



Thematic Week: Water Economics and Financing

Thematic Axis: Water Markets

Title: The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Authors: Joseph W. Dellapenna

Professor of Law, Villanova University, School of Law, Villanova, United States of America

Abstract:

Global climate disruption will change precipitation patterns around the world, producing far reaching effects on innumerable aspects the lives of humans and other living things. The resulting challenge to water management institutions is also a challenge to water law regimes that create and regulate these institutions. These challenges are occurring in a world in which water management systems and water law regimes are already stressed by growing populations and growing per capita demand. The stresses will be addressed in a world dominated by the “Washington consensus”—the view that markets are the best way to manage resources and the economy, to allocate resources, and to distribute wealth within society. Insistence on markets as the primary tool for managing water is highly controversial. The controversy raises serious questions about the utility of the markets as a tool for addressing the growing global water crisis or for managing water generally. This paper considers whether markets can even work for water resources, drawing upon legal and economic theory, on the actual effects of the privatization of water utilities, and the consequences of treating water simply as a commodity.

Keywords: privatization; property rights; Washington consensus; water law; water management

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

I. INTRODUCTION

The emerging climate disruption will change precipitation patterns around the world (IPCC/TEAP 2007). The changes will have far reaching effects on innumerable aspects of the lives of humans and other living things (Gallopín & Rijsberman 2000; Wilcove 2008). The resulting challenges to water management institutions and to water law regimes occur in a world in which those systems are already under stress because of growing populations and growing per capita demand (Dellapenna 1997, 1999). The resulting stresses, moreover, arise in a world dominated by the “Washington consensus”—the view that markets are the best way to manage resources and the economy and should be used both to allocate resources and to distribute wealth within society (Stiglitz 2002). The resulting controversy raises serious questions about the utility of markets as a tool for addressing the growing global water crisis or for managing water generally. This paper considers whether markets can work for water resources, drawing upon legal and economic theory, on the actual effects of the privatization of water utilities, and the consequences of treating water simply as a commodity.

II. THE WASHINGTON CONSENSUS

Ronald Reagan’s presidency of the United States brought to power people committed to the neo-liberal theory of the primacy of markets as the mechanism of social organization and a willingness to pursue that philosophy aggressively. Some of these people treat markets with an unreasoning devotion comparable to religious faith, advocating markets as the solution to all problems of social organization and management (Nelson 2001). Yet the supposition that economic theory accurately represents how people think and decide, and therefore allows accurate prediction of how they will behave, has been disproved in numerous experiments (Jones 2001). Consider the story of Steven Lubet (Lubet 1996). Lubet, a professor of law and economics, reports his experience with the Bedouin who rent horses for traversing the canyon at Petra. Waiting to near the end of the day to leave the city in the confident assumption that when Bedouin began leading empty horses out of the canyon they would accept any price he might offer. He found that the Bedouin, unwilling to bargain earlier in the day when there were plenty of potential customers, were still unwilling to bargain when refusing meant no income at all from leading the horses out of the canyon. The standard explanation is that the Bedouin valued the psychic income of refusing to bargain more than the actual foregone income. Lubet noted that this expands the range of explanations for human behavior so widely that all you are saying is that people chose what they chose because they chose it. That, of course, is to say precisely nothing about why people make the choices they make. By such a broad reading, economics is stripped of all meaningful content and deprived of all predictive value.

The pro-market dogmas, however, became the “Washington consensus” embraced not only by the U.S. Treasury Department (and other branches of the U.S. government), but also by the World Bank group and the International Monetary Fund. While the latter two institutions are international organizations, they have always been dominated by the United States through voting weighted according to financial contributions—and the United States has always been by far the largest contributor (Krisch 2005). The Bank and the Fund are located directly across the street from each other in downtown Washington, DC, only a few blocks from the U.S. Treasury. From the 1980s onward, the three institutions have collaborated in proselytizing and in pressuring countries into adopting market systems, efforts that included intense pressure on countries in need of their assistance to privatize water utilities, to treat water as a commodity, and to rely on markets as the primary management tool for water resources (Dinar 2000; Teerink & Nakashima 1993).

The effort to rely on markets as the primary tool for responding to the growing water crisis has generated intense controversy (Naegele 2004; Rothfeder 2001). While I side with those who are critical of such efforts, I do not suggest that markets generally are a bad idea. My point is modest: markets need to be carefully considered before being adopted as a mechanism for social ordering

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

for a particular field of activity rather than reflexively instituted in the belief that markets always work best. To test this view, consider the Washington consensus in practice. The Washington consensus got its first big test with the collapse of Communism in Eastern Europe. With the advice of numerous American economists funded by the Washington institutions, the newly freed countries undertook a “shock treatment” to convert themselves in the shortest possible time from nearly totally planned economies to nearly totally free market systems (Frydman & Rapaczynski 1994). The results produced a great deal of corruption which produced fabulous wealth for a favored few, a great deal of impoverishment, especially for retirees on fixed incomes, and considerable social unrest (Amsden et al. 1993). There were real benefits to the move towards markets, despite the social costs, and given time most of the problems solved out or at least ameliorated (Yergin & Stanislaw 2002). Yet the economists promoting the shock treatment, whatever the problems and however deep the crisis, had only one response—let the market take its course (Gianviti 1997).

Markets are not always a satisfactory way to manage certain aspects of economic or social activity. This should hardly be surprising to anyone who actually examines the empirical evidence—something the economists of the Washington consensus seem unable to do. Ronald Coase, winner of the Nobel Prize in Economics and considered by many to be the guru of the primacy of markets, famously demonstrated that a private-property/market system is a most efficient mechanism for allocating resources for particular uses when it works and that the particular rules of law applied to disputes over resources will not affect how those resources are allocated to particular uses so long as markets work (Coase 1960). Coase, however, stressed that markets fail when there are significant barriers to their functioning, particularly transaction costs. No wonder Coase denied that he was a “Coasean.”

III. ARE MARKETS THE BEST MODEL FOR MANAGING WATER RESOURCES?

Many economists argue that markets are the best method for achieving environmental goals (Jaeger 2005; Olmstead & Keohane 2007). Markets have been particularly stressed for managing water resources. Systems of public allocation of water can result in significant inefficiencies and waste, particularly if there is no mechanism for shifting water from old uses to new ones. The problem is compounded by the tendency of major regulated industries to capture the regulators because of the need to rely on information provided by those industries and the rotation of high-level administrators between the public agency and the industries (Morgan & Chapman 1995). Market incentives, we are told, also lead people to actions that are desirable from a social perspective” (Heal, 2000). Can markets in fact solve these problems?

A. The Asserted Benefits of Markets for Water

Economists tend to argue that water can be managed more productively and more efficiently when treated as a tradable standardized commodity rather than as a product of engineering or an integral part of nature (Thobani 1996). According to this view, the most efficient use of water can be made only through private, for-profit markets, primarily because of the theoretical benefits of competition (Anderson & Snyder 1997; Lee 1999; Merritt 1997). The argument is that private markets, with individuals buying and selling water according to economic rules, rather than management by government regulators, can determine the true economic value of water, ensuring that water is allocated to its highest and best use. It is important to stress that the concern here is exchanges involving substantial amounts of water over wide distances and (often) widely differing uses, not mere temporary changes of limited quantities of water between neighboring users. Yet market transactions on this scale have been vanishingly rare, unlike small scale transfers between similar users in close proximity to each other (Dellapenna 2000).

For large, long-distance transactions, we are told, maximizing the economic efficiency of water allocation is the maximizing of the financial return gained from the allocation (Rosegrant & Gazmuri 1995). This identity arises because economists measure the value of water by society’s willingness to pay for the increment of production resulting from the additional allocation of water

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

(Dasgupta, Kristom, & Maler 1995). Yet some economists distinguish between the true “economic” value of goods and the “financial” value of goods. Proponents of this view recognize that there are important ecological, environmental, aesthetic and spiritual benefits, in addition to the benefit of human survival, that should be met outside the market for the good for society as a whole. The obvious difficulty is quantifying such social benefits outside the market pricing mechanism. Leaving aside for the moment such non-marketizable benefits, a number of potential benefits would seem to arise from private markets for water. Ownership of clearly defined water rights is said to provide security to water users and allows them to be more responsive than under the centralized allocation of water. Tradable water rights provide an inherent value or opportunity cost that creates built-in incentives to conserve water and to put it to the most productive use, allowing the movement of water to higher-value uses in a way that is cheaper and fairer than the alternatives. Such rights encourage investment and growth in activities that require assured supplies of large quantities of water and in water-saving technologies because the investors will benefit from the savings (Rosegrant & Binswanger 1994; Thobani 1996). Markets supposedly avoid the “tragedy of the commons” by assigning prices to scarce commodities, pressing for economizing on such scarce resources (Perelman 2003). Such a system also might provide an incentive for industry to locate to areas where water costs less—often rural areas with few employment opportunities.

Economists tell us there are several requirements for a well-functioning competitive water market to exist. There must be exclusive, secure, well-defined, non-attenuated, transferable and enforceable private property rights (Hart 2008; Winpenny 2003). There should be an absence of collusion or market power among buyers or sellers and an absence of unpaid-for benefits (positive externalities) and uncompensated costs (negative externalities). Finally, each transaction should operate in a competitive market under the motivation to maximize profits. Under such conditions, demand and supply forces will determine the quantities to be traded and the unit price for the commodity in this market, with water moving from low value uses to higher value uses. These conditions, it turns out, are nearly impossible to create for water.

B. Why Markets for Water Fail

It is notable that markets for water—particularly water in a natural water body (“raw water”)—are rare. As Terence Lee noted, “The idea of treating water as an economic good ... is so novel that using markets, rather than bureaucratic decision, for water allocation makes almost everyone responsible for water policy very nervous” (Lee 1999, p. 78). Water markets have seldom produced significant changes in the ways water is used; such markets as do exist involve relatively small amounts of water sold among similar users in close proximity to each other, often among shareholders in a mutual ditch company or the like (Howe & Goemans 2003; Zaman, Davidson, & Malano 2005). When there have been so-called markets intended to bring about major changes in the time, place, or manner of use, they functioned only through heavy-handed intervention of the state (Dellapenna 2000). The process in reality is not a market. So, if markets for raw water are so good, why are they so seldom used? Market advocates, however, seldom address such questions, preferring to denigrate their critics for holding cultural, religious, even mystical prejudices about water that prevent water from being treated as it should—just like any other commodity (Anderson & Snyder 1997, at 17-29, 114-15). But water is not like other resources.

Despite the theoretical advantages of water markets, even a “perfect” market has disadvantages, not the least of which is that their proper functioning requires transactions by a rational individuals, with perfect knowledge, deliberately choosing to maximize utility (Dellapenna 2007). One need think back no further than the high tech “dot.com” frenzy of the 1990s to doubt the rationality of some economic decisions (Perelman 2003). Rationality problems have become the focus of cognitive psychologists and by certain economists working in the fields of “behavioral economics” or “socioeconomics” (Jones & Goldsmith 2005; Kelman 2003; Korobkin & Ulen 2000). They show that irrationality is built into how people live and make decisions, irrationality that prevents the market models from working in the way that economists assume. Of course, an economist’s notion of irrationality often is just another person’s idea of taking into account different values than those favor by economists—values that are impossible to price on and

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

therefore impossible to appraise or manage through a market. These might well be the cultural, religious, even mystical prejudices about water that economists love to denigrate. In addition to rationality problems, the complexity of the modern economy means that decision-makers not only often lack perfect knowledge, they often have only rudimentary knowledge.

Effective water management must do more than provide economic efficiency; it must also provide efficient decision-making, clearly communicate its rules and regulations, and furnish prompt enforcement (Coase 1960). Nor will efficiency principles always coincide with equity and political considerations. Apart from these generic difficulties with markets (which are not so different from the generic difficulties with public management of water resources), the special problem of water that makes markets unsuitable is the inability of bilateral water transactions between sellers and buyers to reflect the effects of the transaction on third party, public, or environmental interests (Lund & Israel 1995). Furthermore, a system of tradable property rights impedes the development of effective river basin planning and environmental and ecological protection. Finally, there is the potential loss of the authority and control of the internal water resources of a nation or state to foreign buyers.

The core problem with markets—particularly the inability of markets to factor in adequately the external effects of market transactions—is transaction costs. Transaction costs can severely distort the economic efficiency of private water transactions, rendering theoretical market models that ignore transaction costs completely irrelevant (Dellapenna 2000). Nearly always a change in the time, location, or manner of use of water affects other water users. If the core idea that drives markets as useful tools for society is that a person's interests will only be affected if that person consents, then the effects of the proposed change on such third parties must be accounted for in determining whether the change in the ownership or use of a water right should take place (Dellapenna 2007). Transaction costs, in short, are the costs of determining the costs to third parties and then compensating them for those costs.

While it is easy enough for someone to own and manage water unilaterally in small amounts (for example, bottled water), withdrawing water on a large scale necessarily affects many others, making it difficult to contract for the consent of all significantly affected persons. But, unless the agreement of all affected parties is obtained, third parties may be effectively deprived of their right to use water without their consent and wealth is transferred from those who formerly used water to those who thereafter would use water. Typically those who lose out are small users without capital resources or alternative sources of supply of water. And this doesn't even begin to consider the impact on persons or ecosystems that do not have legally recognized rights to use water but that nonetheless enjoy the fruits of water's location or use. Thus allowing market transactions causes the transfer of wealth from the general public, particularly its poorer members, to the privileged few. The law usually protects against such externalities by the rule, found in nearly all legal systems, that one cannot alter the time, place, or manner of the use of water without the consent of other holders of water rights (Thobani 1996). Yet, if the rights of third parties and the public are protected, transaction costs with respect to all but the smallest water bodies quickly become prohibitive (Dellapenna 2000).

The reality of transaction costs should give even the most free-market oriented economist cause to consider whether true markets can function effectively for water resources (Dellapenna 2000, 2007). One of the best examples of the problem was a proposed water trade between the City of Denver and the Coors Beer Co. (Colorado Supreme Court 1972). Coors, then known for the high quality of the water used in its brewing, could not produce enough beer to satisfy demand for its product without finding more water. Denver, a fast growing city, also sought new sources of water. Denver and Coors agreed to exchange Coors' "clear mountain stream" for the right to use unlimited quantities of Denver sewage water in its brewery. The transaction failed not because of possible outrage by beer drinkers, but because farmers downstream from Denver (organized as the Fulton Irrigating Ditch Co.) obtained an injunction against the trade. The transaction would have deprived the farmers of the return flow on which they relied, even though, 30 years earlier, they had contractually recognized the seniority of Denver's rights over their own. Coors or Denver could have paid the farmers to surrender their right to block the deal, but that would have left

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

others, further downstream, free to challenge the transaction. The number of potential claimants was many thousands, at least, and some of them could become “holdouts”—persons who either were wholly unwilling to deal, or who were willing to deal only at prohibitive prices wholly out of line with the market values at stake. Denver and Coors abandoned the transaction. Coors went on to establish satellite breweries in other parts of the country because of its inability to obtain more water for its original brewery (Dellapenna 2000, 2007).

Advocates for water market sometimes insist that the protection of third-party rights represents an overly rigid legal regime. If only such requirements were removed, markets would flourish. This mischaracterizes the situation. Protection of third-party rights operate to prevent market-generated externalities from destroying the property rights of the third parties. Rather than representing government intervention that prevents or distorts markets, such protections are the minimum that is necessary to ensure that property rights—each person’s property rights—are transferred only through markets. Richard Posner has fully described why such third-party rights must be protected if society is to assure that water is used efficiently in a passage arguing for markets as the primary water management tool:

If the effects of return-flow were ignored, many water transfers would reduce overall value. Suppose A’s water right is worth \$100 to him and \$125 to X, [a] municipality; but whereas A returns one half of the water he diverted to the stream, where it is used by B, X will return only one fourth of the water it obtains from A, and at a point far below B, where it will be appropriated by D. And suppose B would not sell his right to A’s return flow for less than \$50, while D would sell his right to the municipality’s return flow for \$10. Given these facts, to let A sell his water right to X because it is worth more to X than to A would be inefficient, for the total value of the water in its new uses (X and D’s)—\$135—is less than in its old uses (A and B’s)—\$150. The law deals with this problem by requiring the parties to show that the transfer will not injure other users. In practice this means that A and X in our example, in order to complete their transaction, would have to compensate B for the loss of A’s return flow; they would not do so; and the transaction would fall through, as under our assumptions it should (Posner 2007, § 3.11).

Things get even more complex where the transfer increases return flows. Because of these complexities, transaction costs will prevent the functioning of markets so long as third party rights are recognized except on a small-scale without major changes in where or how water is used.

The law generally does not protect persons or natural entities that do not hold water rights, yet the effects on those persons and entities can be equally dramatic. For example, an irrigating farmer supports various businesses and industries that provide seed, farm equipment, and other daily or seasonal needs. Both a permanent and a seasonal labor market develop to support the farmer. When the farmer’s water withdrawal permit is transferred to another location or manner of use, an entire business community and the tax base of local governments are adversely affected (Mann & Mecon 2002). Even in a relatively humid area like Georgia (in the United States), values for agricultural land with a water withdrawal permit are almost double those for land without a permit (Demeo 2003). This would not be an issue if only a few farmers trade their water withdrawal permits, but as more farmers do so, the drain on the community mounts up. Should there be a limit? Who decides when the limit is reached? How should the law determine which farmer can trade and which cannot? These are serious problems that have a significant economic impact on individuals and local governments. These are problems that market mechanisms simply do not address, suggesting a need to consider social equity, as well the protection of other private rights, in any transaction in water rights.

Economists argue that such effects can be eliminated if the transfer is restricted to the consumptive use of the water withdrawn. This presupposes that one can readily determine what the consumptive use is. For municipalities and industries that return water to one or another water source through a “point source” outlet, precise measurements are possible. And for such activities, the percentage of the water withdrawn that is consumed often is very low—although the return flow often will be heavily polluted if it is not treated properly before its return. For agricultural and other uses that do not involve a point source discharge, determining the amount of return flow can be difficult or impossible. Absent proof of the amount of consumptive use, the transaction will be barred (Dellapenna 2000).

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Complicating the problem of transaction costs and public values is that the value of water often extends beyond its financial benefits. To many individuals and societies, water symbolizes security, opportunity, and self-determination (Draper 2005; Shiva 2002). In areas where water scarcity is normal, water is associated with life, power, and status (de Haan 1997). Certain water uses are associated with quality-of-life issues or have social or civic purposes that cannot be quantified in a market valuation. Thus minimum flow patterns established for environmental and ecological purposes, as well as the water needed to meet other public purposes, must be established by political processes and not through markets.

Finally, beginning with the Dublin Principles of 1992, there has been recognition that water management should be based on four guiding principles; economic, sociopolitical, gender, and economic issues (Dublin 1992). These principles have developed into a doctrine of integrated water resources management, the primary goal of which is to develop a comprehensive understanding of the available water resources and human and ecological water resource needs within a given basin, and then to manage those resources in an equitable and sustainable basis. Integrated water resources management stands on a foundation of four legs: economic efficiency and growth; social equity; environmental and ecological protection; and effective governance. Water management processes are required to integrate the assessment, management, protection, and use of all water resources within a basin to meet human needs on a sustainable basis while still protecting the integrity of the resource and its associated ecosystems. Tradable property rights to water prevent integrated water resources management because the market's focus is exclusively on economic efficiency, neglecting or negating the other three legs.

C. Supposed Real World Examples of Successful Markets

Market advocates often point to certain real world examples that they claim prove that markets work as predicted. Advocates of markets for water claim that Chile provides an example that shows how successful market institutions can be in reallocating water, leading to the conclusion that market institutions can provide flexibility, encourage conservation, and help to prevent negative economic consequences that stem from water scarcity (Mohanty & Gupta 2002; Rosegrant & Binswanger 1994). A World Bank study even concluded that the Chilean water law “successfully improved water delivery and use, stimulated investment, and reduced water conflicts,” increasing the value of water, reducing environmental and ecological damage, and benefiting poor farmers at the expense of “politically influential water users” (World Bank 1994).

Free-market trading of water rights has been the law in Chile for nearly thirty years. The Chilean water law of 1981 introduced a model of tradable water rights with two distinct features: legal security and increased capacity for water reallocation. Chilean law declares that water is public property, to which the state can grant private rights of use, yet water rights are also explicitly guaranteed as private property in the Chilean Constitution. Water rights are separated from land ownership and, according to the law, can be freely bought, sold, mortgaged, inherited, and transferred like any other property. Water right owners can freely change the types or methods of use without administrative approval from the government; the one exception is changing the location of diversions from a natural channel. Owners have no legal obligation to actually use their water rights and no penalties are assessed for lack of use. Since water rights are governed by private law rather than public law, conflicts between users are resolved by ordinary civil courts

Several researchers have concluded, however, that the Chilean system of tradable water rights does not confront the externalities, such as third party effects or environmental and ecological issues, caused by water rights transactions (Bauer 2004; Vergara 1997). Moreover, as Carl Bauer has shown, market advocates base their conclusions on the theoretical effects of water markets rather than from an examination of the actual functioning of the Chilean law. While Chile could provide a laboratory to analyze the strength and weaknesses of tradable property rights to water, there has, in fact, been little actual market activity in Chile despite the grand claims for that law (Bauer 2004). Almost no trades occurred in any river basin other than that of the Limarí, and even there, trades have largely stopped because of intense public opposition. In Bauer's view, the

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Chilean system seems “incapable of handling the complex problems of river basin management, water conflicts, and environmental protection” (Bauer 2004, at 86-89). This real world laboratory thus confirms suspicions that a system of tradable water rights is incapable of accomplishing the broader goals of society, goals such as economic justice for water users not party to the transaction, river basin management, social equity, environmental and ecological sustainability, and intergenerational justice, and might not accomplish much even in strictly economic terms. Considering the broader goals of society, water truly is a common good that requires governmental institutions to regulate its allocation.

Two other highly touted examples of supposed successful water marketing, both in California, are particularly illustrative of the exaggerations regarding supposed markets for raw water. These are the “California Water Bank” and the “sale” of water to San Diego by the Imperial Valley Irrigation District. Neither was a real market, yet both are set up as proof that markets work for water (Huffman 2004).

California created a water bank because of an intense drought between 1988 and 1992. The California Water Bank functioned as a pseudo-market for moving water out of agriculture in order to serve the desires of certain northern California cities (Gray 1994a; Israel & Lund 1995). California dispensed with the protection of third parties holding valid water rights for the water bank. This gave the state, as buyer or seller, an inestimable advantage over private buyers or sellers, yet the California Water Bank was a small operation by California standards, involving in its peak year (1992) some 400,000 acre-feet (489,400,000 m³) when the state’s shortfall alone exceeded 6 million acre-feet (7,401,000,000 m³). The California Water Bank, moreover, was the only legal buyer for the 350 persons who were willing to sell water rights, while it was the only legal seller for the 20 municipalities willing (and allowed) to buy water rights. The Bank’s prices were set administratively, not from bidding in a market. The Bank also selected the buyers and sellers by administrative fiat. This was not a market in any meaningful sense of the term, but rather it was government administration of water policy through economic incentives, with at least a veiled hint of its coercive power.

Nearly a decade later, another five-year drought at the turn of the millennium covering the entire southwest of the United States provoked the transfer Colorado River water from several large irrigation districts in southern California to nearby large cities (Dellapenna 2007b). The city of San Diego asked the Imperial Valley Irrigation District to sell 800,000 ac.-ft. (986,800,000 m³) of water—about 11 percent of its allocation from the Colorado River, but the District board voted 3-2 in December 2002 to reject the offer. The federal and state governments then put enormous pressure on the District; Secretary of the Interior Gail Norton even cut the District’s allocation of water from federal works on the Colorado River by 15 percent, indicating she would restore it only if it was sold under the terms of the rejected contract. The Irrigation District continued to resist the deal and sued Secretary Norton unsuccessfully. In the end, however, the District board surrendered and “accepted” the contract by another 3-2 vote.

The Imperial Valley sale, of course, was hardly a market transaction given the heavy government involvement in selecting the buyer and the seller, in setting the terms of the transaction, and in coercing “agreement.” This transaction did provide cash to the owners of the farms served by the district, but it provided nothing but unemployment for the farm workers on the land idled in order to free up water for the transfer to San Diego. The transaction also promised disaster to the ecosystems dependant on runoff from the farms. Even the landowners believed they were being short-changed, which is why the Irrigation District held out against consenting to the transaction. In contrast with the intense struggle with the Imperial Irrigation District over the “sale” of water to San Diego, the nearby Coachella Valley Irrigation District reached a quiet settlement to sell part of its water. This is hardly a better example of a market; with the Imperial Valley Irrigation District’s experience happening right in front of them, the vote of the Coachella District board hardly seems, in any real sense, voluntary.

Rather than touting such transactions as the California Water Bank or the Imperial Valley “sale” as examples of markets, they should be described as state administration hiding behind a facade of a market (Dellapenna 2007b; Gray 1994b). The state used economic incentives to

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

encourage private (and public) actors to comply with the state's policy choices while disregarding the effects of the state's actions on other private (or public) actors whose claims, if recognized, would have precluded accomplishment of the state's goals. While the transactions introduced flexibility to change water uses within the state, they transferred wealth from those who formerly used water—particularly those who lost their water rights without any compensation or who had no water right to lose but depended on the water nonetheless—to those who thereafter would use water (Gray 1994b). The California Water Bank transferred wealth from relatively small, poorer farmers to relatively wealthier middle class urban dwellers (Gomez & Loh 1996). Much the same happened in the Imperial Valley “sale,” even for the farmers who were paid. As for the farm workers who lost their jobs, not to mention the ecosystems deprived of water, again there was a transfer of wealth from the poor to the rich, or at least the better off (Robbins 2003). Flexibility, even through the dispossessing those who are already disadvantaged in society, might be a laudable goal in California at this time, yet considerable evidence suggests that for water, at least, equity is more important than efficiency (Godden 2005; Howe 1996). This, along with the inherent problems with markets for water, leads us to the alternative to markets—public management.

IV. PUBLIC MANAGEMENT AS AN ALTERNATIVE TO MARKETS

Although individuals and organizations have tried for years to quantify social, environmental, and other non-production costs and values (e.g., valuing social, religious or aesthetic needs and desires or valuing ecological sustainability and ecosystem services), our inability to fully understand and to fully quantify the total impacts of our economic decisions and our inability to assign generally accepted economic values to those actions severely limits our ability to evaluate and balance the overall costs and benefits of such actions in economic terms. Thus, ecosystem services are not priced in the market place, but they are real enough and inure to the benefit of all, including many who may not be participants in the withdrawal and use of water for a given economic activity (Draper 2005). Preserving the opportunities for future generations (intergenerational justice) is also an important goal, although future generations cannot participate in the market. Moreover, environmental issues affecting ecological sustainability often occur over long time horizons; for example, climate disruption issues have developed over a century or more. Species extinction, biodiversity loss, and the storage of nuclear waste involve similar time horizons, time horizons that are completely outside the normal range in economic decision making (Heal 2000).

The externalities and other difficulties demonstrate that there cannot be market for water without public oversight and intervention (Heal 2000). As a result, historically public water allocation has been the norm, in part because water has been considered a public asset, not a marketable commodity (Le Moigne et al. 1997). For effective water management, stakeholder involvement and public participation are essential (Gleick 1998; World Commission on Dams 2000). Water management restricted to private transactions between willing buyers and sellers precludes such a governance structure. Public management can promote equity objectives and enable decision-makers to deal with some of the unusual aspects of water resources, while the public sector, so long as the political will can be found, is able to fund large-scale water development that is too expensive for the private sector. Public management can also protect the poor and consider environmental and ecological needs. The case for public allocation is particularly strong in inter-sectoral allocation and reallocation because the state is often the only institution that includes all users of water resources, and has jurisdiction over all sectors of water use (Dinar, Rosegrant, & Meinzen-Dick 1997). The resulting public management, if done effectively, involves a multi-disciplinary endeavor, involving the natural and social sciences, engineering, politics, and law, as well as economics. The preference for public management does not preclude recourse to economic instruments as public managerial tools. One simply must not confuse these with markets. I begin this section with brief consideration of the two currently most popular arrangements for introducing economic arrangements into a public management system and then follow with a broader consideration of the role of economics in public management generally.

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

A. The Privatization of Public Utilities

Since the late nineteenth century, water delivery within municipalities generally has been a public service, usually provided through systems under public ownership or close public supervision. Today public bodies provide 90 percent of water utility services in the developing world. These bodies rely on public funding, often undercharging for their services; increasing public resistance to taxes means, however, that they find it increasingly difficult to make-up financial shortfalls (Rajaraman 2006). Beginning in the 1990s, municipalities across the planet turned to privatization to securing new capital in an era of tight public budgets (Brown & Holcombe 2004; Chenoweth 2004). Proponents of privatization, including the World Bank, argue that private operators would be more efficient and thereby would provide service even while reducing costs. The World Bank is so convinced of this proposition that between 1996 and 2002 it conditioned about one-third of its water-related loans on privatization of water utility services (Petrova 2006).

These efforts are more problematic than the champions of privatization predicted or acknowledge (Braadbaart 2005; Hukka & Katko 2003). Privatized water utilities do not perform better than publicly owned utilities (Estache & Rossi 2002). Prices often rise precipitously immediately after privatization, sparking public riots and other forms of resistance that block efforts at privatization in many parts of the world, most famously in Cochabamba, Bolivia in 2000 (Naegele 2004; Rothfeder 2001, pp. 99-114). The World Bank had pressured Bolivia into privatizing water services in Cochabamba, but the company that won the concession was forced to abandon it. In the United States, privatizers had their way for about a decade until a backlash set in against higher prices and worsening service. As a result, some parts of the United States now have laws and regulations to block the privatizing of public water services (Arnold 2005). Some communities have even bought back water utilities that were privatized a decade earlier because of the inability of the private utility to provide satisfactory service at a reasonable cost. Such utilities were privatized on “favorable terms” in order to attract a buyer, but when bought back command prices reflecting the full value of plant and equipment and the capitalized value of the business enterprise.

The most prominent example of a failed privatization in the United States is from Atlanta, Georgia. Atlanta privatized its municipal water and sewer service in 1998 in order to resolve a financial crisis. The system, under municipal ownership for 123 years, was serving approximately 1,500,000 people in the greater Atlanta area. It is the largest system to have been privatized in the United States and one of the largest in the world. There was little public opposition at the time. The sale was made to a French company, Suez Lyonaise (“Suez”)—one of the largest of several water service companies operating worldwide. (Technically, Suez partnered with an American company, but Suez bought out its partner within a year.) Atlanta officials were so pleased with the arrangement that they expected it to become a model for other municipalities across North America. The winning bidder faced trying to collect on as much as \$30,000,000 in unpaid water bills, the need to catch up on neglected maintenance, and an obligation to undertake major upgrades to the system (Hairston 1998). As a result, Suez immediately announced sewer rate increases and soon the costs of water delivery began to rise. The illusion of improved service at lower cost vanished (Hardie 1999). Less than five years after Atlanta privatized its water system, the city bought the system back in the hope of improving service and containing costs—at a considerable financial loss (Jehl 2003).

The problem is not simply that Atlanta had made a poor contract, something better negotiating could solve the next time. With an obligation to provide water even to those who cannot pay the full cost of the service and the huge capital demands in providing water service to large numbers of people, the overall rate of return on investment is not high enough to attract the capital necessary to provide improved service at lower cost to those who are expected to pay full price for their water services (Hukka & Katko 2003; Winpenny 2003). Moreover, privatization efforts do not create a market (except, perhaps, for the initial sale itself). The privatized utility operates as a monopoly, depriving the customers of the benefits of competition—the real strength of markets when they are able to function. The result is the entirely predictable efforts of the new owners to raise prices as

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

quickly as possible in order to achieve a rate of return comparable to that achievable in other opportunities for investment and possible to garner excess (monopoly) profits from the situation (Wodraska & von Haam 1998). The response to these risks is to impose regulations or taxes to prevent monopolistic excesses (Mohanty & Gupta 2002). This, of course, leads right back to the problem of inadequate returns preventing adequate private investment in the privatized system. None of these difficulties and setbacks stopped the effort to privatize water utilities (Winpenny 2003). Privatizers are also pressing for privatizing water quality management without much consideration of under what circumstances such privatizations might work to society's advantage (Jones et al. 2006; Windahl 2006).

B. Public-Private Partnerships

Given the resistance to the privatization of water utilities and the marketizing of water, some proponents of a larger private role in water management have turned to “public-private partnerships” as the next best alternative (Minow 2003). Public-private partnerships can take any number of forms, from simple procurement contracts to contracts for public assets to be managed by private operators to build-operate-transfer contracts and more. In fact, in one sense all publicly run utilities in a society with private markets are to some degree public-private partnerships in that at least some of the needs of the public utility will be met through contracting in the private marketplace (Sagers 2007). Here I refer to arrangements where the public entity involved agrees to a private entity taking on a major or the major aspects of the activity, reserving to the public entity largely an oversight or supervisory role.

The greater public involvement compared to simple privatization might make these partnerships work better, but there are no guarantees. In fact, some of the privatizations of public utilities were in the form of long-term leases or concessions rather than outright sales. This includes the Atlanta privatization—which technically was a lease for 20 years—that was at first seen as the model for privatization generally. These leases often led to the same outcome as an outright sale of the public utility. Moreover, often, some would say too often, these partnerships appear to harness public authority to the service of private interests rather than the other way around—as epitomized by numerous redevelopment programs designed to gentrify poor neighborhoods (Alexandre 2008; Mihaly 2007). There is, in short, no reason to think public-private partnerships will function any better than outright sales of water utilities because the partnership does not solve the fundamental problems that make it so difficult to attract sufficient private capital to enable better service at lower cost.

C. Is There a Role for Economic Incentives in Water Management?

To some extent, all this talk of privatization and markets reflects a simple demand to an end to the treatment of water as a free good. Pricing water, or other economic incentives, could force water users to evaluate the social consequences of their conduct more realistically (Damania 1996; Dinar & Subramanian 1997). To go further, to deny that water is a public good, however, is simply wrong. Consider that even the strongest advocates of free-market economics use water metaphors to describe the few public goods that they will recognize: “common pool resource,” “spill over effects,” etc. Yet advocates of markets for water hardly mention the public nature of water and barely consider the transaction costs inherent in any attempt to treat water as a private good. Recourse to economic incentives should not obscure the fact that water remains the prime example of a public good for which prices cannot be set realistically in a market. While some economists do acknowledge that the inherently public nature of water precludes true markets, they often end up advocating “transferable allocation permits” as the best method for allocating water to particular uses (Rosegrant & Binswanger 1994; Rosegrant & Gazmuri 1995; van Egteren & Weber 1996). Such economists seem unable, however, to explain how such tradable permits would differ from markets.

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Economic incentives are useful as a management tool (Seroa da Motta et al. 2005; Wichelns 2006). The question is how to structure economic incentives so as to ensure a reasonable modicum of efficient use coupled with adequate protection of public values. Economic incentives can take any number of forms, from taxes, to “water banks,” to assigning operation and maintenance to farmer organizations or water districts, to user charges, to volumetric or quasi-volumetric pricing. A system of economic incentives depends on the premise that economists, or bureaucrats, will do a better job of setting the price than the market will (Freeman 2002). That might be true when, as with water resources, true markets are not possible. Yet the economists (and bureaucrats) are almost certain to get the price wrong—as long as the “right” price is defined anyway other than the price set by economists (Oates 1996). The problem is that inappropriately low prices stimulate greater water use, perpetuate inefficient use, and result in increased water scarcity, while inappropriately high prices impede economic activity (Anderson & Snyder 1997; Dinar, Rosegrant, & Meinzen-Dick 1997; Dinar & Subramanian 1997; Merritt 1997). Thus economic incentives to provide conservation incentives where possible is a necessary step in attaining sustainability or other social goals, but they are not sufficient by themselves (Heal 2000).

V. CONCLUDING REMARKS

The paradigm of property remains the ownership of land. Land can be marked off and considered for most purposes as the exclusive domain of a particular owner with, despite certain restrictions on the rights of landowners, limited regard for the effects of the owner’s conduct on other persons or property. Land, for the most part, stays put within its boundaries. Flowing water, an ambulatory resource, simply does not fit very easily into such a paradigm. Concepts of property in water can be broadly divided into three types: common property, private property, and public property (Rose 1994). The three types each correspond closely to the three real world models of water law found today in the United States (Dellapenna 2000). Riparian rights is a near perfect embodiment of the model of common property—each riparian owner decides for herself when, where, how, and how much water to use and outside decision makers become involved only if two riparian owners directly interfere with each other. Appropriative rights are as close as one finds to a private property model to water rights. The right to use water is defined as to the timing, location, purpose, and amount of use, as well as according to a strictly enforced temporal priority ranking (“first in time, first in right”). And increasingly states in the United States are turning to regulated riparianism, an application of a public property model to the right to use water. The right to use water depends upon a time-limited permit allowing the state collectively to determine, and periodically to re-determine, the socially best use of the water.

The correspondence between the forms of American water allocation law and the several basic models of property rights is important because the correspondence enables us to predict with some certainty whether existing forms are adaptable to changing circumstances, or whether an entirely new form must be substituted when circumstances of water demand or supply change dramatically. Treating water as common property leads into the tragedy of the commons as soon as water becomes a scarce commodity in a particular region, and thus state after state in the eastern United States has abandoned traditional riparian rights (the common property model) in favor of regulated riparianism (the public property model)—and not, as economists and others predict, in favor of a private property model (Dellapenna 2000). There are reasons, some highly specific to the situation of the eastern states in the second-half of the twentieth century, why the eastern states did not adopt a private property model. At bottom, however, the problem is that markets have simply failed to emerge even under appropriate rights—the private property model—for the reasons discussed above. Because of the utter failure of true markets states have been left to use the admittedly imperfect public property model as the best available.

The attempt to commodify water generates the inequities that follow from markets without, however, bestowing the benefits that markets, when functioning at their best, can provide—the benefits of rational management and efficient use that to some extent justify the inequities generated by the use of markets. Indeed, the utter unsuitability of markets for managing raw

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

water—water in bulk in its natural sources—raises questions of why anyone, including economists, would insist on treating water solely or even primarily as a market commodity. Blind faith seems a better explanation than the rational application of well-founded economic theory to yet another natural resource. True markets must remain marginal to the management of large quantities of raw water for numerous diverse users, and economic incentives must be seen as supplemental to public management. This is not to deny that economics is relevant, merely that it is not the only relevant mode of analysis. Today, resistance to markets for raw water is stiffening and has achieved some real successes, both nationally and internationally. Rather than viewing this as a failure of policy makers to enact the necessary market reforms, efforts to reform water law need to consider alternatives to markets—alternatives that should include economic incentives, even if not markets—as means for adapting to the global climate disruption. It is time to put the Washington consensus into the past and to move forward without such crippling preconceptions—not to eliminate the market under all circumstances as a possible choice (remember bottled water), but to recognize it as an option, and an option that is not very good for raw water.

Bibliography

Alexandre, M., 2008. 'Love don't live here anymore': Economic incentives for a more equitable model of urban redevelopment, *Boston College Environmental Affairs Law Review*, 35, pp: 1-43.

Amsden A.; Kochanowicz, J.; and Taylor, L., 1993. *The market meets its match: Restructuring the economies of eastern Europe*, 250 pp.

Anderson, T.L.; and Snyder, P., 1997. *Water markets: Priming the invisible pump*, 228 pp.

Arnold, C.A., 2005. Privatization of public water services: The states' role in ensuring public accountability, *Peppardine Law Review*, 32, pp: 561-604.

Bauer, C.J., 2004. *Siren song: Chilean water law as a model for international reform*, 173 pp.

Braadbaart, O., 2005. Privatizing water and wastewater in developing countries: Assessing the 1990's experiments, *Water Policy* 7, pp. 329-344.

Brown, C.; and Holcombe, A., 2004. Pursuit of the millennium development goals in water and sanitation, *Water Policy*, 6, pp. 263-266.

Chenoweth, J., 2004. Changing ownership structures in the water supply and sanitation sector, *Water International*, 29, pp. 138-147.

Colorado Supreme Court, 1972. *City and county of Denver versus Fulton Irrigating Ditch Company*, *Pacific Reporter*, 506, pp. 144-153.

Coase, R.H., 1960. The problem of social cost, *Journal of Law & Economics*, 3, pp. 1-44.

Damania, O., 1996. Pollution taxes and pollution abatement in an oligopoly supergame, *Journal of Environmental Economics and Management*, 30, pp. 323-336.

Dasgupta, P., Bengt Kristrom, and Karl Goran Maler, (1995) "Current issues in resource accounting," in Johansson, P.-O.; Kristrom, B; and Maler, K.-G. (eds.), *Current issues in environmental economics*, pp. 117-152

de Haan, E.J., 1997. Balancing free trade in water and the protection of water resources in GATT, in Brans, E.H.P., de Haan, E.J., Nollkaemper, A., and Rinzema, J. (eds.), *The Scarcity of water: Emerging legal and policy responses*, pp. 245-259

Dellapenna, J.W., 1997. Population and water in the Middle East: The challenge and opportunity for law, *International Journal of the Environment and Pollution*, 7, pp. 72-110.

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Dellapenna, J.W., 1999, Adapting the law of water management to global climate change and other hydro-political stresses, *Journal of the American Water Resources Association* 35, pp. 1301-26.

Dellapenna, J.W., 2000. The importance of getting names right: The myth of markets for water, *William and Mary Environmental Law and Policy Review* 25, pp. 317-377.

Dellapenna, J.W., 2007a. Transboundary water sharing and the need for public management, *Journal of Water Resources Planning and Management*, 133, pp. 397-404.

Dellapenna, J.W., 2007b. Introduction, in Amy K. Kelly (ed.), *Waters and Water Rights*, ch. 6.

Dinar, A. (ed.), 2000. *The political economy of water pricing reforms*, 405 pp.

Dinar, A.; Rosegrant, M.W.; and Meinzen-Dick, R., 1997. *Water allocation mechanisms: principles and examples*, (World Bank Policy Research Paper No. 1779), 41 pp.

Dinar, A.; and Subramanian, A. (eds.), 1997. *Water pricing experiences: An international perspective* (World Bank Policy Paper no. 386),

Draper, S.E., 2005. The unintended consequences of tradable property rights to water, *Natural Resources and Environment*, 20, no. 1, pp. 49-55.

Dublin International Conference on Water and the Environment, 1992. *Dublin statement on water and sustainable development*. Available: <http://www.gdrc.org/uem/water/dublin-statement.html>.

Estache, A.; and Rossi, M.A., 2002. How different is the efficiency of public and private water companies in Asia? (World Bank Policy Research Paper 2152), 31 pp.

Freeman, A.M. III, 2002. *The measurement of environmental and resource values: Theory and methods* (2nd ed.), 491 pp.

Frydman, R.; and Rapaczynski, A., 1994. Privatization in Eastern Europe: Is the state withering away?, 221 pp.

Gallopin, G.; and Rijsberman, F., 2000. Three global water scenarios, *International Journal of Water* 1, pp. 16-40.

Gianviti, F., 1997. The IMF and the liberalization of capital markets, *Houston Journal of International Law* 19, pp. 773-783.

Gleick, P.H., 1998. Water in crisis: Paths to sustainable water use, *Ecological Applications*, 8, pp. 571-579.

Godden, L., 2005. Water law reform in Australia and South Africa: Sustainability, efficiency, and social justice, *Journal of Environmental Law* 17, pp. 181-205.

Gomez, S.; and Loh, P., 1996. Communities and water markets: A review of the Model Water Transfer Act, *Hastings West-Northwest Journal of Environmental Law and Policy* 4, 63-73.

Gray, B., 1994a. The market and the community: Lessons from California's drought water bank, *Hastings West-Northwest Journal of Environmental Law and Policy* 1, 17-47.

Gray, B., 1994b. The modern era in California water law, *Hastings Law Journal*, 45, pp. 249-308.

Hairston, J.B., 1998. Water privatization: Winning builder will face, debt, backlog, major upgrade, *Atlanta Journal-Constitution*, August 23, p. D1.

Hardie, A., 1999. City, firm up to their necks in complaints: Spotlight on a flood of excuses: Getting a problem with your water service solved has proven as difficult as figuring out who is to blame, *Atlanta Journal-Constitution*, Sept. 6, p. B1.

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Hart, K.J., (2008). The Mojave Desert as grounds for change: Clarifying property rights in California's groundwater to make extraction sustainable statewide, *Hastings West-Northwest Journal of Environmental Law and Policy* 14:1213-1239.

Heal, Geoffrey. (2000). *Nature and the marketplace: Capturing the value of ecosystem services*, 203 pp.

Howe, C.W., 1996. Water resource planning in a federation of states: Equity versus efficiency, *Natural Resources Journal*, 36, pp. 29-36.

Howe, C.W.; and Goemans, C., 2003. Water transfers and their impacts: Lessons from three Colorado water markets, *Journal of the American Water Resources Association* 39, pp. 1055-1065.

Huffman, J.L., 2004. Water marketing in western prior appropriation states: A model for the East, *Georgia State University Law Review*, 21, pp. 429-448.

Hukka, J.J.; and Katko, T.S., 2003. *Water Privatisation Revisited: Panacea or Pancake?*, 159 pp.

IPCC/TEAP Special Report, 2007. Working Group II, Fourth Assessment Report: Impacts, Adaptation, and Vulnerability. Available: <http://ipcc-wg1.ucar.edu/wg1/wg2-report.htm>

Israel, M.; and Lund, J.R., 1995. Recent California water transfers: Implications for water management, *Natural Resources Journal*, 35, pp. 1-32.

Jaeger, W.K., 2005. *Environmental Economics for Tree Huggers or Other Skeptics*, 281 pp.

Jehl, D., 2003. As cities move to privatize water, Atlanta steps back, *New York Times*, Feb. 10, p. A14.

Jones, C.; et al., 2006. *Water Quality Trading: A Guide for the Wastewater Community*, 329 pp.

Jones, O.D., 2001. The evolution of irrationality, *Jurimetrics Journal*, 41, pp. 289-318.

Jones, O.D.; and Goldsmith, T.H., 2005. Law and Behavioral Biology, *Columbia Law Review*, 105, pp. 405-502.

Kelman, M. 2003. Law and behavioral science: Conceptual overviews, *Northwestern University Law Review*, 97, pp. 1347-1392.

Keohane, N.O.; and Olmstead, S.M., 2007. *Markets and the Environment*, 274 pp.

Korobkin R.B.; and Ulen, T.S., 2000. Law and behavioral science: Removing the rationality assumption from law and economics, *California Law Review*, 88, pp. 1051-1144.

Krisch, N., 2005. International Law in Times of Hegemony: Unequal Power and the Shaping of the International Legal Order, *European Journal of International Law*, 16, pp. 369-408.

Lee, T.R., 1999. *Water Management for the 21st Century: The Allocation Imperative*, 206 pp.

Le Moigne, G.; Dinar, A.; and Sandra Giltner, 1997. Principles and examples for the allocation of scarce resources among economic sectors, (*Options Méditerranéennes Séries A.*, no 31). Available: <http://ressources.ciheam.org/om/pdf/a31/CI971533.pdf>.

Lubet, S., 1996. Notes on the Bedouin horse trade or why won't the market clear, daddy?, *Texas Law Review*, 74, pp. 1039-1057.

Lund, J.R.; and Israel, M., 1995. Water transfers in water resource systems, *Journal of Water Resources Planning and Management*, 121, pp. 193-205

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Mann, R.; and Mecon, R., 2002. Economic effects of land idling for temporary water transfers, (Report, California Department of Water Resources). Available: http://www.watertransfers.water.ca.gov/docs/econ_effects.pdf.

Merritt, S., 1997. Introduction to the Economics of Water Resources: An International Perspective, 211 pp.

Mihaly, M.B., 2007. Living in the past: The Kelo case and public-private redevelopment, *Ecology Law Quarterly*, 34, pp. 1-60.

Minow, M., 2003. Public and private partnerships: Accounting for the new religion, *Harvard Law Review*, 116, pp. 1229-1270.

Mohanty, N.; and Gupta, S., (2002). Breaking the gridlock in water reforms through water markets: International experience and implementation issues for India. Available: http://www.libertyindia.org/policy_reports/water_markets_2002.pdf.

Morgan, S.P.; and Chapman, J.I., 1995. Special district privatization: A report prepared for the Association of California Water Agencies. Available: <http://www.acwa.com/mediazone/research/privat.asp>.

Naegele, J., 2004. What is wrong with full-fledged water privatization?, *Journal of Law & Social Challenges*, 6, pp. 99-130.

Nelson, R.H., 2001. Economics as Religion: From Samuelson to Chicago and Beyond, 378 pp.

Oates, W.E., 1996. *The Economics of Environmental Regulation*, 452 pp.

Perelman, M., 2003. *The Perverse Economy: The Impact of Markets on People and the Environment*, 217 pp.

Petrova, V., 2006. Note: At the frontiers of the rush for blue gold: Water privatization and the human right to water, *Brooklyn Journal of International Law*, 31, pp. 577-613.

Posner, R., 2007. *Economic Analysis of Law* (7th ed.), 787 pp.

Rajaraman, I., 2006. Perspective on irrigation water pricing: A case study of Karnataka, India, *Water Policy*, 8, pp. 171-181.

Robbins, E., 2003. Winning the water wars: In the west, they say that water flows uphill to money, *Planning*, 69, no. 6, pp. 69.

Rose, C.M., 1994. Property and Persuasion: Essays on the History, Theory, and Rhetoric of Ownership, 317 pp.

Rosegrant, M.W.; and Binswanger, H.P., 1994. Markets in tradable water rights: Potential for efficiency gains in developing-country water resource allocation. *World Development* 22, pp. 1613-1625.

Rosegrant, M.W.; and Gazmuri, R.S., 1995. Reforming water allocation policy through markets in tradable water rights: Lessons from Chile, Mexico, and California, *Cuadernos de Economía*, 32, pp. 291-316.

Rothfeder, J., 2001. Every Drop for Sale: Our Desperate Battle over Water in a World about to Run Out, 205 pp.

Seroa da Motta, R., et al., 2005. Economic Instruments for Water Management: The Cases of France, Mexico and Brazil, 151 pp.

Sagers, C., 2007. The Myth of 'Privatization,' *Administrative Law Review*, 59 pp. 37-78.

Shiva, V., 2002. *Water Wars: Privatization, Pollution and Profit*, 156 pp.

The myth of markets for water: privatization, commodification, and the Washington consensus applied to water

Stiglitz, J.E., 2002. *Globalization and Its Discontents*, 282 pp.

Teerink, J.; and Nakashima, M., 1993. *Water Allocation, Rights, and Pricing: Examples from Japan and the United States* (World Bank Policy Paper No. 198), 68 pp.

Thobani, Mateen. (1996). *Tradable Water Rights: A Private Property Approach to Resolving Water Shortages and Promoting Investment* (World Bank, FDP Note No, 34), 23 pp.

van Egteren, H.; and Weber, M., 1996. *Marketable Permits, Market Power, and Cheating*, *Journal of Environmental Economics and Management*, 30, pp. 161-173.

Vergara, A., 1997. *Perfeccionamiento legal del mercado de derechos de aprovechamiento de aguas*, in *Convencion nacional de usuarios del agua*, 17-18 October, 1997, Arica Chile, Santiago, Confederacion de Canalistas de Chile, pp. 83-96.

Wichelns, D., 2006. *Economic incentives encourage farmers to improve water management in California*, *Water Policy*, 8, pp. 269-285.

Windahl, C., 2006. *Suppliers in the privatised UK wastewater market and their possible moves towards integrated solutions*, *Water Policy*, 8, pp. 559-572.

Winpenny, J., 2003. *World panel on financing water infrastructure: Financing water for all*. Available: www.gwpforum.org/gwp/library/ExecSum030703.pdf

Wilcove, D., 2008. *No Way Home: The Decline of the World's Great Animal Migrations*, 245 pp.

Wodraska, J.R.; and von Haam, P.E., 1998. *Developments in California water management*. Available: http://www.ucowr.siu.edu/updates/pdf/V111_A13.pdf.

World Bank, 1994. *Peru: A User-Based Approach to Water management and Irrigation Development*, World Bank Report No. 13642-PE. Available: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1995/04/11/000009265_3961214160422/Rendered/PDF/multi_page.pdf.

World Commission on Dams, 2000. *Dams and Development: A New Framework for Decision-Making*, 404 pp. Available: <http://www.dams.org/report/>.

Yergin, D.; and Stanislaw, J. 2002. *The Commanding Heights: The Battle for the World Economy*, 488 pp.

Zaman, A.S.; Davidson, B.; and Malano, H.M. *Temporary Water Trading Trends in Northern Victoria, Australia*, *Water Policy*, 7, pp. 429-442.