Neoliberalizing Nature? Market Environmentalism in Water Supply in England and Wales

Karen Bakker

Department of Geography, University of British Columbia

The 1989 privatization of the water supply sector in England and Wales is a much-cited model of market environmentalism—the introduction of market institutions to natural resource management as a means of reconciling goals of efficiency and environmental conservation. Yet, more than a decade after privatization, the application of market mechanisms to water supply management is much more limited than had been expected. Drawing on recent geographical research on commodities, this article analyzes the reasons for this retrenchment of the market environmentalist project. I make three related claims: resource commodification is a contested, partial, and transient process; commodification is distinct from privatization; and fresh water is a particularly uncooperative commodity. To illustrate these claims, I explore how water's geography underpinned the failure of commodification initiatives in England and Wales. I focus specifically on contradictions faced by industry regulators, water companies, and the government when attempting to implement direct competition, universal metering, and full-cost pricing of water supply. The failure to resolve these contradictions was a critical driver in the reregulation of the water supply industry and in the overall trend toward improvement in environmental and drinking water quality, a finding that underpins my closing argument—that neoliberalization is implicated in processes of reregulation that rescript the entitlements of both humans and nonhumans, with outcomes that are not necessarily negative for what we conventionally delimit as the environment. *Key Words: water, neoliberal, nature, market, regulation, England and Wales.*

Water supply management has undergone a dramatic transformation in England and Wales over the past three decades.[1] With the privatization of the industry in 1989, ownership passed from nationalized monopolies to private companies listed on the London stock exchange. Market-based regulation has displaced direct government management of supply systems. Demand management is prioritized over dam building. Engineering expertise has been supplemented by that of economists and environmental scientists. Water is no longer perceived to be universally abundant; areas of water scarcity have been enshrined in legislation. Efficiency and cost-reflectiveness are prioritized over social equity in water pricing; national cross-subsides have disappeared, and regional cross-subsidies have dwindled. Environmental and drinking water quality have improved; according to the environmental regulator of the industry, river water quality in Britain is at its highest level since the Industrial Revolution (DEFRA 2001b; EA 2001; DWI 2003).

The transformation of the English and Welsh water supply industry is an example of the neoliberalization of nature, a subject that has received growing attention within geography (Bridge 2004; Mansfield 2004a; McCarthy 2004; McCarthy and Prudham 2004; Prudham 2004). Much of this research has been sparked by concern over the consequences of the increasing involvement of private sector actors, displacement of public policy by market mechanisms, uptake of environmental valuation methodologies, and commercialization and privatization of resource management institutions. Of specific interest have been the impacts of neoliberalism on a panoply of nonhuman natures: fisheries, water, minerals, wetlands, and genes, to name just a few (Bakker 2000; Gibbs and Jonas 2000; L. Walker, Cocklin, and Le Heron 2000; Bakker 2001; Bridge and Jonas 2002; Bridge, McManus, and Marsden 2003; Johnston 2003; McAfee 2003; Bridge 2004; Maddock 2004; Mansfield 2004a, b; Robertson 2004; Smith 2004).

Commodities have similarly experienced a surge of attention in geography. Recent work on commodities has emphasized the sociocultural dimensions of commodities as vectors of social relations and cultural identities and as a means of interrogating practices of production, consumption, and material culture (see, e.g., Jackson 1999; Bridge 2000, 2001, 2004; Castree 2001; Bridge and Smith 2003). Commodity chain analysis has emphasized articulations between analyses of consumption and production as a means of documenting and politicizing the social relations of production (Hartwick 1998, 2000; Hughes and Reimer 2004). These "intimate

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encounters" between concepts of culture, economy, and commodities have focused on the spatiality of commodities and the materiality of culture in ways that thoughtfully interrogate processes of commodification and decommodification (Sayer 2003).

Drawing on these two bodies of research, the purpose of this article is to retheorize commodification as a distinct dimension of the neoliberalization of nature and to explore the geographical bases of contradictions that arise when attempting to commodify water supply. I develop the argument in four sections. In the second section of the article, I revisit contemporary debates over the political economy of the environment, arguing that privatization and commodification are distinct and not necessarily concomitant processes, and that disaggregating these two processes and conceptualizing the commodification of nature as a partial, transient process enables a better understanding of the implementation of neoliberal projects. In the third section, I develop my argument through documenting the implementation of a specific variant of neoliberalization—market environmentalism—in water supply management in England and Wales. A central claim of my argument, in contrast to much writing on neoliberal nature, is that private ownership and the introduction of markets do not necessarily entail commodification. I document this claim by examining how and why the privatization of the water supply industry in England and Wales did not result in the full commodification of water. Indeed, I argue that the reregulation of the privatized water supply industry can be explained, in part, as a response to the failure to fully commodify water.

In order to explore why the water has proved to be such an uncooperative commodity, I focus in the fourth and fifth sections on two key elements of the commodification process: respectively, competition and pricing. Here, I explore how water's geography—specifically its spatiality and biophysical characteristics—underlies the contradictions faced by the architects of market environmentalism. As I argue in the sixth, concluding, section of the paper, the failure to resolve the contradictions presented by water's geography posed significant, irresolvable challenges to the neoliberal project—and was a critical driver in the reregulation of the water supply industry. This reregulation is part of the explanation for the improvement in environmental and drinking water quality following privatization. This observation underpins a call, at the close of the article, for a more fine-grained approach to neoliberalization, one that acknowledges that neoliberalization is implicated in processes of reregulation that rescript the entitlements of both humans and nonhumans with outcomes that are not necessarily negative for what we conventionally delimit as the environment.

Commodifying Socionature

From State to Market: Privatization, Commercialization, Commodification

The arguments of the proponents of neoliberal resource management are perhaps best captured by the term "market environmentalism": a mode of resource regulation that promises both economic and environmental ends via market means (Anderson and Leal 2001). As a variant of ecological modernization, market environmentalism offers hope of a virtuous fusion of economic growth, efficiency, and environmental conservation (Hajer 1995; Christoff 1996; Mol 1996; Hawken, Lovins, and Lovins 1999). Through establishing private property rights, employing markets as allocation mechanisms, and incorporating environmental externalities through pricing, proponents of market environmentalism assert that environmental goods will be more efficiently allocated if treated as economic goods, thereby simultaneously addressing concerns over environmental degradation and inefficient use of resources. Markets will be deployed as the solution rather than being the cause of environmental problems.

Some political economists have framed market environmentalism as a form of "green imperialism," whereby specific instances of environmental degradation (an inevitable if unintended by-product of capital accumulation) are mobilized as opportunities for continued profit (O'Connor 1996; Pratt and Montgomery 1997; Hudson 2001). Others focus on the political economic dimensions of privatization; Harvey, for example, characterizes privatization of water supply as one example of "accumulation by dispossession"—the enclosure of public assets by private interests for profit, resulting in greater social inequity (Harvey 2003). Other political economic approaches have focused on the dynamics of resource regulation, seeking to articulate specific neoliberal projects with analysis of generalized transformations in modes of political economic governance (Gandy 1997; Henderson 1999; Bakker 2000; Bridge 2000; Prudham 2003; Mansfield 2004b). Drawing on Foucauldian governmentality theory, attention has also been paid to neoliberalism as a project of environmental governance (Darier 1999; Luke 1999; McCarthy 2004; McCarthy and Prudham 2004). From this perspective, neoliberalism is understood to be more than merely a political economic project with impacts on the environment; rather, neoliberalism is conceptualized as being consti-

tuted by (and of) processes of socioenvironmental change (see, e.g., the recent special issue of *Geoforum* on neoliberal nature).

Concepts of privatization, commercialization, marketization, and commodification figure centrally in much of this work. Yet, as Noel Castree observes in his review of recent work on the commodification of nature, these concepts are often conflated (Castree 2003). Privatization is often assumed to entail commercialization and commodification, to the extent that the terms are, at times, used interchangeably. Moreover, much of this work is, if only implicitly, normative. Commodification, markets, and private sector actors are understood to be pernicious; often, albeit with some notable exceptions (see, e.g., Angel 2000), the impacts of neoliberalism upon the environment are assumed to be largely negative. As Castree observes, analytical imprecision and the failure to make explicit the normative bases of our arguments have significant consequences—occluding processes of commodification in some instances and undermining the progressive potential of critical scholarship in others. This difficulty is compounded by an analytical focus on neoliberalism as a hegemonic, singular project, which encourages excessively generalist categorizations of neoliberalism in some cases and unreflexively concrete and contingent analyses of local neoliberal projects in others (Peck and Tickell 2002; Lerner 2003; Peck 2004).

How might we undertake a finer-grained analysis of commodification and the effects thereof, articulating frameworks of extralocal political economic projects with specific historical-geographical moments while avoiding the pitfalls of localized myopia or of totalizing master-narratives? Peck and Tickell offer the alternative of a process-based approach to analyzing neoliberalization, as distinct from neoliberalism (Peck and Tickell 2002). Rather than approaching neoliberalism as a hegemonic political economic project and unitary ideology, Peck and Tickell argue that analysis should focus on the "(re)constitution of the process of neoliberalization and the variable ways in which different 'local neoliberalisms' are embedded within wider networks and structures of neoliberalism" (Peck and Tickell 2002, 380). This parallels Swyngedouw's assertion that socionature must be understood as a historical-geographical process (Swyngedouw 1999, 445). Rather than approaching society and nature as distinct, mutually constitutive entities, Swyngedouw argues that analysis should focus on the processes by which specific socionatural entities are continually (re)produced. This focuses attention on processes of regulation in a Marxian, metabolic sense, where regulation is understood to be simultaneously material, social, and discursive; a continuous process of mediation and production of socionatures (Gandy 1997; J. Foster 2000). Evolving patterns of resource management can thus be framed as historically-geographically specific practices of resource reregulation, rather than deregulation (Bridge and Jonas 2002; Mansfield 2002; Jonas and Bridge 2003; Bakker 2004; Perrault forthcoming). Neoliberal reregulation can thus be interpreted in two ways: as the reconfiguration of the role of the state to ensure the continued functioning of capitalism, and as a continuous process of (re)production of socionatures.

In the case of market environmentalism, this process of resource reregulation usually involves three interrelated processes: privatization, commercialization, and commodification. *Privatization* entails a change of ownership, or a handover of management, from the public to the private sector. *Commercialization* entails changes in resource management practices that introduce commercial principles (such as efficiency), methods (such as cost-benefit assessment), and objectives (such as profit-maximization) (Leys 2001). Privatization thus entails organizational change, in distinction from commercialization, which entails institutional change (in the sociological sense of rules, norms, and customs). Privatization and commercialization (although often interrelated) must be understood as distinct processes. Privatization can occur without full commercialization, as is the case with many water companies in developing countries, where private, for-profit companies operate tariff structures that price water on a below-marginal cost basis to poorer customers. Commercialization can be initiated prior to privatization or while ownership is retained in the public sector. For example, many publicly owned utilities in the Organization for Economic Cooperation and Development (OECD) employ rising block tariffs and universal metering to price water at full cost (Jones 1998).

From a neoliberal perspective, neither privatization nor commercialization will ensure the conversion of resources into commodities. *Commodification* entails the creation of an economic good through the application of mechanisms intended to appropriate and standardize a class of goods or services, enabling these goods or services to be sold at a price determined through market exchange. Commodification and commercialization are related, but analytically distinct; the latter entails changes in resource management institutions, a necessary but insufficient condition for the former, which involves the conversion of a resource into an economic good—by no means a straightforward process, as neoclassical economists recognize when referring to the multiple market failures that characterize resources such

as water supply.[2] Yet, from a neoclassical perspective, the conversion of a resource into an economic good is necessary if water is to be more efficiently managed. Here, efficiency is understood to be equivalent to Pareto-optimality;[3] the more efficient the water management allocation mechanism—here understood as the allocation of water to its highest value uses—the higher a society's welfare. Hence, the conversion of water into an economic good, as promoted by international agencies such as the World Bank and affirmed by international declarations such as the Dublin Principles and Hague Declaration,[4] is necessary for the efficient management of water. Privatization and commercialization are therefore necessary but insufficient conditions for optimal water management.

From a political economic perspective, in contrast, commodification is understood to be more than merely economic. Commodification is a process whereby goods formerly outside marketized spheres of existence enter the world of money and, as such, is multidimensional: *socioeconomic*, entailing changes in pricing (pricing and the creation of price-signaling mechanisms), charging methods, and allocation and exchange mechanisms; *discursive*, entailing transformations in the identities of and values ascribed to natural objects such that they can be abstracted from their biophysical context, valued, and displaced; and *material*, entailing physical interventions and adaptations such that desired nature(s) can be alienated from their ecological context as standardized goods, amenable to exchange (Kaika and Swyngedouw 2000; Robertson 2000; Castree 2003).

From a political economic perspective, then, one might argue that water is commodified if it has a price and if market incentives and private companies play a role in establishing this price. Indeed, many political economic analyses of neoliberal nature make precisely this assumption. From a conceptual standpoint, this view may be correct. However, in failing to acknowledge the neoliberal definition of a commodity, political economic analyses often lead to misreadings of neoliberalization, insofar as the assumption that commodification has already occurred obscures active, ongoing, and sometimes thwarted attempts to convert goods into commodities. In failing to disaggregate privatization, commercialization, and commodification, we overlook a critically important dimension of neoliberal projects, which weakens our ability to understand how neoliberalization evolves and why neoliberal projects may sometimes falter.

Moreover, political economic analyses of neoliberal nature often fail to grapple with the symbolic dimensions of commodification. As work on commodity cultures has shown, commodities embody "emotional value in the meanings and attachments bestowed upon them by cognizant consumers" (Bridge and Smith 2003, 258). The persistence of multiple cultures of water use and divergent identities ascribed to "waters" (rather than the economist's singular "water") is borne out, in the case of the U.K., by both ethnographic and historical research (Hamlin 2000; Strang 2004). Although neoliberalization attempts to rescript water as an economic good, consumers' meanings and values of water do not easily succumb to messages of economic reductionism. This negation of commodification is not necessarily wholesale; rather, commodification "is not so much a durable state as a series of passing moments, and is continually being negated in consumption or use" (Sayer 2003, 345). Consumption provides an opportunity for negating or destabilizing commodification, as much of the literature on commodity culture seeks to demonstrate. From this perspective, commodification is thus best understood as contested, partial, and transient (Kopytoff 1986; Sayer 2003); objects move in and out of, and back and forth from, commodity status. This contrasts with much of the literature (both academic and activist) on water privatization, in which commodification is treated as a unilear and economic process, "which implies a singular, momentous, irreversible and universal transformation of water (from a non-commodity produced for its use-value into a commodity produced for its exchange-value)" (Page forthcoming).

These insights—that commodification is transitory, imbued with symbolic as well as economic meaning and may be destabilized through consumption—complement reworked Marxian theories of the production of nature that acknowledge that the process of commodification is particularly contentious and difficult when dealing with what Benton terms "eco-regulatory" production, which simultaneously circumscribes, transforms, and adapts to nature as resource (Benton 1996; J. Foster 2000). This is in part because commodification is a politically contentious process insofar as it must "play out upon, as well as produce, a diverse ecological landscape" (Robertson 2000, 466) invested with divergent political and economic interests (Page 2003). Moreover, some socionatures do indeed fail to cooperate with the market because the process of commodity production under capitalism is characterized by contradictions that are difficult, if not impossible, to resolve. These contradictions are rooted in the biophysical and spatial characteristics of resources, which violate the conditions necessary for well-functioning markets (hence their 'failure' from a neoclassical perspective), or resist commodification (from a political economic perspective). Resources, thus, often present serious, if not insur-

mountable, barriers to commodification; hence, as explored in more detail in following sections, the unruliness or uncooperativeness of substances such as water, often expressed as contradictions between a neoliberal economic logic and the materiality (both biophysical and discursive) of resources (Bridge 2000; Bakker 2004).

In an attempt to counter these contradictions, reregulation of resources occurs as public and private actors respond in a variety of creative and constantly evolving ways: capital seeking profit and the state seeking to develop a mutually supportive relationship between capital accumulation and regulation, enabling economic growth and creating the conditions for political stability—an example of Polanyi's "double movement," as Mansfield notes in her study of U.S. ocean fisheries (Mansfield 2004b). Contradictions at the heart of the commodification process thus underlie the dynamism of resource (re)regulation. In some instances, this takes the form of active state involvement in regulating and facilitating markets (Peck and Tickell 2002). Both markets and states thus play an active role in reregulation. Yet reregulation should not be understood solely in an institutional sense—of a "thickening" of rules and laws required for capital accumulation. As explored above, regulation is also inescapably ecological. In reworking resource allocation institutions, we (re)produce socionatures, repositioning the entitlements and designations of users and environment, with both positive and negative effects. Rather than examining the impacts of neoliberalism on the environment, analysis should focus on specific socionatures as the active subjects of neoliberalization, asking how they transform modes of regulation and are transformed in the process, and exploring the shifting power geometries that result. This requires analysis of the reregulation of particular resources in specific historical-geographical contexts—a task to which I now turn.

Water Supply: The State Hydraulic Model

Throughout much of the twentieth century, water supply was mobilized as a strategic resource for societies undergoing modernization, industrialization, urbanization, and agricultural intensification. Most OECD countries adopted a "state hydraulic" paradigm of water management characterized by: planning for growth and supply-led solutions, with an emphasis on hydraulic development as a means of satisfying water demands; a focus on social equity and universal provision; command-and-control regulation; a discursive representation of nature as a resource; and state ownership and/or strict regulation of water resources development and water supply provision, based on a desire to provide sufficient quantities of water, where and when needed, such that economic growth could proceed unconstrained (Goubert 1986; Hassan 1998; Coutard 1999; del Moral and Sauri 2000; Bakker 2004). Given high capital costs and long infrastructure lifetimes, public financing was critical for the development of water supply. In the United States, capital investment for water over the twentieth century is estimated at US$400 billion (unnormalized) (Rogers 2003). During the New Deal period alone, the Public Works Administration financed over 2,500 water projects (Melosi 2000a, b). Other industrialized countries show similar patterns. In Spain, for example, a country that has one of the highest proportions of surface area covered by reservoirs in the world, the nominal economic value of the water resources made available through hydraulic development has been calculated at a range of between 5 percent and 8 percent of GDP (Martín Mendiluce 1996; MIMAM 1998). This pattern was not unusual, as the state played a key role as a facilitator of growth and promoter of technological progress across utility and resource sectors in many industrializing countries (Chant 1989; Graham and Marvin 2001).

Yet, by the late twentieth century, water use and investment patterns had begun to change due to deindustrialization, increasing technical efficiency in an era of heightened concern over resource scarcity, and changing patterns of domestic water use. Overall demand stagnated and even dropped in the U.K. (Figure 1). In the United States, water withdrawals began declining in the mid-1980s and are now 10 percent below their peak (Gleick 2000). Greater awareness emerged about the (still hotly debated) effects and (often un-

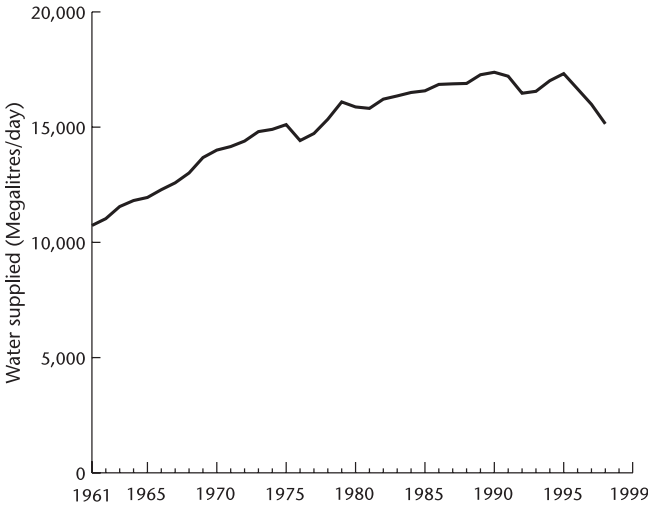

Figure 1. Water consumption in the U.K (1961–2000).

quantified) costs of hydraulic development, particularly large dams: extirpation of species (particularly fish); displacement of communities; flooding of cultural sites; contamination of water sources; disruption of ecological processes; and environmental degradation (WCD 2000; Graf 2001; Ortolano and Cushing 2002; Biswas 2004). With threats to human health from water-borne diseases, such as typhoid, having been brought under control, concern began to focus on nonpoint sources of pollution and other contaminants, as evidenced by Clean Water legislation in the United States and similar legislation on water quality in the European Union. This concern was heightened by a growing realization that the postwar economic boom had obscured systematic deterioration of water supply infrastructure in many countries (Kinnersley 1988; Melosi 2000a).

In a period of fiscal and ideological crises of the state, governments' inability (or unwillingness) to finance infrastructure combined with public environmental concern and technological innovations to increase the appeal of alternative approaches to water management (O'Connor 1973; Gleick 2000). Proponents of the "state failure" hypothesis were largely successful in discursive depictions of states as unproductive, inefficient, and ineffective (and from some neoconservative perspectives, despotic and inimical to freedom), signaling a sea change in the ideology of democratic governance in most industrialized nations. The state hydraulic paradigm thus faced a multidimensional challenge: ecological, cultural, ideological, and socioeconomic.

Market Environmentalism: The Emergence of Neoliberalism

The emergence of market environmentalism in water supply management is premised, in part, on the perceived failures of the state hydraulic mode of water management (Figure 2). Although market environmentalism is not monolithic and varies with the type of resource, jurisdiction, socioeconomic framework, and cultural setting, several general characteristics can be identified (Winpenny 1994; Cesano and Gustafsson 2000; Gleick 2000; Saleth and Dinar 2000; Rogers, de Silva, and Bhatia 2002). An emphasis is placed on demand management, while the assumption of the link between economic growth and growth in water use is challenged. Water conservation is balanced with, and in some cases prioritized over, security of supply. Along with a growing emphasis on environmental valuation and the incorporation of environmental values into policy, environmental protection, remediation, and restoration assume increasing importance as goals of, and constraints on, water supply management. In pricing, rather than access or equity, economic efficiency is prioritized. In some instances, private property rights and tradable markets for water may be established; more frequently,

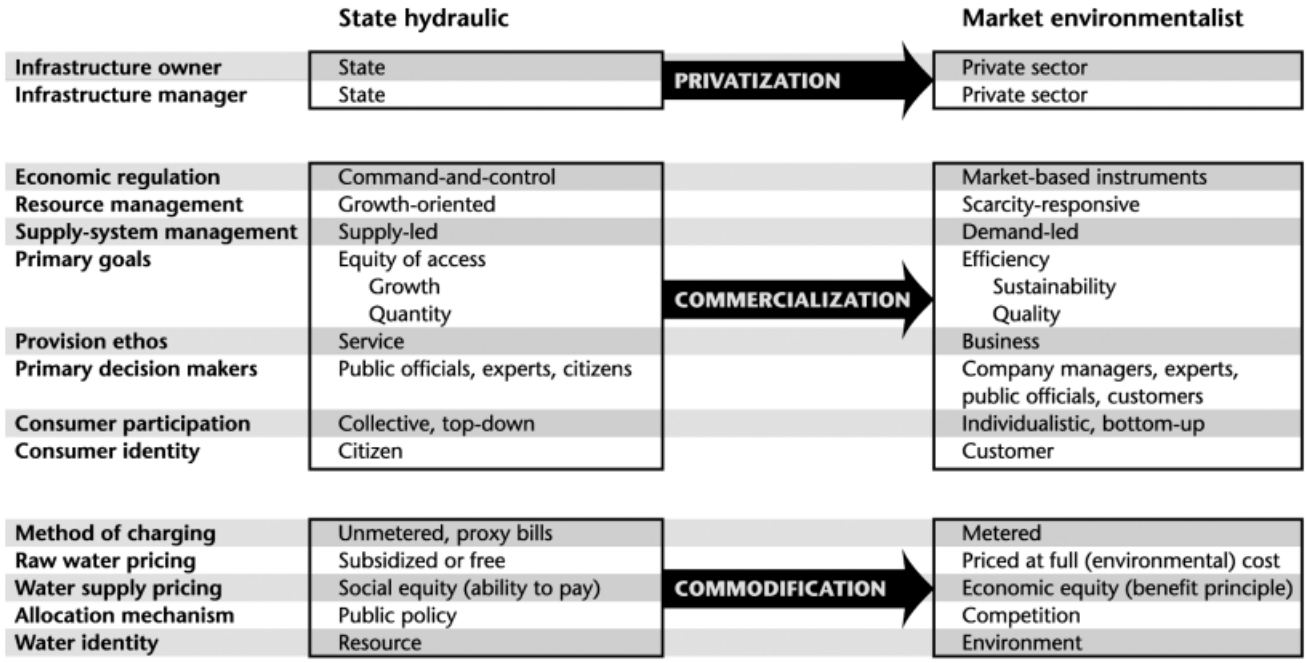

Figure 2. Neoliberalizing water supply.

governmental regulation employs market-based or market-simulating techniques. The private sector, as both owner and manager of infrastructure, tends to play a relatively important role in comparison with state actors.

Technically, the focus shifts from creating new sources of supply to managing demand through a variety of techniques (conservation, new water-saving technologies), alternative supplies (grey water, reclaimed wastewater, desalinated water, recycled water), metering, new tariff structures, and educating consumers in a new ethic of water use (Lacey 2004). Economic equity (the "benefit" or "willingness-to-pay" principle) displaces social equity (the "ability-to-pay" principle) in water pricing (Jones 1998). Consumer access is legitimated not by a citizen's entitlement to water as a service, but by a customer's purchase of water as a quasicommodity. A reconfiguration of the hydrosocial contract between users and their environment is required; consumers paying per unit volume at cost-reflective prices will use water more efficiently than unmetered households or farmers accustomed to treating water as a public service.

This argument is supported by a discursive repositioning of the concept of water availability: water scarcity is depicted as a universal condition—simultaneously natural (justifying a new ethic of efficiency and the commercialization of water) and social (the result of flawed public management, justifying the privatization of water). This serves as a further justification for water commercialization: if water is an increasingly scarce resource, it requires efficient management, which (if we accept the claim of state failure) only the private sector can provide, premised on the creation of necessary institutions—most importantly, pricing and property rights—required in order for water to be allocated to its most highly valued uses, thereby maximizing efficiency (Anderson and Leal 2001; Bjornlund 2003; Razzaque 2004). The allure of market environmentalism thus lies in the promise of simultaneously addressing and mobilizing water scarcity, in the pursuit of continued economic growth.

If the dam-as-icon symbolizes the modernist impulse underlying the state hydraulic mode of regulation (Kaika and Swyngedouw 2000), the tradable, artificial wetland is perhaps the archetype of a market environmentalist approach to water resources management (Robertson 2000, 2004). Restoration ecology and economics displace hydraulic engineering as dominant paradigms for interventions in hydrological landscapes. "Nurturing nature" holds out the promise of enhanced environmental value (amenity and aesthetic), while harnessing the environment to provide functions more efficiently than through previous infrastructure-intensive developments (e.g., marshes as flood-control and water purification mechanisms) (Holloway 1994; Graf 2001). These dimensions of market environmentalism take on varying degrees of importance in different geographical contexts. In the global South, private sector participation in water supply in urban areas has increased dramatically over the past two decades and the irrigation sector has been the target of pricing and market reforms in rural areas. In the global North, private sector management of urban water supply networks, ecological restoration, and water quality amelioration have been given greater priority (Kloezen 1998; Landry 1998; Kijne 2001; Kumar and Singh 2001; Takahashi 2001; Ward and Michelsen 2002; Bakker 2003a; Huffaker and Whittlesey 2003).

Market Environmentalism in Water Supply in England and Wales

The transition from state hydraulic to market environmentalist water supply management began over thirty years ago in England and Wales. Throughout much of the twentieth century, the water supply industry in England and Wales was run on a monopolistic basis and regulated as a public service, with the majority of infrastructure owned by governments (municipal and then national). Drinking water was supplied with the goal of universal provision. Water pricing was based on a concept of social equity: household supply was not metered, and bills were linked to property value, supported through cross-subsidies between consumers and, in some instances, between regions and level of governments (Bakker 2001). Potable water was a key concern for the developers of water supply networks, who were keenly aware of the links between polluted water and the cholera and typhoid epidemics that ravaged nineteenth century cities. Water planners focused on developing new water sources such as reservoirs, pursuing a supply-led strategy to anticipate increasing water demands stemming from economic and population growth. Underinvestment in infrastructure (to minimize public sector borrowing for macroeconomic reasons and to maintain low water bills for political reasons) and sustained industrial water pollution contributed to the continued decline of river and tap water quality in Britain for decades (Pearse 1982; Kinnersley 1988, 1994; Summerton 1998). The much-lauded integration of water supply and regulatory functions in basin-wide regional water authorities, according to the principle of integrated river basin management, had the undesirable side effect of discouraging enforcement of water quality regulation

(particularly sewage works), further aggravating environmental degradation.

In the context of an acute public sector fiscal crisis and dramatic shift in political direction with the election of Margaret Thatcher's Conservative government in 1979, the government initiated commercialization of the water supply sector in the early 1980s, transforming the water industry "from a public service to a business organization" (Penning-Rowsell and Parker 1983, 170). Labor levels and investment were reduced, tight financial controls were introduced, price increases were mandated (with bills rising above inflation), and increasing emphasis was placed on economic, as distinct from technical, performance indicators. Commercialization and subsequent privatization "thrust [water companies] into a more commercially orientated world, wherein the organization was under pressure first to show, and then to continually expand, a return on capital employed" (O'Connell-Davidson 1993, 191). By the late 1980s, the water utilities, along with other nationalized industries, were best characterized as publicly regulated private monopolies, operating on modified market principles (Parker and Sewell 1988; Hay 1996).

The decision to privatize the water industry was an apogee of the Conservative government's privatization program. Water privatization emerged relatively late on the government's agenda; it was not explicitly promoted during Thatcher's first term in office. Undertaken without a clear strategy, water supply privatization was contested within the Government and the civil service, as well as by the public (C. D. Foster 1992). Despite experience with privatization of network utilities (British Gas had been privatized in 1986, and British Telecom in 1984), the Conservative government made many policy reversals before going ahead with the initiative (Richardson, Maloney, and Rudig 1992).

Part of its hesitation stemmed from the realization that water supply was somehow different from other utilities. Given the nature of the distribution networks, privatized water companies would remain monopolies, at least in the short term. Given the public health and environmental issues associated with water supply, a fairly comprehensive regulatory framework would be required—one that might not mesh easily with the "light touch" economic regulatory framework Treasury economists had devised to be applied to all privatized network utilities. Public opposition was another concern; opinion polls demonstrated that a majority of the population was opposed to privatization (Saunders and Harris 1990, 1994).

Another issue was the sheer size of the capital investment required. The flotation of the water supply industry, with over 50,000 employees and assets valued at over £28 billion,[5] was one of the largest utility privatizations in Britain to date. Moreover, large capital expenditure requirements, due to years of underinvestment, were substantially increased by new, stringent European Union legislation on river, bathing, coastal, and drinking water quality.[6] The decision of the European Union to prosecute Britain for noncompliance in the mid-1980s was politically decisive (Hassan 1998); increased capital investment to meet European water quality standards was unavoidable, and estimated investment requirements for the following decade ranged from £24 to £30 billion (1989 prices).

Fiscal and political imperatives were thus central to the government's decision to privatize: the imperative to avoid increasing public sector borrowing in light of the Conservative government's policy of fiscal constraint, and the desire to avoid inciting public displeasure over the rate increases necessary to fund required capital expenditure (Rees 1989; Ogden 1991; Ferner and Colling 1993; Saunders and Harris 1994). Yet, privatization of the water supply industry posed a potential risk: Would the capital-intensive water industry be able to attract sufficient interest on the part of investors? The government decided to take the chance; in December 1989, the ten regional water authorities were floated on the stock exchange. Most industry observers agree that the companies were deliberately priced low due to ministers' fears about the failure of water privatization (Richardson, Maloney, and Rudig 1992; Kinnersley 1994); shares were oversubscribed six times (Curwen 1994), and the total value of shares rose by £1 billion to £6.2 billion at the end of the first day of trading (Ernst 1994). Little coordinated public protest and labor opposition took place. The flotation of the water supply companies had succeeded, although questions about underpricing of the original share offer would persist. The British model of water supply privatization had proven to be a success, or so it seemed.

Privatization and Reregulation: The Environment as a Legitimate User

Privatization consolidated the commercialization of the water supply industry through the introduction of market-simulating regulatory mechanisms such as cost-benefit analysis into both economic and environmental regulation. Little over a decade after privatization, labor levels have been dramatically reduced, collective bargaining mechanisms dismantled, and outsourcing noncore functions has significantly changed labor relations and practices in the industry (O'Connell-Davidson

1993). Investment levels have increased, with companies spending £31 billion from 1990 to 2000; investment over the period from 1991 to 1996 was twice levels prior to 1989 (Kinnersley 1998). In pricing, economic equity is prioritized over social equity (Bakker 2001). In economic regulation, efficiency is prioritized, although the increase in efficiency of water supply management is disputed. Water companies have been consistently profitable, although rates of profit have dropped as the price-cap regulatory regime has been progressively tightened (Ofwat 2002a), with a corresponding drop in share prices, albeit amid controversy over fat-cat salaries and the extent to which the increase in consumers' bills above costs of doing business (rather than increases in efficiency) is a contributing factor to profitability (Shaoul 1997; Saal and Parker 2001).

Water supply system management practices have evolved significantly; rather than engineering-driven approaches prioritizing redundancy and interconnection in the storage and distribution networks (and hence security of supply), economics-driven approaches prioritizing economically efficient management of the network and demand management (and hence on cost minimization for given output) are increasingly central to water resource management policies (Guy and Marvin 1996a, b; Mitchell 1999). This shift stems in part from growing concerns about the impacts of climate change on water resource security, particularly in southern England (Arnell, Jenkins, and George 1994; Marsh 1996; DOE 1996b), and an increasingly dominant discursive depiction of water as a scarce resource (noteworthy in such a wet country)—which recently has been enshrined in U.K. legislation with the designation of official Areas of Water Scarcity.[7]

Another driver is the prioritization of environmental concerns. Environmental issues have been formally integrated into water resources planning, and the water

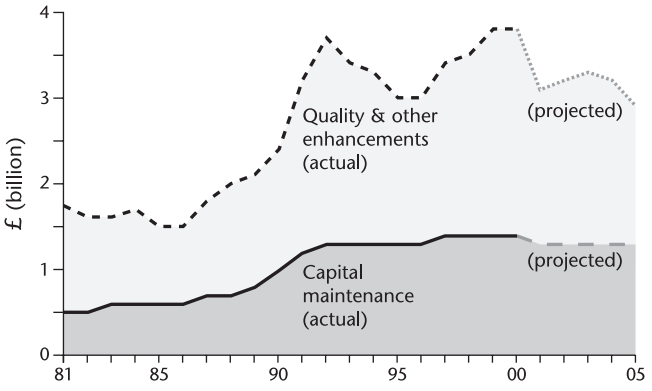

Figure 3. Capital investment, U.K. water supply industry, 1981–2000 (£ × 10^9).

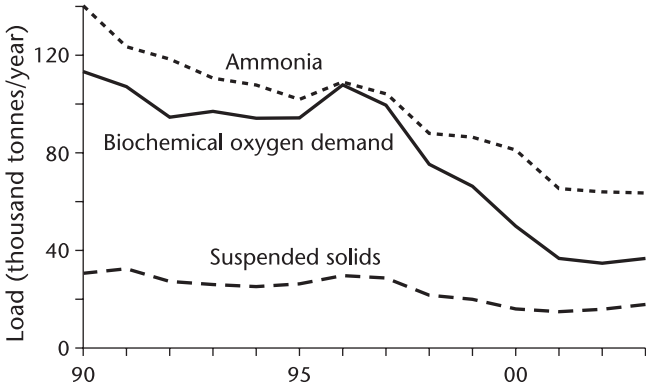

Figure 4. Discharges from sewage treatment works (1990–2003).

industry has to some degree reinvented itself as an environmental services industry. The creation of a separate environmental regulator has elevated the environment to the status of legitimate user—with visibility and clout—within the regulatory framework. Much greater emphasis is placed on aesthetics, amenity value of landscape, and value of natural landscapes—incorporated in environmental economic valuation, instrumentalized through changes to pricing of water abstraction, and valorized through river restoration projects. Water quality and environmental expenditure are key drivers of capital expenditure programs in the industry; with an estimated expenditure of between £8 and £8.5 billion on water quality between 2000 and 2005, much of this is directed toward improving the quality of discharges from sewage treatment works and ending the practice of direct disposal of sewage to sea or waterways through combined sewerage overflows (DEFRA 1999) (Figures 3 and 4, Table 1). Partly as a result, chemical and biological river water quality has improved, although compliance with river water quality objectives set by the government had reached only 82 percent in 1999, a level viewed by the government as unsatisfactory (DEFRA 1999) (Figure 5). Drinking water quality has also improved significantly (Figure 6). Much of this

Table 1. Water Quality, Selected Indicators (1990–2004)

	1990–1991	Latest figures (2002–2003)
River and canal chemical quality – good or fair	84%	95%
River and canal biological quality – good or fair	84%	94%
Coastal bathing water – compliance	66%	99%
Sewage treatment works – compliance	90%	99%
Sewerage overflows – unsatisfactory	31%	17%

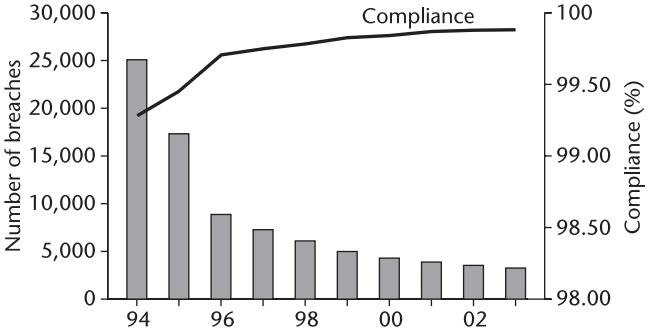

Figure 5. Compliance with and breaches of drinking water quality standards (1994–2003).

improvement is driven by increasingly comprehensive European Union water quality legislation governing beaches and bathing waters, drinking water quality, and environmental quality of both surface and groundwater (D. Walker 1983; Buller 1996; Kallis and Butler 2001; Kaika 2003). Water companies in England and Wales are, to a much greater extent, guided and constrained by environmental regulations than they were three decades ago. So too are managers, whose performance-based incentive schemes now routinely incorporate environmental performance criteria (Hopkinson, James, and Sammut 2000), backed up by the threat of prosecution or "naming and shaming" by the environmental regulator (Table 2).

The increasing dominance of environmental concerns is characteristic of a shift in relative influence of different stakeholders under market environmentalism, with labor unions sidelined and consumers' interests to be balanced

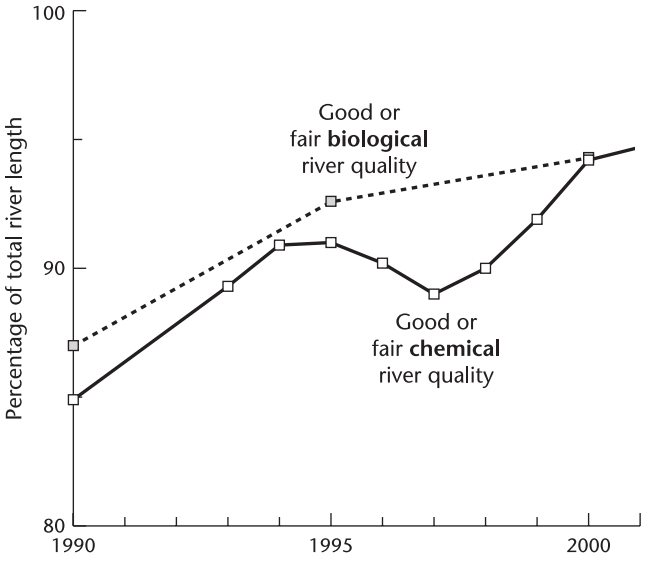

Figure 6. Biological and chemical river quality (1990–2000).

Table 2. Pollution Incidents and Prosecutions (2003)

Offender	Number of serious incidents	Number of events leading to prosecution
Anglican Water Services Limited	9	3
Dŵr Cymru Cyfynfedig	11	5
Northumbrian Water Limited	16	6
Severn Trent Water Limited	23	<10
South West Water Limited	22	10
Southern Water Services Limited	24	10
Thames Water Utilities Limited	40	5
United Utilities Plc	15	8
Wessex Water Services	4	3
Yorkshire Water Services Limited	21	<10

with, or trumped by, environmental concerns. Environmental externalities are addressed within the water policy framework and backed up in most instances by legal obligations. In contrast, social externalities are now, to a greater degree than in the past, excluded from the water policy framework (Bakker 2004). These shifting power geometries are most clearly observed in the formal structure of regulation: whereas the environmental regulator is a separate well-funded entity, the regulatory body responsible for consumers has, until recently, operated under the aegis of the economic regulator, the Office of Water Services (Ofwat), with a highly constrained role (Page and Bakker forthcoming). A significant proportion of the increases in domestic, postprivatization water users' bills has been due to environmental expenditure, producing clear gains for the environment in some cases, but at the apparent cost of consumers; hence, the frequent disagreements between environmental groups and consumers groups over water policy, particularly given the highly controversial impacts of water debt and water poverty on public health (Drakeford 1997). Decision making on capital investment in the industry balances the interests of consumers' willingness to pay against environmental protection and rehabilitation requirements—a cost-benefit exercise that minimizes the participation of labor and attempts to exclude questions of ability to pay, in distinct contrast to preprivatization (Bakker 2001).

The Drive for Commodification

As explored above, the reregulation of the water supply industry, which accompanied privatization, consolidated and deepened the progressive commercialization of the water supply industry that had been initiated in the 1980s, and incorporated the environment as a legitimate user into the formal regulatory framework.

Yet, successive governments (both Conservative and Labor), as well as the economic regulator (Ofwat), envisioned a further step—the gradual commodification of water—introducing accurate prices and competition as a means of enabling market exchange through introducing universal metering, environmental economic valuation, and direct competition through the integration of water supply networks.

To argue that water is not a commodity, despite the fact that it has a price and is delivered by private companies, may seem at first disingenuous. But water clearly did not fit the neoclassical definition of a commodity that the proponents of market environmentalism envisioned: a standardized good or service, with interchangeable units, sold at a price determined through market exchange. Postprivatization, in England and Wales, water was not standardized; water quality varied considerably (chemically and biologically) between catchments, and water supply networks were not integrated even within company supply areas. Water companies remain vertically integrated monopolies, responsible for everything from raw water abstraction through delivery to the customer. With no national, and few truly regional water grids in the U.K., water was not traded in bulk, and water transfers between companies were limited in volume. Charges paid by companies for abstracting raw water covered solely administration costs;[8] water was nominally priced free (Day 2003). Externalities generated by water abstraction and disposal were not reflected in users' bills. The majority of domestic users, who did not have meters, paid charges determined relative to the property value of their homes rather than to the costs of supplying water to them or to the amounts they used. Monopolies remained in place, and the principle of universality—through which water was discursively constructed as a material emblem of citizenship—remained legally entrenched.

The principles underlying water supply thus remained that of the state hydraulic era, and networked water supply in England and Wales remained (from a neoliberal perspective) a quasicommodity, or only partially commodified. This was not unexpected; neoclassical economists use the term "market failure" to describe instances where goods fail to meet the necessary criteria for commodification. They identify two important market failures with respect to networked water supply: natural monopoly (supply by one firm entails lower costs than supply by more than one firm) and externalities (costs or benefits arising from water production not accounted for in the price mechanism, which thus do not accrue to the producer). Water's biophysical characteristics underlie these two market failures: (a) a flow resource through which pollution is not easily contained, and hence easy to externalize; (b) water is cheap to store but heavy to transport, requiring expensive sunk infrastructure with a long lifetime—resulting in a natural (or rather, naturalized) monopoly.

Commodification was thus by no means a straightforward process and did not follow automatically from the privatization or commercialization of the English and Welsh water supply industry. Two barriers to commodification were the focus of Department of Environment postprivatization policy making: the absence of transregional infrastructure networks (which implied the continuation of monopolistic provision and an absence of competition) and the absence of cost-reflective pricing mechanisms and low penetration of household water meters (implying a continuation of widespread cross-subsidies, failure to incorporate externalities in water pricing, and an absence of accurate price signals). The resulting difficulty, from the perspective of Ofwat and the government, was that the production of water would be less than optimal; in the absence of competition and adequate price-signaling mechanisms, the market would not function as an efficiency-maximizing institution for the allocation of resources. The solution, according to the British model of utility regulation, was to introduce cost-reflective pricing, volumetric metering, and competition—processes that, as explored in the following section, have proven to be fraught with difficulty.

Competition Proves Elusive

Networked water supply, as a naturalized monopoly, posed a particularly intractable challenge to market environmentalism. Under the state hydraulic mode of regulation, protecting consumers against the abuse of monopoly powers was thought to be best accomplished through direct government vetting of prices and investment programs, and, in many instances, public ownership and management of infrastructure. Under market environmentalism, competition was assumed to be a better mechanism than command-and-control regulation, legislation, or moral suasion. As two of the best-known proponents of free market environmentalism in the United States assert, "good resource stewardship depends on how well social institutions harness self-interest through individual incentives" (Anderson and Leal 2001, 5). Self-interest, in the case of water supply companies, equates to profit, to be harnessed via competition, thereby encouraging innovation and—as expected by the architects of economic regulation for

privatized utilities in Britain—driving down consumer prices.

The commitment to introducing competition is reflected in the statutory duty of the economic regulator, Ofwat, to facilitate competition. Five types of competition can be applied to the water industry: direct competition *in* the market (or product market competition); surrogate competition (via regulatory intervention); competition for corporate control (by mergers and takeovers); procurement competition (for inputs such as capital); and competition *for* the market (e.g., franchising) (Cowan 1997; Vass 2002). These different types of competition have not been equally applied in the water supply industry. Competition for the market has been limited to date given the exclusive licenses held by water companies on the twenty-five-year terms thought to be necessary at the time of stock-market flotation to reassure investors and guarantee a degree of stability in the sector following privatization. Procurement competition has fared better; the use of outsourcing for activities ranging from pipe maintenance to information technology and customer call-center management has been widespread in the industry. Yet this covers only a limited proportion of companies' overall costs and activities. The opportunities for product market competition were recognized at the time of privatization to be limited in the absence of a national water grid.

Accordingly, the postprivatization regulatory framework focused on surrogate competition through a system of comparative or "yardstick" competition administered by an economic regulator and competition for corporate control (mergers and takeovers). The British system of comparative competition was designed by Treasury economist Stephen Littlechild in the mid-1980s and has been applied to all of the privatized British network utilities (Littlechild 1986, 1988). Unlike American-style, rate-of-return regulation, in which dividends are capped, utilities' maximum price increases are capped. Price cap regulation was deemed to be "preferable to rate of return regulation of profits because it is simpler, less expensive and interventionary [sic], and less vulnerable to 'cost-plus' disincentive effects" (Littlechild 1986, 2). The price cap system operates on the assumption that the regulator, gathering and comparing information about companies' performance and required investment, can set an upper limit on price increases that allows an efficient company to achieve a reasonable revenue stream (Glynn 1992). In theory, the incentive for a water company to increase efficiency arises from the fact that companies can increase profit by increasing efficiency, thereby retaining expenditure in addition to the revenue implicitly allowed by their price cap.

The supposed merit of comparative competition arises from the way in which comparing performance of different companies encourages efficiency. Price caps are calculated by the regulator every five years in a periodic review process, set in advance at levels determined through comparison of company performance and designed to encourage innovation and efficiency without allowing excess profits. Comparative competition thus relies on a set of benchmarks, which are, in theory, a function of all firms' performance, thereby diminishing (if not eliminating) the scope for strategic behavior (such as inflation of cost projections) on the part of the private company. With price caps set in advance, competition among companies occurs relative to the efficiency yardsticks calculated by the regulator, backed up by the threat of takeover in case of poor performance. The profit motive is thus, in theory, harnessed by comparative, competition-driven, price cap regulation to drive efficiency gains and reduce costs. Efficiency targets and the threat of takeover together serve as a "proxy for a competitive market" (Ofwat 1998b, 49). Proponents of comparative competition maintain that capital markets are better assessors of water company performance than regulators. It is argued that "City" scrutiny, backed up by share price movements as measures of performance, will ensure efficiency, effectively substituting competition in the performance of water managers for competition in the product market (Littlechild 1988).

While City scrutiny and shareholder pressure encourage profit maximization, it is through regulatory intervention (namely, lowering price caps at periodic reviews) that efficiency gains are, in theory, to be shared with consumers. Yet while consumers' bills increased rapidly (and above inflation) through the 1990s, water companies' share prices outperformed the market, and water companies reported increasing rates of profit and paid dividends to their shareholders well above the average paid to stock market investors (Figure 7) (Ofwat 1996; Bakker 2003b). In the five years from 1991/1992 to 1995/1996, as water bills continued to rise above inflation (in contrast to the other privatized utilities), water companies paid $US 160 million in taxes, but $US 8 billion in dividends (Kinnersley 1998). Rather than sharing efficiency gains between consumers and investors, the regulatory regime appeared to have permitted gains to accrue largely to investors, a highly politically contentious issue in the context of bills rising above inflation and growth in water poverty, much publicized by the opposition Labor party prior to their election to power in 1997 (Bakker 2001).

The failure to control prices and profits is one reason why comparative competition had, by the late 1990s,

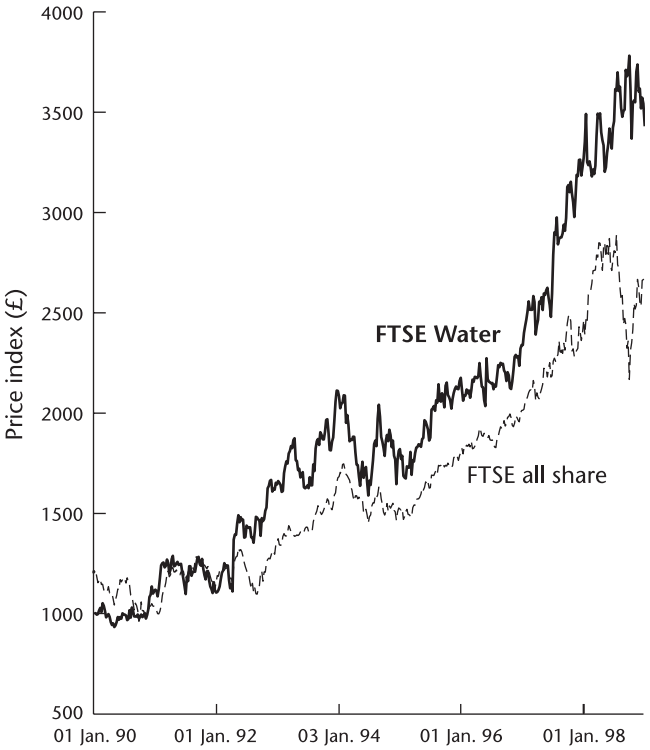

Figure 7. Share prices, U.K. water sector and FTSE all share (1989–1999).

begun to be viewed by many within the industry as a "pale and sickly relative of market competition" (Summerton 2001, 23). Another, more fundamental, issue also troubled the economic regulator, Sir Ian Byatt: the difficulty in comparing company performance. In order to calculate price caps, the regulator employs econometric models and detailed assessments of individual company performance to identify potential reductions in operating, capital maintenance, and capital enhancement expenditure (Ofwat 1998a). Comparative competition thus entails the calculation of potential efficiency gains not only through reference to individual companies, but also through the relative ranking of company performance; this is an information-intensive and costly exercise—the budget for the economic regulator alone was just under $25 million USD in 2002–2003, excluding the costs of reporting and auditing requirements borne by the water companies.[9] Despite the scale of the regulatory exercise, technical difficulties arose in comparing companies following privatization, notably variations in environmental conditions (Hopkinson, James, and Sammut 2000). The difficulty of accurate forecasting was reinforced by unexpected changes in the key variables on which the forecasts underlying the price limits had originally been based. Soon after privatization, Byatt decided to carry out periodic reviews of price caps at five-year rather than the original ten-year intervals and to intervene more frequently in order to readjust price caps as required.

Yet the most intractable flaw in the comparative competition approach from Byatt's perspective was the contradiction between comparative competition and corporate competition. Competition for corporate control is an essential complement to yardstick regulation, because "the spur to efficiency is sharpened by competition in the capital market, including the threat of takeover" for badly performing companies (Littlechild 1986, 3). This threat was repeatedly enacted postprivatization; mergers and acquisitions resulted in a concentration of the industry and mergers reduced to the original thirty-nine companies down to twenty-two by 2004 (Fletcher 2001; Day 2003). As a result, all water companies are now large enough that any proposed merger would result in an automatic referral to the government's Competition Commission.[10] In the last three "water-to-water" mergers cases, the commission concluded that the mergers would result in substantial detriment to the comparative competition regime. The commission prohibited the mergers, citing the need to retain a sufficient number of comparators in order for the economic regulator to carry out comparative competition. The economic regulator has indicated that he would be reluctant to see any further reduction in the number of water companies and, hence, comparators. Further mergers and takeovers are, in effect, prohibited. Here lies a dilemma at the heart of price cap regulation. Takeovers and mergers reduce the number of comparators available to the economic regulator for use in his comparative competition model. The preservation of a sufficient number of distinct water suppliers is necessary to underpin comparative competition, but this reduces the threat of takeover as a spur to efficiency.[11]

Trading Water: The Failure to Introduce Direct Competition

Given the flaws in comparative competition, the economic regulator has repeatedly asserted the view that customers "shouldn't have to rely exclusively on comparative competition" (Garrett 2002, 6). As the limitations of comparative competition became more apparent, postprivatization government policy shifted towards more explicit encouragement of product market or direct competition (DEFRA 2001a, b). Direct competition may occur via *common carriage* (competitors jointly using infrastructure) and *inset appointments* (competitors using proprietary infrastructure to connect

to customers within another company's monopoly supply area) (Ofwat 2002b). Committed to introducing competition in all of the privatized utility sectors, the government devised legislation permitting inset appointments and common carriage at the time of privatization (DOE 1992, 1995).

Inset appointments were expected to occur first in areas on the borders between the water companies, where a direct bulk water supply or sewage connection would be easier to facilitate. One result of the introduction of competition via inset appointments was a strategic reduction in tariffs on the part of companies to large-scale users. Prices dropped for those cohorts of customers for whom competition is an option (large industrial users connected to the domestic water supply system) in order to ward off competition; meanwhile, the prices of domestic consumers (in the same tariff basket) rose to cover the resulting loss in revenue (Consumer's Association 2000). Although competition will provide large-scale water users with lower-cost services, the domestic consumer is unlikely to be a beneficiary (Miller-Bakewell 1998), in part because companies can independently determine rates of charges for different classes of consumers after the overall price cap is set. In this instance, the regulator's duty to encourage competition contradicts the requirement of prohibiting undue discrimination among classes of consumers. A further contradiction arises when the spatial scale at which competition would take place is considered. The unbundling of regional prices implies the reduction or elimination of subsidies to rural consumers; Ofwat's duty to promote competition in this instance conflicts with the duty to protect rural consumers, reflected in DEFRA's voicing of concerns about cherry-picking consumers should competition be widened in the industry. Given these constraints, few inset appointments have been issued to date; only eleven had been issued as of August 2004, almost fifteen years after privatization.[12]

Competition through common carriage, via bulk water sales through an expanding and integrating national network, was also envisaged at the time of privatization.[13] In 1996, the government announced its intention to explore virtual markets for water users by allowing competing companies to monitor distribution through an integrated network using electronic data interchange (DOE 1996a). Direct competition into the water industry is hindered by technical factors related to water's biophysical characteristics. Water is a "heavy" product—cheap to store but expensive to transport relative to unit volume. Water is also a flow resource, required to fulfill environmental as well as public health functions; the differences in quality between different water supply zones pose particular problems for common carriage competition. Despite much study of the possibility of integrating water supply networks between watersheds in England, the ecological consequences of integrating water supply networks raised significant concerns among all three regulators, on the basis of which it was acknowledged that trading of water would have to be constrained to local areas, so that "resources in different catchments are unlikely to be direct substitutes" (Day 2003, 35).

By the end of the 1990s, regulators had reached the conclusion that the environmental and health and safety risks posed by water resources abstraction, supply, and disposal pointed toward continuation of local monopolies (Vass 2002). Regulatory complexity, with responsibility divided between regulators and various government departments, implies that no clear line of accountability exists for the sector overall and that the transaction costs of regulating competition would be high. The structure of government, with water supply system ownership, management, and regulation varying between the constituent parts of the U.K. (England and Wales, Northern Ireland, and Scotland) is also perceived to pose greater barriers to common carriage. The progressive retreat from full common carriage competition was motivated, in part, by safety concerns, given the difficulties posed by the problem of mixing (most importantly, the designation of responsibility for water quality incidents under common carriage). Moreover, the structure of price cap regulation contained a built-in disincentive for integrating networks. In order to minimize price caps and encourage efficiency savings, companies are permitted by the regulator to earn rates of return on capital investment (e.g., building a new reservoir) but not on operating expenditure (e.g., buying bulk water supply from a neighbouring company); hence, connecting up networks implies the possibility of reducing profit. Equally important, the contradiction between competition and cost efficiency appeared to be insurmountable (Vickers 1997). The high costs of water supply infrastructure required for common carriage competition would have had dramatic effects on pricing structure—raising prices significantly and abruptly. In the context of the highly contested politics of water regulation postprivatization, the government retreated from its plans for direct competition (Bakker 2001).

Officially, the government retained a commitment throughout the 1990s to increasing competition; in 2004, the economic regulator introduced "self-lay" competition for new properties, whereby competition was introduced into the laying of water mains and service pipes for new properties. However, after pro-

longed consideration of the common carriage option, restricted measures were announced in March 2002; common carriage and wholesale supply competition would be permitted for users who consumed fifty megaliters or more of water per year—essentially, a limited number of large, industrial users (Ofwat 2003). Similarly, only industrial and commercial users using fifty megaliters of water annually (some 2,000 users) would be eligible for inset appointments (DEFRA 2002; Fletcher 2002). The government also decided not to pursue tradable water abstraction permits, as had originally been proposed, given that few trades would be possible without significant regulatory scrutiny (DEFRA 2001a). As a result, direct competition in the water supply sector remains limited in comparison with the expectations of architects of privatization and in comparison with other privatized utility industries in the U.K., where direct competition plays a more prominent role.

Valuing Water: The Contradictions of Full-Cost Water Pricing

Under market environmentalist modes of water supply regulation, pricing of water is one of the key institutions required in order to maximize the efficiency of water use. Correct price signals are deemed necessary to encourage customers to conserve where water is scarce. Hence, optimized price cap regulation requires the valuation of water and a means whereby price signals can be communicated to consumers—namely, volumetric metering.

At the time of privatization, the water supply of the majority of domestic consumers in England and Wales was not metered. Customers paid bills linked to the property value ("rateable value") of their homes. The pricing regime was thus characterized by a high degree of cross-subsidy. The implementation of full-cost pricing would require accurate pricing mechanisms and the unwinding of cross-subsidies through the implementation of mandatory volumetric metering—a target set by the government in 1989 to be reached by the year 2000.

The rationale for full-cost pricing lies in its promise of optimizing water use via the technique of marginal cost pricing. Marginal cost can be defined as the cost resulting from a unit increase in production at the margin; marginal cost pricing entails setting the price of a good equal to the marginal cost of production. Where marginal costs and benefits are equal, according to neoclassical theory, efficiency is maximized (Ofwat 1997). For example, in an area where there is no margin of supply over demand and any new demand will require new resources that will be very expensive to obtain, the marginal cost for new demand will be very high. Pricing water at marginal cost rather than average cost would encourage customers to conserve. According to its proponents, pricing water at the margin should lead to water conservation (even in the absence of government regulations); environmentally sustainable solutions are the promised outcome.

The materiality of water, however, poses challenges to implementation of this logic. First, cost-reflective pricing requires pricing that incorporates externalities, the cost of which is difficult to measure (McMahon and Postle 2000). The environmental economic methodologies used to calculate the value of environmental externalities have been disputed by companies, and even by the Department of the Environment's own inspectors (Bateman et al. 2000). Second, water resource investment is incremental and characterized by high capital expenditure relative to revenue; accordingly, rather than the smooth marginal cost function of the economist's ideal world, the marginal cost function is "lumpy," implying sudden and large increases in water bills. Moreover, marginal costs vary temporally (due to peak loading), spatially (due to distance from the source, soil quality, or topography), and seasonally (as raw water availability varies); scaling water charges to the appropriate spatial and temporal resolution thus poses significant practical difficulties. If prices were to accurately reflect costs, then each consumer would have to be charged a price related to the costs they imposed on the system, implying temporal and spatial variation in pricing. If marginal cost pricing were fully applied in the U.K., differentiation of charges within regions might lead to significant price rises for rural consumers. Anticipating the political fallout from this eventuality, the architects of privatization assigned a duty to protect rural consumers to the economic regulator at the time of privatization. The economic regulator thus operates under formal legal (as well as informal political) constraints: to retain prices at affordable levels and avoid large spatial variations perceived to be discriminatory against certain regions or classes of consumers.

Given the variability inherent in marginal cost, smoothing out the marginal cost curve using long-run marginal cost (LRMC) analysis has been Ofwat's preferred methodology for determining an optimal solution to the supply-demand balance. LRMC attempts to smooth spikes and variability in the price curve by estimating the marginal cost over a long timescale (e.g., ten years), using the cost per unit of capacity of the next resource development (e.g., treatment plant) to be built (Scott 1995; Hall 1996). LRMC is the methodology

Ofwat specifies water companies must use in determining the solution to any gap between supply and demand. The most optimal economic solution, as determined by LRMC, must be followed in determining what mix of water management options (e.g., building a new reservoir, reducing leakage, encouraging xerophytic gardening) companies will use in making up any water supply shortfalls.

LRMC pricing has been implemented by some water companies in England and Wales. For example, one water company in the north of England, with excess capacity and thus a low marginal cost, has reduced its volumetric charge, while increasing its standing charge—effectively encouraging consumers to use more water (ESRI 1994). Conversely, another water company in the south of England, with a high LRMC, is lowering the standing charge and raising the volumetric charge, sending the opposite signals to consumers in an area where supply barely meets demand (Scott 1995). As these examples demonstrate, it is not always economically efficient to conserve water. Although the Environment Agency (the environmental regulator) and environmental groups such as the Council for the Protection of Rural England support metering and other demand-management measures, they recognize that "once customers are metered the incentive for companies to restrict demand growth vanishes; with controlled unit prices companies [will] make more money from selling rather than saving water"(Rees and Williams 1993, 23). In cases where there is a surplus resource, it may be more economically efficient to encourage increases in use by customers and to keep encouraging increases in demand until all excess capacity is used up.

Nor is it necessarily economically efficient to reduce leakage. Demand management techniques, such as leakage reduction and consumer conservation campaigns, are, from an economic perspective, techniques for smoothing the discontinuous cost curve. Demand management should be applied in situations of deficit or near deficit of water and only when the marginal cost of the next unit of water is thus very high (London Economics 1997). In other words, demand management is useful to water companies as a short-term response to critical shortages, and as a means of "peak lopping," smoothing out the cost curve before a new resource is brought on line, or for containing demand in a water-stressed zone or locality instead of engaging in expensive new mains renewal or refurbishment. For companies that have a surplus of water resources, and thus a low marginal cost, it is cheaper to treat and leak water than to incur operating expenses fixing leaks. Yorkshire Water, for example, in its first study of an "economic level of leakage," indicated that leakage rates of 27 percent were optimal. As one senior manager from another water company noted, having been asked about company leakage rates reported at nearly 40 percent:

> Leakage of treated water is not a problem cost-wise. After all the money spent on pipes, a bit of money spent on chemicals, etc. is incidental. The water doesn't cost that much to treat. So companies don't really lose a lot of money this way until resources are tight. We are having to decrease leakage because of political reasons and public perception. It was never considered a strain on resources. It is cheaper to go on treating and leaking as long as water is plentiful.
>
> —(Interview with the author, August 1997)

In short, demand management is not always economically efficient for companies. As demand management is mostly used on the metered side of the business, it has direct cost implications for companies who are charging rates above marginal cost, as it implies a direct reduction in revenue. Therefore, companies have, on the whole, been reluctant to introduce widespread metering for domestic consumers, particularly in regions where marginal costs are low and metering would reduce bills, implying a drop in revenues. They have also been reluctant to introduce marginal cost pricing where marginal cost is less than average cost, because this would imply a drop in revenues, given that LRMC satisfies the allocative function of price but does not ensure cost recovery for which additional charges must be imposed.

This observation directly contradicts analyses of water industry trends that highlight the shared interest of infrastructure providers and users in employing environmentally sensitive approaches to network management (Guy and Marvin 1996a, b). Depending on the marginal cost of water in a given region, operational efficiency (conservation) and economic efficiency are not necessarily simultaneously maximized. Under normal conditions, the effects may not be apparent, but under situations of abnormal water scarcity, such as a drought, supply systems may fail unexpectedly and dramatically, as was the case in Yorkshire in 1995 (Bakker 2000).

Metering Stymied

In addition to properly valuing water in order to establish its true costs, commodification requires a mechanism for communicating price signals to consumers. Accordingly, some form of volumetric metering is required (Herrington 1996). At the time of privatization, 100 percent penetration of meters into domestic properties was envisaged; full metering was originally required of the water supply industry by the year 2000.

Meters have been progressively installed in domestic properties since 1989, but the rate of meter installation was much slower than expected over the 1990s and met with resistance on the part of consumer advocacy groups, some politicians, and nearly all water companies. By the late 1990s, the government had quietly dropped the obligation on the part of water companies to meter all customers. Although over 99 percent of the population of England and Wales is connected to a water supply network, by 2000, domestic metering penetration levels had not yet reached 20 percent, one of the lowest levels in the OECD (Day 2003).

Understanding the difficulties with which the obligatory metering requirement was faced requires reference to the communicative function of water meters. Meters are a means of introducing measuring points into every home, opening up the "black box" of consumer demand to quantification; accordingly, "the *set* of meters is a powerful instrument of control" (Akrich 1992, 217, emphasis added). This move is understandably of great interest to companies seeking to manipulate demand so as to minimize operating expenditure, as indicated by the growth over the 1990s in the number of surveys monitoring domestic consumption (Turton 1995). Yet a meter is a two-way means of communication; it also provides a means whereby control is destabilized. Currently, water utilities are ensured of stability in future revenue streams given their captive monopoly domestic markets and property-value-based charging systems. An increase in metering, in short, may imply a decrease in the predictability of companies' revenue streams.

Metering may also affect customer behavior in unexpected ways. The economic regulator supports metering, arguing that it provides customers with a choice, insofar as a meter provides them with information enabling them to control bill levels. Simultaneously, meters provide a means whereby price signals can be sent to consumers; meters act as a reciprocal medium of communication. The environmental and economic regulators argue that meters, combined with cost-reflective pricing, will encourage conservation. However, a decrease in consumer responses to appeals to conserve water during times of drought, as observed during the Yorkshire drought of 1995, when demand actually increased after company appeals to reduce usage, may be an unexpected result of metering in some cases. Although few studies exist, some water industry managers doubt that metering will act uniformly to reduce consumption and mention the possibility of metering bounce back (a rise in consumption associated with changing behaviors stemming from metering justifying consumption as long as the water bill is paid). Unpredictability of revenues and customer behavior is the Janus face of the increased surveillance opportunities open to companies through the installation of domestic meters. Companies' resistance to metering is partly explained by this surveillance-security trade-off.

Perhaps most importantly, meters came to be associated in public discourse with "water poverty," as prepay meters were introduced into homes of low-income consumers in several water company areas (Bakker 2001). Although the High Court later ruled that the meters were illegal, the political damage was done. As NGO campaigns and Labor opposition campaigning made clear throughout the mid-1990s, efficient water pricing was not politically acceptable water pricing. The government retreated on its commitment to metering, passing new legislation that enabled consumers to choose whether or not to have a meter and to choose to revert to unmetered supply (with the exception of new homes) (Bakker 2004).

Repoliticizing Pricing

Under market environmentalism, the justification for full-cost pricing is its supposed effect on consumer and environmental welfare, defined in economic terms. A minimization of prices for a given level of service is predicted to be the result of efficiency gains in water services provision. In legislation and in practice, it should be noted, the minimization of prices is not an explicit goal; the promotion of efficiency is an explicit goal (and a primary duty in the case of the economic regulator), from which the minimization of prices for a given level of output is expected to result. This is reflected in the regulator's primary duties under the terms of the Water Industry Act to ensure that companies can carry out and finance their functions (in particular by ensuring a reasonable rate of return on capital), implying an increase in price caps, balanced with a secondary duty to protect consumers through ensuring that no undue discrimination is shown in setting water prices.

The architects of privatization assumed that these duties would be complementary: customers would benefit if efficient companies remained financially viable. Full-cost pricing of water was deemed to be essential. But given that raw water costs (via abstraction fees) currently represent less than 2 percent of companies' total operating costs, and as demand for water is relatively inelastic (i.e., insensitive to changes in price) raw water prices would have to rise between 150 and 1,000 percent in order for price signals to motivate conservation (Day 2003). Price rises of this magnitude have eq-

uity dimensions that cannot be overlooked. The regulatory framework, however, contains no explicit mechanism for addressing the question of the *acceptable* level of these prices.

Accordingly, balancing the need to generate stable, sufficiently high levels of return to satisfy investors on the one hand and politically acceptable rates of return on the other has been accomplished through political intervention. With the election of Tony Blair's Labor government in 1997, measures to protect vulnerable consumers were instituted; price caps were reduced to zero percent above inflation at the 1999 Periodic Review (Bakker 2001). Instances of regulatory pressure on companies not to take up full-price caps and an increasingly frank focus on acceptable rates of return, rather than price caps, sparked pronouncements of the "death" of price cap regulation by regulatory economists (Mayer 2001).[14]

In contrast to other privatized utility sectors (such as telecommunications), where privatization and price cap regulation have led to increasing competition and reductions in prices, the water supply sector had proved to be the most problematic for the British model of privatized utility regulation. As a natural monopoly essential for public health and discursively constructed as an emblem of inclusionary citizenship, water supply access and affordability remain highly politicized. As stated by the Department of the Environment in 1985, one of the key objectives of the privatization program was to "free enterprise from state controls" (DOE 1986). However, as a senior economist with the Office of Water Services (the economic regulator) recently noted, "water remains a matter of public policy . . . political and social concerns are alive and well as key influences on the pattern of water prices" (Day 2003, 41)—precisely what the architects of privatization had hoped to avoid.

Conclusions: Uncooperative Commodities

Postprivatization, both the government and the economic regulator were intent on fully commodifying water. The conversion of water into an economic good required the introduction of true competition (via integrated, trans-watershed-infrastructure networks), and cost-reflective pricing (requiring new environmental valuation techniques and technologies such as meters in order to convey price signals). After a decade of experimentation, both of these initiatives have been substantially retrenched.

Market environmentalism in water supply in England can thus be characterized as a case of successful privatization, broad-based commercialization, and failed commodification. As explored above, this failure to commodify water is, in large part, due to water's geography: a life-giving, continually circulating, scale-linking resource whose biophysical, spatial, and sociocultural characteristics render it particularly resistant to commodification. The ecological and possible public health consequences of network integration of a flow resource effectively prevented the introduction of direct competition; the introduction of accurate prices was stymied by political resistance to metering and price increases due to water poverty and the difficulty of incorporating robust environmental economic valuation techniques.

The failure to commodify was further deepened by what Mansfield has termed the "geographical dimensions of neoliberal contradictions" (Mansfield 2004b). Charged with the duty of increasing competition in the water industry, regulators are faced with a trade-off between maintaining a sufficient number of comparators for comparative competition to function and maintaining sufficient takeover pressure on water company managers as an incentive for performance. With respect to water pricing, regulators are confronted with a contradiction between the outcome of the application of the principle of economic equity (spatial differentiation of prices to facilitate competition) and a politically acceptable threshold of spatial homogeneity of bill levels. In environmental regulation, a contradiction may arise when employing techniques of water valuation: an accurately valued environment may not be sufficiently valuable enough (in monetary terms) to justify the goals and standards of environmental conservation. When implementing demand side-management policies in the water industry, a (narrowly defined) concept of economic efficiency as employed in LRMC pricing formulae may, in some instances, counteract water conservation, in the sense of a sustained reduction of water demand.

As explored above, these contradictions could not be resolved within the postprivatization regulatory framework, leading to substantial reregulation of the water industry. Moreover, intense political debate about water's identity—as entitlement for citizens, or as commodity for customers—further destabilized the market environmentalist project. Hence, the government retreated from valuation and liberalization, scaling back on plans to introduce direct competition and trading of abstraction licences, dropping the requirement for universal metering, and reinserting social considerations, particularly for vulnerable consumers, into the pricing framework. The postprivatization regulatory framework is thus characterized by a mix of command-and-control regulations and market mechanisms; for example, man-

datory leakage targets set by the government, with companies and the regulator negotiating over capital expenditure to reach "economic levels of leakage."

This process of reregulation is by no means unique; the increasingly interventionist role of the state in England and Wales's water follows a generalized pattern, which Peck and Tickell characterize as a shift from roll-back to roll-out neoliberalism (Peck and Tickell 2002). Yet the shift in water governance should not be read as a mere tightening of command-and-control regulatory techniques, nor as a retreat from commercialization. Rather, key elements of the market environmentalist project—the broad-based commercialization of the water supply industry, together with the insertion of environmental considerations into virtually every aspect of water supply management and regulation—remain intact.

Accordingly, although water has proved to be an uncooperative commodity, the question of the effects of market environmentalism must be treated with caution. Drinking water and environmental water quality have improved since 1989. Some of these environmental improvements may be attributed to the reregulation that took place during the 1990s, as the shortcomings of the postprivatization became increasingly apparent (Bakker 2004); the role of the European Union in legislating and enforcing water quality standards has also been critical (D. Walker 1983; Buller 1996; Kallis and Butler 2001).

Why would this be the case? In this article I have argued that improvements in environmental quality arose in part because water has been recoded as part of the environment (rather than a mere resource); this new definition has been formally incorporated into the regulatory framework, with conservation and preservation supported by a broad range of regulations and techniques and by strategic alliances between economists and environmentalists both within and beyond the formal regulatory framework. The reconfiguration of citizens as consumers under market environmentalism has thus occurred in tandem with the representation of the environment as a legitimate user whose interests are to be balanced with—or even prioritized over—those of consumers.

This analysis contrasts with critiques that emphasize the negative environmental implications of deregulation as proof of "greenwashing" (Greer and Bruno 1997) or as evidence of the moral unacceptability of the neoliberal model as applied to nature (Goldman 1998). These critiques overlook the ambiguity and potentiality of market environmentalism, through which greater legitimacy and protection for an expanded environment have been embedded in water regulation and management in England and Wales. My argument is not that neoliberalism is causally related to improvements in environmental quality. Rather, my point is that neoliberalization is constituted by (and constitutive of) processes of reregulation that may result in improvements in environmental quality. The difference between these two arguments is subtle, but important. The former asserts a causal relationship; the latter, in contrast, cautions analysts not to jump to conclusions about causality and, in particular, not to assume that environmental quality can only decline in the context of neoliberalization of resource regulation.

This argument is predicated upon an analytical framework that, in contrast to much of the literature on neoliberal nature, treats privatization, commercialization, and commodification as distinct processes. Privatization is not, in this case, a variant of commodification (contra Castree 2003), nor is commodification an inevitable result of privatization. A more general claim follows: although neoliberalization usually implies the growing prevalence of market institutions, this does not imply an automatic or complete commodification of socionatures. Applying this framework to the case of water supply in England and Wales enables explanation of why the government and economic regulator were so intent on introducing competition and pricing mechanisms in the years following privatization. Moreover, this approach avoids the pitfall of assuming that neoliberalization is hegemonic; rather, acknowledging that the architects of privatization lacked a clear blueprint for how a privatized system would function (beyond the abstractions of economic theory) allows for a focus on the ensuing process of experimentation and reregulation, thereby recasting commodification as transient and partial. In refusing to treat neoliberalism as a totalizing project, this approach opens up analytical opportunities for undermining the narratives of resource triumphalism often associated with projects of neoliberal nature, such as market environmentalism (Bridge 2001), while enabling more precise explanations of reregulation.

In turn, this enables a focus on the progressive possibilities opened up within the current international trend towards market environmentalist resource management. This is particularly relevant to the case of water. Some of the great gains in human welfare during the twentieth century associated with the state hydraulic paradigm were made at the expense of the environment—with the state temporarily devolving costs onto the environment in what might be termed an ecological fix (Bakker 2004), rationally administering massive environmental degradation and systematic underprovision of environmental goods. Attitudes toward the state be-

come more ambivalent (and the conflation of state with public interest more obviously erroneous) when one factors the environment into the redistributive equation. This is particularly relevant to developing countries, where community-led resource management remains widespread and, in many cases, a more viable option to state-led development models—more accurately described as the territorialization of state power through an imposition of control over local resources (Bakker 2003a). Acknowledging that market environmentalism is implicated in broader processes of reregulation, which do not necessarily have negative implications for the environment, may open up opportunities for securing improvements in environmental quality.

More generally, this insight may allow us to engage with neoliberalization as a process of reregulating socionatures that entails a shift in power geometries, empowering some socionatures and disempowering others, reconfiguring (and in some cases constraining) the entitlements of both humans and nonhumans. In the case of market environmentalism in England and Wales, interests circumscribed as environmental have gained ground against those of human consumers and labor. European Union regulations, domestic environmental politics, and a formal regulatory framework converged both to drive privatization and commercialization and also to support the elevation of environmental quality improvements to enforceable standards, backed by legislative requirements and enacted by a robust regulatory framework. Improved water quality and increased protection against domestic disconnections are respective examples of progressive environmental and social aspects of this transition. Yet the balance of cost allocation has shifted; whereas the social costs of water production were previously externalized from the sphere of the politicized citizen and borne by the environment, the environmental costs of water production are now (to a greater degree) externalized from the sphere of capitalized environment and borne by consumers. Of course, the distinction between environmental and social costs is a constantly shifting and unstable divide; as David Harvey has repeatedly pointed out, ecological projects are always sociopolitical projects (and vice versa) (Harvey 1996). The task for the analyst, as attempted in this article, is to identify how our collective commitment to socioenvironmental justice has been altered as a result.

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Notes

1. Water supply in England and Wales is administratively distinct from Scotland and Northern Ireland, where water supply systems are publicly owned and managed. Public water supply is the largest element of water usage in England and Wales, representing approximately 40 percent of total abstractions. Hydropower is the next largest use at approximately 25 percent of total abstractions.
2. The classic definition of a market failure is a case in which a market fails to allocate goods and services efficiently, due to the failure to meet assumptions of standard neoclassical economic models. For example, market failures occur when property rights are not clearly defined or are unenforceable, when goods are nonexcludable and nonrivalrous (public goods), when prices do not incorporate full costs or benefits (externalities), when information is incomplete, or in a situation of monopoly.
3. The concept of Pareto-optimality (drawn from welfare economics) refers to a situation where no individual can be made better off without another individual being made worse off; in other words, to a situation where no resources are wasted.
4. The 1992 International Conference on Water and the Environment set out what became known as the Dublin Principles, including, "Water has an economic value in all its competing uses and should be recognized as an economic good." The Dublin Principles have been adopted by numerous international, multilateral, and bilateral agencies including the World Bank. The Ministerial Declaration of the Hague on Water Security in the twenty-first century followed the interministerial meeting known as the Second World Water Forum in 2000. See www.worldwaterforum.net.
5. Current cost replacement value (1989).
6. Two of the most important directives specified standards for the quality of water for human consumption (80/778/EEC) and for bathing waters and beaches (76/160/EEC).
7. Under the 1999 revisions to the Water Act (1991), consumers may opt out of metered supply, but may exercise this choice only if water in the home is not used for nonsubsistence purposes (such as garden watering or a pool) or if the property is in an "Area of Water Scarcity," as designated by the Secretary of State for the Environment (S.I. 1999 No. 3442). The legal definition of water scarcity is relative to available resources, "likely" demand, and the measures a company could undertake to meet demand. In these areas, water companies will be able to undertake measures not normally permitted under the current regulatory framework, such as compulsory metering.
8. Abstractions are subject to licensing by the Environment Agency, the main environmental regulator of the water supply industry, to whom abstraction license fees are paid.

9. 13.8 million pounds for the financial year 2002–2003, exchange rate 1$USD = 0.558 pounds sterling (Ofwat 2003).
10. The Competition Commission conducts in-depth inquiries into mergers, markets, and the regulation of the major regulated industries. The commission was established by the Competition Act (1998) and replaced the former Monopolies and Mergers Commission.
11. The threat of takeover is not eliminated, as water suppliers may still be taken over by other companies not already operating in the domestic water sector.
12. Personal communication, Office of Water Services, September 2004.
13. As originally set out in the Water Industry Act (1991) and as extended by the Competition and Services (Utilities) Act (1992) and the Competition Act (1998).
14. In contrast to the years immediately following privatization, the economic regulator now makes explicit announcements regarding expected rates of return. At the most recent periodic review (1999), price cap cuts implied a reduction in companies' rates of return; the overall pre-tax return on regulatory capital value was 6.6 percent in 2001–2002, down from a high of 10.1 percent in 1998–1998 (Ofwat 2002b).

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Correspondence: Department of Geography, University of British Columbia, Vancouver, BC V6T 1Z, Canada, e-mail: bakker@geog.ubc.ca.