bonding and financing system to generate new monies for the project, which would saddle residents with higher taxes. Whether this form of privatization is good or bad depends on the understanding between the municipality and the private contractor. Does the municipality have adequate oversight on issues of water quantity and quality? Will the company undertake sufficient water conservation efforts, such as attempts to increase the use of municipal effluent? The answers depend on the specifics of the contract between the two parties.⁷⁸ The most bitter international controversies have involved situations where local governments have entered into contracts with the private sector to own and operate the system for a substantial period of time, often 50 years. The time period necessary to recoup the heavy initial investment by the private corporation justifies the length of the contract, but the duration may effectively cede control over a public resource to a for-profit corporation.

The final form of privatization, the one that really gets the juices flowing, that most resembles a red flag in front of a bull, involves ownership of the water itself. If a private corporation owns the water, may it sell the water at whatever price it wishes to whomever it wishes? This form of privatization presents a number of problems.⁷⁹ Given that government's essential role is to provide basic services and water, perhaps government has defaulted on its responsibility. If companies own water, they may distribute it unequally, favoring the wealthy who can pay more and the politically powerful who can help in other ways. The contract between a government and a private corporation will determine which residents receive water and at what price. Privatization risks shutting out the public from participation and may make a company's practices less transparent. When economic conditions produce natural monopolies of scarce resources, we create regulated industries. Whether this regulation is successful depends on the strength of the political institutions.

That is why the criticism of water privatization in Third World countries does not transfer very well to the U.S. domestic situation. In the Third World, privatization makes the most sense in those places where the government has failed to provide basic human needs for their people. But in those countries with weak, ineffective, or corrupt governments, privatization presents a problem because the governments may not adequately regulate the

78. For an analysis of the various types of privatization, see GLEICK ET AL., *supra* note 63, at 26–28.

79. For an analysis of the risks of privatization, see *id.* at 29–39.

private sector.⁸⁰ The United States, by contrast, has a strong tradition of democratic oversight of private utilities through public utility commissions (PUCs). PUCs exist in every state and the membership usually consists of elected officials beholden to the public. Most PUCs see their mission as placing a strong thumb on the neck of utilities that might otherwise gouge consumers. I am not suggesting that PUCs always provide the most efficient, democratically accountable regulation of private utilities, but they do an adequate job in most instances.

Environmental consequences and water quality are two other issues surrounding privatization. A private corporation has little incentive to be concerned about the environmental impact of providing water. If the local water supply is groundwater that is being used in an unsustainable fashion, the consequences on the environment may be immense.⁸¹ Similarly, surface water diversions may have horrible environmental consequences but be of little concern to the private corporation that diverts the water. These environmental costs are not internalized by the company but shunted off on society generally.⁸² As for water quality, private companies often resist undertaking expensive monitoring programs for low levels of pollutants. Corporations fear, often reasonably, that it will be difficult to recoup these costs through rate increases, which are subject to both consumer acceptance and PUC approval.

Some opponents of privatization claim that if a country allows its resources to be privatized, international agreements will require unlimited access to the country's water supplies, thus setting off a mad scramble by foreign corporations to export water for sale. This fear rests on provisions in the General Agreement on Tariffs and Trade⁸³ (GATT) and the 1994 North American Free Trade Agreement⁸⁴ (NAFTA). GATT governs international trade for the 148 countries who are members of the World Trade Organization (WTO).⁸⁵ Some environmentalists believe that if a country permits bulk transfers of water domestically, GATT would prevent a country

80. See *Morning Edition: Difficulties of Providing Safe Drinking Water to Developing Nations* (NPR radio broadcast, Jan. 7, 2003) (interviewing Peter Gleick, who stated that "where governments are the weakest is where privatization is most likely to fail because . . . weak governments . . . [do not] have the oversight that's necessary to protect the public interest").

81. See GLENNON, *supra* note 5, at 3 ("[G]roundwater pumping has caused rivers, springs, lakes, and wetlands to dry up, the ground beneath us to collapse, and fish, birds, wildlife, trees, and shrubs to die.").

82. For an analysis of the risks of privatization, see GLEICK ET AL., *supra* note 63, at 29–39.

83. General Agreement on Tariffs and Trade 1994, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, LEGAL INSTRUMENTS—RESULTS OF THE URUGUAY ROUND vol. 1 (1994), 1867 U.N.T.S. 187, 33 I.L.M. 1153 (1994) [hereinafter GATT].

84. North American Free Trade Agreement, Dec. 17, 1992, 107 Stat. 2057, 32 I.L.M. 289 [hereinafter NAFTA].

85. The WTO, established in 1995, is the successor to GATT. See Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Apr. 15, 1994, 33 I.L.M. 1125 (1994). As of February 2005, there are 148 members of the WTO. World Trade Organization, Members and Observers, at http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm.

from regulating further trade in its water resources. However, there are two exceptions to the bulk transfers requirements: actions by a country to protect human life or health and actions to conserve exhaustible natural resources.⁸⁶ Though the legal question remains unresolved,⁸⁷ it is likely that these exceptions mean that any country that imposes water use restrictions on its own citizens for purposes of conservation need not fear that GATT will require it to open its water resources to international marketing. As for NAFTA, it places “ordinary natural water of all kinds” under a tariff heading, implying that water can be traded internationally.⁸⁸ However, a 1993 joint declaration signed by Canada, the United States, and Mexico specifies that water is not covered by NAFTA unless it has entered into commerce and become a good or product.⁸⁹ “And nothing in NAFTA would obligate any NAFTA party to either exploit its water for commercial use or to begin exporting water in any form.”⁹⁰

A practical reason suggests that the fear of transfers between countries or continents and across oceans is more theoretical than practical. Water is heavy: about 2 pounds per quart or 1,358 tons per acre-foot. Wide-eyed dreamers have proposed moving water by tanker from Canada to the Caribbean, by immense water balloons from the Arctic to California, and by ships towing icebergs from the Antarctic to the Middle East, but few investors have placed serious money on the table to underwrite these schemes. The practical reality is that water has such little value as currently priced that these transfers are not economically viable. When the price of water begins to approximate the price of oil which is moved by tankers, it will be time to resolve the GATT and NAFTA issues.

A major weakness in the arguments of the anti-privatization critics is that they have not suggested an alternative. There is really only one: allocation of water through the public sector. Such allocation would be done at the direction of elected politicians or at the discretion of bureaucrats. No economist thinks that this is an efficient way to make resource allocation decisions. Indeed, that’s the problem with the existing distribution of water in the

86. See OFFICE OF U.S. TRADE REP., THE GATT URUGUAY ROUND AGREEMENTS: REPORT ON ENVIRONMENTAL ISSUES (Aug. 1994) (noting that [GATT] “Article XX(b) provides an exception for measures ‘necessary to protect human, animal or plant life or health,’ while Article XX(g) provides an exception for measures ‘relating to the conservation of exhaustible natural resources’”), available at 1994 WL 761804 (G.A.T.T.).

87. For an analysis of these issues, see GLEICK ET AL., *supra* note 63, at 15–20. See also BARLOW & CLARKE, *supra* note 63, at 165–80 (arguing that the Article XX exception may not be as helpful to conservation-minded countries as one might believe, because when WTO trade panels have heard arguments on this provision “the rights of commerce [with the exception of one dispute] have been upheld over the rights of the environment”).

88. NAFTA, art. 201 (incorporating the explanatory notes to GATT Heading 22.01, which “covers ordinary natural water of all kinds (other than sea water) . . . whether or not it is clarified or purified”).

89. See GLEICK ET AL., *supra* note 63, at 18 (citing the 1993 joint declaration).

90. *Id.*

American West. The Bureau of Reclamation has curried favor with important members of Congress and important agricultural organizations and has distributed the water accordingly. Allocation decisions made through the political process will invariably result in the water being allocated to the most powerful economic interests in the state.

As critics of water privatization, Maude Barlow and Tony Clarke argue that water is an inalienable political and social right, and that each person should be guaranteed a “water lifeline,” which they calculate as 6.5 gallons per day.⁹¹ Peter Gleick also argues for a human right to water and has analyzed that it takes a minimum of 13 gallons of water per day per person for drinking, cooking, bathing, and sanitation.⁹² Who could disagree? After all, the United States—the richest country in the history of the world—can easily make this commitment to its people. However, recognizing a human right to water does not resolve the issue of privatization; indeed, it begs the question. The amount of water needed to supply basic human needs constitutes only a tiny fraction of the water used each day in the United States. Thirteen gallons per day multiplied by 295 million people in the United States totals roughly 3.8 billion gallons of water per day. That’s less than 1% of the 408 billion gallons per day used for all purposes in 2000.⁹³ The real issue confronting the United States is not whether to recognize a human right to water, it is how to allocate the remaining 99% that we use each day. So let’s recognize a human right to water and focus on how to distribute the rest of the water. The question becomes what is the appropriate role for water privatization with respect to the remaining 99%?

For privatization to be successful, governments must regulate water as a social good, ensuring access to all at a fair price. PUCs must carefully monitor the financial returns to the private company and link any rate increases to agreed-upon improvements in service, conservation programs, or environmental stewardship.⁹⁴ Moreover, government should retain ownership of the water resources. In the United States, there is no reason to surrender the ownership of a municipal water supply to a private corporation.⁹⁵

91. BARLOW & CLARK, *supra* note 63, at 239–40.

92. Peter H. Gleick, *The Human Right to Water*, 1 WATER POL’Y 487, 496 (1998).

93. HUTSON ET AL., *supra* note 4, at 1 (presenting estimates of freshwater and saline-water withdrawals for 2000).

94. For the standards of how privatization should proceed, see GLEICK ET AL., *supra* note 63, at 40–42 (outlining three basic standards and multiple substandards for privatization).

95. *See generally id.* (asserting that when governments enter into public-private partnerships to provide water services, governments should retain or establish public ownership or control of water sources in order to ensure that social concerns are adequately protected).

VII. Newcomers Versus Existing Users

In the United States, the poster child for what is wrong with the privatization movement is Nestlé Waters North America, a subsidiary of the Swiss-based food giant Nestlé. The company commands a 32% share of the American bottled water market and, in its quest to supply “spring” water to American consumers, controversies over its water use have erupted in Texas, Florida, Maine, Michigan, New Hampshire, Wisconsin, and California. A foreign multinational coming in and bottling millions of gallons of local spring water, only to transport it out of the basin, presents moral, ethical, environmental, and economic questions. I may have been the first to point the finger at Nestlé.⁹⁶ Nevertheless, what Nestlé is doing is no different than the actions of many other entrepreneurs.

For example, consider brewers of beer. Whether it is Budweiser, Miller, or Coors, American brewers use huge quantities of local water to brew beer and then ship the beer out of state. The question is whether it is preferable to allow the brewing of beer over the bottling of water. Millions of beer-drinking Americans think this is an easy choice. Nevertheless, both bottled water and bottled beer involve the export of large quantities of local water for human consumption.

There are indirect transfers of water out of basins as well. Consider a processing plant for Del Monte’s green beans or canned corn. Each can contains a little bit of water from the local area that is sent out of state. Or consider crops, such as tomatoes or cantaloupes, that consist almost entirely of water. To be sure, the farmer has input both labor and materials to seed, cultivate, and harvest the crops. But, like a bottled water operation, it is a transfer of water from in-basin to out-of-basin.

What distinguishes these situations? For me, it is the distinction between current users and future users. In times past, we allowed Coors to divert huge amounts of Rocky Mountain water, which created problems for downstream communities and the environment. Were we to take a fresh look at whether to permit Coors to open a new brewery, we might decide that the answer is no. But the plant is already in existence and in operation. That distinguishes Coors from a new, highly consumptive use of a public resource that may either interfere with the public water supply or cause undesired environmental harm. We must and should grandfather in existing users, if only for the political reasons noted above, but there is no reason to treat newcomers like Nestlé equally. Such new-entrant water entrepreneurs have no claim to water based on history, community, vested rights, or equity. They should be required to demonstrate that their proposals are consistent with the public interest and will not cause environmental harm.

96. See GLENNON, *supra* note 5, at 3–9 (describing Nestlé’s pumping of springs in approximately fifty locations to bottle and sell throughout the United States).

The law in some states distinguishes between current and new users. The seminal 1980 Arizona Groundwater Management Act⁹⁷ mandated two policies that are critical to the reallocation of water from one activity to another. First, it grandfathered in existing users and quantified their rights. Second, it made those rights transferable.⁹⁸ This paved the way for market transfers from existing to new uses. The State of Arizona coupled these changes with a program that requires developers to demonstrate that they have an “assured water supply,” which is defined as sufficient water for one hundred years, before they can sell homes or lots.⁹⁹ Think of my metaphor of the milkshake glass. Before a developer can drill a new groundwater well, the government should insist that the developer pinch someone else’s straw. That is, the developer must purchase and retire an existing water user’s right in exchange for permission to place a new demand on the aquifer.

VIII. Water Rights in the United States

Regardless of the normative arguments as to whether water *should* be privatized, the legal system in the United States recognizes private rights in water. In the American West, nineteenth-century judges developed the prior appropriation doctrine, which recognized rights to use water from rivers and streams.¹⁰⁰ As its name implies, the doctrine favored early diverters or appropriators over those who came later. This “first-in-time, first-in-right” principle divided surface water users into seniors and juniors, depending on the date when each person began to use the water. During times of shortage, the juniors were cut off while the seniors continued to receive their entire appropriation. Appropriators could divert limitless quantities of water so long as they used it for a beneficial purpose, most often for crop irrigation. The prior appropriation doctrine encouraged economic development by creating an incentive to divert water, but its environmental impact has been catastrophic—diversions have completely dried up many rivers. The doctrine left no room for competing values, such as the ecological, cultural, or spiritual importance of a free-flowing river to fish, animals, plants, and human beings.

Although appropriators had legal rights to divert surface water from western rivers, they did not own the water itself. Instead, their property right was one of use, otherwise known as a usufructory right. The water remained a public resource owned by the state, which allowed individuals to use the water subject to government rules and regulations. The prior appropriation doctrine created very valuable private rights to water. But Mother Nature is fickle. In the West, river flows fluctuate, depending on the amount of snow-

97. ARIZ. REV. STAT. ANN. §§ 45-563 to -569 (West 2003).

98. Glennon, *supra* note 54, at 91.

99. *Id.* at 90, 107.

100. GLENNON, *supra* note 5, at 15–16.

fall during the winter and the rate of runoff during the spring snowmelt. Water is usually plentiful during the spring, when the farmers do not need it, and scarce during the summer, when they need it most. This is where the federal government came in.

Congress passed the Reclamation Act in 1902, creating the U.S. Bureau of Reclamation (BOR) and authorizing it to build large-scale dams and irrigation projects.¹⁰¹ The BOR literally changed the face of the West, from Hoover Dam to Grand Coulee Dam and from California's Central Valley Project to Arizona's Central Arizona Project. By the time the frenzy of dam building came to an end in the 1960s, most of the great rivers in the American West had been transformed into quiet millponds—storage reservoirs that served the needs of western farmers. None of these projects would have been undertaken by the private sector because they made absolutely no economic sense.¹⁰² But the federal government was less interested in cost-benefit ratios than in encouraging the development of agricultural communities throughout the West. Thus it built immense subsidies into the reclamation program.

In theory, the federal government would merely encourage the establishment of small family farms in the West by fronting the construction costs for BOR projects, which beneficiaries would repay once they began to use the water. The reality was something altogether different, and the pay-back provisions never operated to recapture the construction costs. Despite the provision in the Reclamation Act that limited the size of individual farms to 160 acres, artifice and outright fraud enabled farmers to circumvent the maximum acreage restrictions and to amass agricultural empires of thousands of irrigated acres. Farmers' repayment obligations were based on their ability to pay, not on the actual costs of the project. Farmers' payments did not begin for 10 years, stretched out over 50 years, and were interest free. To make the projects even more alluring to prospective farmers and irrigation districts, the BOR wrote off a substantial percentage of its construction costs as nonreimbursable federal benefits, such as flood control.

In return for its huge investment in water infrastructure, the federal government could have insisted that it had rights to the water held in the reservoirs, but it did not.¹⁰³ Instead, water developed by the BOR was doled out by contract to farmers and irrigation districts. Thanks to these federal dams, farmers and irrigation districts have extraordinary rights to a year-round supply of water.¹⁰⁴ The Bush Administration recently decided to

101. See REISNER, *supra* note 23, at 2, 118 (discussing the passage of the Act).

102. *Id.* at 114–16 (describing the financial difficulties of the Reclamation program).

103. See Hayes, *supra* note 63, at 20 (“The feds could have demanded, for example, that federal agencies, acting on behalf of the taxpayers, obtain the benefits of new water supply opportunities provided by federal investments in major water projects.”).

104. See *id.* (noting that federal water infrastructure investments have “actually increased the value of ‘private’ water rights”).

renew more than 200 contracts involving the Central Valley Project in California,¹⁰⁵ the largest water-supply project in the country. By extending the contracts for 50 years and by committing a large volume of water to the project, the Administration has virtually guaranteed that Central Valley farmers will play a major role in California's water markets.¹⁰⁶

Farms, mines, and cities also have (largely unregulated) rights to groundwater, a situation that has caused horrible environmental problems.¹⁰⁷ Groundwater pumpers do not own the water; instead, they have a right to use groundwater subject to government rules and regulations. A few states, such as Arizona, have enacted progressive legislation to curb unsustainable groundwater withdrawals,¹⁰⁸ but reform does not come easily. Farms, mining companies, and cities have spent billions of dollars on wells. Entire communities and local economies have come to rely on groundwater. Turning the spigot off at this late date is not easy politically or legally. Legislators are reluctant to alienate powerful economic interests. Judges are loathe to disrupt the settled expectations of custom. Consequently, the groundwater table continues to drop.

In a handful of western states, the prior appropriation doctrine applies to groundwater.¹⁰⁹ These states curb excessive groundwater use by granting legal rights to the first pumpers as against later arrivals. This doctrine avoids many of the environmental problems associated with unrestricted pumping because it coordinates ground and surface water use and avoids the tragedy of the commons. Yet, it does so by creating stronger legal rights. Though the rights remain ones of use rather than of ownership, they are enforceable legal rights.

In short, if we are to reallocate water from existing, low-value uses to newer, higher value uses, we must recognize that water rights in the United States are already privatized. Water rights in the American West belong mostly to individual farmers or irrigation districts, not to federal, state, or local governments. As the population in the West mushrooms, local governments are scrambling in search of new water supplies. They face an uncomfortable reality: little water is available. Agricultural interests have a stranglehold on water in the West.

105. Bettina Boxall, *Water Pacts Give State's Growers New Profit Stream*, L.A. TIMES, Feb. 16, 2005, at A1.

106. *Id.*

107. See GLENNON, *supra* note 5, at 29–31 (describing a “chasm between science and law” relating to groundwater, which leads to inconsistent and less stringent requirements on its use).

108. See ARIZ. REV. STAT. ANN. §§ 45-401 to -704 (West 2003 & Supp. 2004) (providing a framework for the management and regulation of the withdrawal, transportation, use, conservation, and conveyance of rights for groundwater use in the state).

109. See Robert Glennon & Thomas Maddock, III, *The Concept of Capture: The Hydrology and Law of Stream/Aquifer Interactions*, 43 ROCKY MTN. MIN. L. INST. 22-1, 22-30 (1997) (listing Kansas, New Mexico, Nevada, North Dakota, Utah, Wyoming, and Idaho as states that include groundwater in the water right priority system).

Three points temper this ownership issue.¹¹⁰ First, most states have charged their water departments with the authority to consider the “public interest” when a new appropriator requests a right to make a diversion. In some states, this has helped protect the environment from the complete depletion of river flows. Second, the public trust doctrine which originally protected the public’s interest in accessing navigable waterways for commerce, navigation, and fishing, has been expanded to include environmental protection and recreational access.¹¹¹ Finally, federal environmental legislation, from the Endangered Species Act¹¹² to the Clean Water Act,¹¹³ has mandated changes in state water rights. A notable example was the furor over the Klamath Basin in 2001.¹¹⁴ When a severe drought hit in 2001, the Secretary of the Interior decided that the Endangered Species Act obligated her to provide sufficient water for salmon to migrate downstream. The farmers received less water.¹¹⁵ This action raised the Takings Clause issue, and the courts have reached different results. Most courts have decided that BOR contractors have no claim for Fifth Amendment takings compensation when they receive less water if it is necessary for other environmental needs. In one case, however, a court held that a taking had occurred. During a drought in the early 1990s, the California State Water Resources Control Board decided to reduce deliveries of water to irrigation districts in order to protect endangered species. Those districts sued, claiming that the *federal* government had taken their contractual water right by imposing restrictions under the Endangered Species Act. In a poorly-reasoned opinion, the U.S. Court of Federal Claims agreed, and subsequently awarded the districts \$26 million as compensation.¹¹⁶ In December 2004, the Bush Administration decided to settle the case for \$16.7 million rather than to appeal the court’s ruling.¹¹⁷

Some may object to the idea that farmers who receive highly subsidized water through BOR projects can then turn around and sell it at 10, 20, or

110. Hayes, *supra* note 63, at 21.

111. See, e.g., Nat’l Audubon Soc’y v. Superior Court, 658 P.2d 709, 729 (Cal. 1983) (holding that the public interest in protecting Mono Lake might override the private water interests of the city of Los Angeles, which had acquired rights to divert water from non-navigable tributaries to the lake).

112. 16 U.S.C. §§ 1531–1544 (2000).

113. 33 U.S.C. §§ 1251–1387 (2000).

114. Hayes, *supra* note 63, at 24.

115. *Id.* Cf. Klamath Water Users Protective Ass’n v. Patterson, 204 F.3d 1206 (9th Cir. 2000) (holding that the Bureau contractors were not third-party beneficiaries to the contract between the federal government and the Basin manager and therefore could not recover under that contract); Tulare Lake Basin Water Storage Dist. v. United States, 49 Fed. Cl. 313 (2001) (holding that the water use restrictions under the Endangered Species Act effected a physical taking of plaintiffs’ “identifiable interest in a stipulated volume of water”).

116. *Tulare*, 49 Fed. Cl. at 313.

117. Dean E. Murphy, *In Fish vs. Farmer Cases, the Fish Loses Its Edge*, N.Y. TIMES, Feb. 22, 2005, at A15.

even 50 times what they paid for it. They declare this windfall unjust. Perhaps. But what is the alternative? If existing water rights holders cannot reap a profit on their water rights, those holders will not sell. The situation is that simple. Given a choice between making a few farmers rich off BOR contracts or continuing the practice of using huge amounts of water to grow cotton, I think the choice is easy. Moreover, the farmers would be selling very valuable water rights—often several generations old—for use by cities and for the betterment of the environment. The measure of value ought not be what the farmers originally paid for the water or even what they currently pay. The measure should be the value of the water in the hands of others. By that measure, the farmers are giving up something incredibly valuable, what Barlow and Clarke call “blue gold.”¹¹⁸

Others may object that transferring water from farms to cities and suburbs encourages urban sprawl. Water marketing, some may argue, provides liquid nourishment to fuel growth. In situations where limited water supplies might constrain development, water marketing removes this obstacle. Developers replace the open spaces of pasture land, cotton fields, and rice paddies with red-tile-roof subdivisions, Circle Ks, Walgreens, and the occasional Wal-Mart or Home Depot. Preserving open spaces, including farmland, is a critical national priority. I’m no fan of mindless sprawl and surely no shill for developers. My problem with our existing water law is that we get both wasteful irrigation and mind-numbing sprawl. We have not made a choice between one or the other. We have supplied water to serve both. That is why it is critical that we require new development to purchase and retire existing water rights: it breaks the relentless cycle of overuse and moves us toward sustainable water use.

Addressing the problem of water scarcity will require action on a number of fronts. We must encourage the reuse of municipal effluent, explore the technological boundaries of water desalination, impose appropriate conservation requirements, and raise water rates. We must also recognize the reality of private rights in water and embrace water marketing as a critical tool to reallocate water use. In this process, the government must play a critical role in overseeing water transfers to protect the interests of third parties and the environment.

118. BLUE GOLD is the short title of Barlow and Clarke’s 2002 book about water. See BARLOW & CLARKE, *supra* note 63.