A Political Ecology of Water Privatization[1]

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Introduction Private-sector participation in the financing, construction and management of water supply infrastructure has increased significantly over the past decade. In OECD countries, this trend has been particularly evident in the United States, England and Wales. In Canada, several municipalities—including Goderich, Halifax, Hamilton-Wentworth, and Moncton—have initiated a variety of projects (such as management contracts or outsourcing of water treatment plants) with the private sector.[2] In non-OECD countries, between 1987 and 2000, 183 water and sewerage projects with private participation were initiated (Table 1).

Table 1
Water and Sewerage Projects with Private Participation in Developing Countries (1987 - 2000)

Year	Number of Projects Reaching Financial Closure (cumulative)
1987	2
1988	2
1989	5
1990	5
1991	7
1992	13
1993	22
1994	37
1995	57
1996	75
1997	105
1998	124
1999	158
2000	183

Source: World Bank PPI database (personal communication)

Argentina, Bolivia, China, Chile, Indonesia, Morocco, the Philippines, Poland, South Africa, Thailand, and Turkey are just a few of the countries in which the state has initiated private-sector participation in water supply.

A handful of private companies holds the majority of contracts, and these companies have been increasing their market share in the domestic water supply sector. Thames Water, England's largest water supply company, for example, has more than 25 million customers on four continents, having begun to diversify from its London-area base only a decade ago.

This trend stands in marked contrast to the increasing dominance of the state in water supply services provision over much of the twentieth century. Water management norms are currently undergoing a dramatic institutional and organizational transformation through a process of marketization: the introduction of markets or market-simulating decisionmaking techniques, and the participation of private companies and private capital in resource development, water supply, and wastewater treatment. Corporate control of water resources development, allocation and supply is gradually being ceded by the state to private companies, decisionmaking mechanisms are increasingly market oriented or market mimicking, and (to a somewhat lesser extent) decisions about water allocation are increasingly being made via the market rather than (or alongside) public policy mechanisms.

This paper provides an overview of the debate about water marketization from the perspective of political ecology—understood as the political economy of socio-environmental change. There exists a large number of studies on water privatization and water management. This paper does not seek to synthesise or summarize their results;[3] rather, it presents a framework for analyzing the simultaneously political, economic and ecological processes underpinning water marketization, and attempts to clarify what a political ecological—as opposed to a political economic—approach might contribute to the privatization debate. The first section of the paper presents an overview of water supply marketization. The second section analyzes a genealogy of ideas about water as a resource, and explores the key economic, political and environmental arguments made in favour of water marketization.

In particular, the paper argues that privatization must be understood within the context of a broad-based transformation in water management, from what I term a "state hydraulic" to a "market conservation" mode of water regulation. In the final sections, three key elements of a political ecology approach to resource marketization are proposed, and the relevance and usefulness of a political ecology approach is discussed.

Water Marketization

> It is safe to predict that turning water into a commodity will prove controversial and will draw deeply on a government's goodwill and credibility with its citizens. Governments should, however, seek every opportunity to remind their citizens of the alternative...a grim scenario of growing and eventually disastrous water stress.[4]

Private participation in water supply is not a new phenomenon. The highly variable mix of private and public systems and operators in OECD countries bears witness to repeated shifts between private and public ownership and management of water systems, particularly over the past two centuries.[5] In countries such as France and Spain, private-sector management of municipally owned water supply infrastructure via long-term management contracts is the norm. The first companies to supply London with water were privately owned; after a period of state (municipal and then national) ownership in the twentieth century, the English water supply utilities were privatized by asset sale in 1989. In many non-OECD countries, the public water supply system—typically a network servicing wealthier neighbourhoods in urban areas—coexists with a private, typically informal water sector. In most cities of the global South, private water vendors—delivering water to households by jerry can or tanker—have long been the means by which the poor obtain water, usually at a cost per unit volume several multiples of that delivered via public water supply systems to the middle and upper classes. Public and private, artisanal and industrial, corporate and community-controlled water supply systems coexist around the world.[6]

Given the multiple meanings of "public" and "private" in colloquial usage, the definition of "privatization" requires refinement. The term "private" as it is used in current debates refers to corporate control by private, for-profit companies (and generally excludes "private" management by communities). The term "privatization" therefore refers to the shift in control from the public to the private sector, through a transfer of ownership or management responsibility for water supply infrastructure. The British case is frequently cited as an example of water privatization. In 1989, England and Wales' ten publicly owned water "authorities" were sold through flotation on the London Stock Exchange, although the Welsh company has recently decided to return itself to "public" ownership by converting into a not-for-profit locally based member-owned company.[7] More careful analyses distinguish between full privatization (divestiture—the sale of assets to the private sector), and what are (in Canada) termed "public-private partnerships"—varieties of contractual arrangements whereby private companies manage infrastructure on behalf of its public (often municipal) owners. French water supply management—in which private companies manage municipally owned water supply infrastructure under long-term contracts commonly referred to in English as "concessions"—is the most frequently cited example of PPPs in water. The majority of water supply "privatizations" to date are, in fact, PPPs, many of them in urban areas of developing countries.[8] Private sector involvement in water supply thus occurs along a continuum, in which distribution of responsibilities for various water management functions are variously allocated between the state and private actors (Figure 1).

Privatization often occurs along with the commercialization of water management. This entails a revision of management institutions,[9] replacing public-sector with private-sector norms. Commercialization may involve the reworking of decisionmaking mechanisms (marketable permits being substituted for public policy allocation of water rights), and of management mechanisms; with, for example, law being replaced by contract as a regulatory mechanism, and hierarchy by competition as an incentive mechanism. This may involve the introduction of markets as allocation mechanisms such as tradable permits in water rights; some water markets

have a long history, such as that in Spain's Canary Islands, and others, such as that of Chile, have been introduced very recently.[10] Market-simulating decisionmaking techniques may also be used; the "comparative" or "yardstick" competition model used in conjunction with price-cap regulation in England and Wales relies on an economic regulator as a "proxy for the market."[11] Market principles (such as economic efficiency and economic equity) and management cultures are frequently introduced. In some places, proposals to introduce competition in the domestic water supply market have been put forward; in England, this would allow consumers to choose between water providers just like electricity or cable providers.[12]

Examples of full marketization are rare; many water companies, however, are highly commercialized. In Amsterdam, for example, the corporatized water utility, legally a private company, operates independently from local government on a full-cost recovery basis, although it remains publicly owned. Privately owned companies are not always fully commercialized; private firms involved in public-private partnerships in developing countries frequently operate tariff structures which provide cross subsidies to poorer consumers. The distinction between fully "public, non-commercialized" and "private, commercialized" is thus relative, and highly contextual, as water property rights institutions and water regulation norms vary significantly from place to place.

In most cases, the introduction of private-sector participation entails a degree of commercialization, whether through a reworking of allocation principles (from social equity to economic equity)[13] and infrastructure management goals (from security of supply to cost recovery), or through a redefinition of principles underlying the business of water supply; water ceases to be a service, supplied at subsidized rates to citizens as a right, and is increasingly viewed as a commodity, sold to consumers on a profit-making basis of willingness-to-pay, rather than ability-to-pay. Even when water moves from public to private monopoly control, without the introduction of competitive markets, privatization is frequently accompanied by a discursive rescripting of water as a commodity rather than a public good, and of users as individual consumers rather than a collective of citizens. Privatization and commer-

cialization in this context refers not to a complete, abrupt conversion from monolithic "public" to "private" control, but rather as an organizational and/or institutional shift along a continuum of water management options towards the market and private corporations and away from the state.

Justifying Privatization: The Retreat of the State, Growing Water Scarcity, and the Lack of Public Finances How do we explain the re-emergence of the "state versus market" debate at the turn of the twenty-first century, given the decline of private sector influence and rise of state dominance in both water supply and water resource management in the twentieth century? Three arguments are frequently invoked: the conjunctural crisis of state finances; a structural "state failure;" and an emerging crisis of water scarcity.

From Market Failure to State Failure: The Demise of the State Hydraulic Paradigm Throughout much of the twentieth century in many countries, water management and investment in the water sector were mechanisms of social legitimization of the state, while playing a supportive role in capital accumulation. Water was understood to be a strategic resource for societies undergoing modernization (and hence industrialization and urbanization), and a factor of production, the use of which has enormous impacts on public health and environmental quality. Drinking water supply was conceived of as a public good, a necessary precondition to participation in public life. The entrenchment of an informal "right" to water (for example, by requiring all households to have water connections and banning disconnections) may be narrowly read as a class accommodation, with the state mediating the inevitable conflicts over water use and facilitating cross-subsidies from one class of users to another. More broadly, water, as with other welfare services, came to signify a broader set of sociocultural entitlements and, as such, may be read as a material emblem of citizenship. This "state hydraulic" mode of regulation varied considerably from one country to the next, but can be characterized by near-complete public control of water resources development, and allocation to strategic sectors by the state on the basis that water is a "public" rather than "tradable" good, whose provision is best undertaken as

a service by the state rather than as a business by the private sector.

The state hydraulic paradigm was frequently justified through reference to the "market failures" which characterize water supply provision. Proponents of the "market failure" argument typically characterized water supply as a "public good," given its public health aspects, linked to the externalities associated with water supply. The high degree of natural monopoly in water supply networks was another argument made against ownership and management of water supply infrastructure by private companies. In addition, the symbolic and cultural importance of water as a (partially) non-substitutable resource essential for life, its strategic political and territorial importance, the intense conflicts that arise over the use of a flow resource required to fulfil multiple functions (agricultural, industrial, drinking water, environmental), and the need in industrialized, urbanized societies to mobilize large volumes—invariably at a high cost relative to the economic value generated implying large, long-term capital investment requirements which private companies were not always willing to assume—have been used, particularly in the twentieth century, to justify public-sector involvement. Indeed, the health and hygiene effects of lack of access to water, together with the tendency of private companies to fail to extend coverage to the poor (both as a result of the tendency to cherry-pick profitable neighbourhoods and classes of consumers, and the high prices and poor services resulting in a situation of natural monopoly), were two of the most important justifications for bringing water supply under the control of the state, whether through strict regulation or public ownership of water supply infrastructure.

Over the past two decades, the concept of state failure has gradually displaced the concept of "market failure" which formerly underpinned arguments in favour of public ownership and management of water. Proponents of the state failure hypothesis assert that flawed management by the state, due to structural defects in public sector management of water, is responsible for the well-documented poor quality and low penetration of water supply systems worldwide. The state, argue the leading multi-lateral lenders for water projects, is "overextended;" only by "relaxing the government's

grip" can countries "free up public resources for high-priority activities; pave the way to better, cheaper services; and unlock opportunities for private sector development."[14] The underlying assumption is that the market is more efficient than government at providing basic services. The involvement of the private sector increases efficiency, it is argued, in part due to the inherent ability of the private sector to innovate, and partly through removing social policy goals from water policy such as employment generation or (more commonly) wealth redistribution through cross-subsidy. Public utility services provision is thus inherently less efficient; in the language of water economists, utility services provision is characterized by "state failure."

Whereas the concept of market failure once underpinned arguments in favour of state provision of water services and management of water resources, state failure is now invoked to argue in favour of marketization. Given state failure, "there is no good economic reason for state ownership to persist in tradable-goods industries."[15] Given that the state is inherently less efficient than the market as a set of social institutions for decisionmaking about resource and wealth allocation, a higher degree of involvement of the market is required in the water sector. Underpinning this argument is a dual discursive move. The category of tradable goods has been expanded to include water: no longer a public good subject to market failures which must be supplied by the state at subsidized prices, but a tradable good which can profitably be supplied by the market under competitive conditions. The utility sector is simultaneously reconceptualized as potentially profitable (running counter to assumptions held throughout much of the twentieth century), rather than a provider of strategic resources in need of subsidies.

The Production of Scarcity and the Rise of The "Market Conservation" Paradigm If water is reconceptualized as a tradable rather than public good, it follows that consumers of water are categorized as customers rather than citizens, who have access to water through their purchase of water as a commodity, rather than the right to a water supply service. Water provision is a business rather than a public service, which (whether under public or private ownership) should

have as its primary goal the maximization of economic efficiency rather than social equity, in the context of the increasing scarcity of water resources. 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. The logic of the market implies greater efficiency which in turn implies conservation; hence the strategic alliances which frequently form between ecologists and economists in support of marketization. This argument is supported by a second discursive move: 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 marketization: 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.

This claim of generalized water scarcity deserves close scrutiny. Water is a resource mobilized by humans on a massive scale. Humans withdraw 5,200 cubic kilometres—or 5.2 trillion metric tons—of water annually (10 percent of total surface runoff).[16] These global figures mask, of course, the high degree of spatial and temporal availability of water; withdrawals are greater than 50 percent of runoff in some regions (North Africa, Central Asia, South-Western US, South-Eastern England). In these regions, water quantity, and in more humid regions, declining availability due to declining water quality, are the causes of the scarcity experienced by humans. Scarcity, in other words, is socially produced (sometimes termed "second-order" scarcity). That our awareness of scarcity is growing is a signal not of absolute scarcity, but of relative scarcity, due to factors such as increasing pollution, population density, and water use per capita.

The increasing awareness of scarcity is in part attributable to the growth in second-order (i.e., relative) scarcity, and also to the appeal of the often implicit Malthusian-style assumptions about the "limits to growth." This is particularly but by no means exclusively applicable to some environmental

groups, for whom an ethic of care has been gradually displaced by a discourse of sustainability and associated logic of compensation in their convergence with economists in advocating an ethic of efficiency in resource management. The shift from state to market, and from a focus on water supply to water conservation, are thus often intertwined in current water policy debates. From this perspective, water marketization is part of a more generalized transition to a new mode of resource regulation which I term the "market conservation" paradigm (Table 2). Conservation should here be read in both a political economic and ecological sense: as the preservation of capitalism as a socioeconomic system, and as the prioritization of environmental conservation—as both market opportunity and strategic necessity—enacted by both private companies and the state.

Table 2: State Hydraulic versus Market Conservation Modes of Water Regulation

State hydraulic	Market environmentalist	
Economic regulation	Command-and-control	Market-based instruments
Resource management	Growth-oriented, supply-driven	Scarcity-responsive, demand-led
Network manager	State	Market
Primary goals	Universal provision; quantity	Efficiency; quality
Provision ethos	Service	Business
Consumer identity	User	Customer
Method of charging	Unmetered	Metered
Raw water	Resource - subsidized or free	Environment - abstraction priced
Water supply pricing	Social equity (ability to pay)	Economic equity (benefit principle)

The Crisis of State Finances The lack of finance for public sector investment in water provision is the third key justification for marketization. Water is a liminal, yet also a highly strategic resource for capital accumulation. This strategic role remains a key justification for public involvement in water management, and was a key factor in the increase of public control of water supply and management (particularly in OECD countries) over the twentieth century, a process in which water resources and often supply networks were taken under public ownership, and water was supplied at subsidized

rates, allocated by the state via public policy mechanisms rather than the market.

The implementation of the state hydraulic paradigm was concretized (at least in most OECD countries) in the postwar period during which the state undertook to provide those services necessary to capital accumulation that were assumed to be unfeasible for the private sector. In many European countries, and in contrast to the nineteenth century, the state entered into the business of water supply, approaching water supply provision as a welfare service and developing water resources as necessary and strategic factors of production. In most industrialized countries and in many urban zones of developing countries, public ownership of utilities and development of resources was underpinned by a model of social welfare in which state provision of an expanded sphere of "public goods" was thought to be in the general economic and social interest.[17] This mode of regulation (variously termed Keynesian, Fordist, or social welfarist) was expressed in different ways in different countries. In the United Kingdom, the entire water use and wastewater disposal cycle was brought under centralized public ownership; in France, private companies continued to operate as service providers to infrastructure-owning municipalities. In Spain, investment in water resources was crucial to Franco's project of agricultural modernization, and the state assumed complete control over surface water resources across all sectors.[18]

In those countries where a high degree of control was assumed by the state, continued public provision of this resource was, by the end of the twentieth century, being undermined by the contradiction which beset public goods provision more generally: the continued legitimacy of the state depended on the satisfaction of expectations that it had itself sanctioned, but which threatened to undermine either environmental sustainability (both in terms of degradation of quality and in terms of second-order (human-created) scarcity) and/or economic competitiveness.[19] The global crisis of the "administered" mode of regulation beginning in the final quarter of the century both contributed to, and was exacerbated by the breakdown of the state hydraulic paradigm. In the case of the water sector, the macroeconomic crisis of the state justified underinvestment in infrastructure and services;

the lack of public finance and the resulting decline in service provision standards (declining quality or quantity, rising prices) undermined the legitimacy of the state as service provider, in turn providing justification for marketization.

Towards a Political Ecology of Water Marketization Having summarized the characteristics of water marketization and outlined the key arguments deployed to argue its desirability, necessity or inevitability, I now consider what a political ecological approach could contribute to the debate. First we return to a more careful consideration of the materiality of water, and the distinct challenges it poses to privatization and commercialization.

Acknowledging the Materiality of Nature Frequent reference is made to "materiality" in political ecological debates, where the term serves as a kind of (rarely decoded) codeword for those seeking to (re)incorporate nature into political economic analysis. At one level, materiality refers to nature as object of the analysis—an acknowledgement of the key role occupied by nature—transformed into resources—in our political economies. This use of the term "materiality" implies an acknowledgement of the corporeality of our economies, of their embeddedness in natural processes.

The term "materiality" also refers to an understanding of nature as a subject of political economic processes. Traditional political economic analysis distinguishes between different kinds of "raw materials," the natural resources available "free" to humans, only insofar as they figure in the production process.[20] As water flows through supply networks, for example, it is simultaneously a raw material (abstracted from a river), a product of the labour process (having been filtered, pumped, and chemically treated) and an instrument of labour (used not only in industrial manufacturing but also a physiological requirement of workers). This categorization is relational, determined by its specific function in the labour process. As Benton argues, however, in his renovation of Marx's concept of labour in an attempt to broaden historical materialism to address "green" issues, much political economic analysis has overlooked nonproductive types of labour, thus evading consideration of the ecological implications of capi-

talist accumulation. In particular, the adaptive and transformative dimensions of the labour process have been overlooked.

Although I agree with Harvey's and Burkett's critiques of Benton's analysis,[21] in particular the weakness in his resuscitation of a nature/society dualism, Benton's argument highlights an important point. The analytical focus of much political economy on labour as a transformative process rather than an adaptive process allows political economic analysis to ignore the very different qualities of various raw materials that should be acknowledged in a relational-dialectic treatment of resources. Privileging the factory as archetypal worksite overlooks the different processes by which use-values are transformed into exchanges values in, for example, a forest or a river. Specific constraints imposed by different biophysical characteristics of "natural resources" will give rise to specific issues in their appropriation into production which will affect how differential rents are captured. This is relevant to analyses which attempt to explain why some resources are more fully and seemingly more easily commodified than others.

Water, for example, is partially nonsubstitutable, essential to urbanization, industrialization and intensive modern agriculture. Water, unlike land, is a flow resource; interconnected, and less easily bounded above or below ground. Water may serve multiple uses simultaneously, and be required to perform several functions in one circuit through the hydrological cycle. This difference is reflected in the fact that property rights are more difficult to establish for water than for most other resources, and boundaries are often more blurred. To a first approximation, the monopolization of location (not water itself) in order to extract profit, and associated territorial effects apply to water as much as to land.[22] Profit extracted from this monopolization of water, and to some extent its price, however, is determined through externalities (Swyngedouw's "territorial effects") peculiar to it as a resource, in particular the degree to which negative externalities can be displaced through taking advantage of the unique flow properties of the water resource. Because negative territorial effects are difficult to control or mitigate under private property regimes given that water is a flow resource, this provides a justification for the involvement of the public sector

and eventually undermines private sector water provision, which is also hindered by the difficulty of creating a market in water supply with multiple networks given highly local nature of the resource (cheap to store, expensive to transport). These qualities of water—a flow resource essential to life through which negative territorial effects can be easily displaced—explain, in part, why water has remained at the frontier of the state and the market.

Water's biophysical characteristics, in addition to human water use practices, are important reasons why water supply has proved to be more difficult to commodify than other resources. Another factor which underlies water's "uncooperativeness" as a commodity is its density: water is one of the heaviest substances mobilized by human beings in their daily search for subsistence. Herein lies an important part of the reason why water historically has been at the limit of the sphere of applicability of the market as a social institution for allocating resources. The public-private tension that besets water supply provision is due in part to water's biophysical characteristics: water is expensive to transport relative to value per unit volume, requiring large-scale capital investments in infrastructure networks which act as an effective barrier to market entry. Water supply is thus highly susceptible to monopolistic control (economists' "natural" monopoly). Fully marketizing water utilities is, as a consequence, invariably fraught with difficulty to a greater extent than for other network utility services such as telecommunications, gas, and electricity. This is an important factor in explaining why, throughout most of the past century, water supply management (as distinct from water resources), particularly but not exclusively in OECD countries, was characterized by the dominant role of the state as owner, manager, and regulator of infrastructure.

Retheorizing Resource Regulation A focus on the materiality of water opens up an understanding of the implications of its particular biophysical characteristics for the social relations (such as property institutions) of its production. This sort of understanding is critical to an analysis of the marketization of any resource. A political economic theory of a specific resource (rather than of Nature writ large) must specify the

particular social-natural articulations between production and consumption, and account for how H_2O's biophysical characteristics both enable and constrain its own production. In other words, acknowledging the materiality of water involves recognizing the socially and temporally contingent limits to the utilization of H_2O in line with human intentions. This semantic distinction between "H_2O" and "water" is deliberate.[23] Whereas H_2O circulates through the hydrological cycle, water as a resource circulates through the hydrosocial cycle—a complex network of pipes, water law, meters, quality standards, garden hoses, consumers, leaking taps, as well as rainfall, evaporation, and runoff. Water is a dynamic resource landscape, generated by the processes imperative in the uneven development of capitalism.[24] This does not imply that a distinction is to be made between "first nature" and "second nature;" both H_2O and water are produced in nature, in a "complex dialectic between production and nature."[25] Rather, water is simultaneously a physical flow (the circulation of H_2O) and a socially and discursively mediated thing implicated in that flow.[26] The water supply network thus extends far beyond the mains conveying water to customers' taps; it is not bounded by the physical infrastructure that abstracts, treats, and distributes water, and removes wastewater. Exchange relationships, demand patterns, customers' expectations about water quality and pressure, laws at national and supranational levels concerning water quality, rainfall patterns, even climate change shape the flow of water through the pipes. Water circulation, in short, is dependent upon institutions and practices as much as on the hydrological cycle; it is not only physically produced, but also socially enacted.[27]

This notion of "enactment" underpins the definition (often deployed, in various guises, by political ecologists) of resource regulation as the social negotiation of the metabolism of a dynamic resource landscape. Human metabolism of water (as with other resources) is, in other words, simultaneously produced materially and enacted socially. This use of the term "metabolism" recovers a dimension of a term often used in Marxian political economy: "metabolism" is understood not as the mere act of digestion or consumption, but rather as the practice of mutual trans-

formation of socio-natures. From the political ecological perspective, then, resource regulation is defined as a practice—of adapting to and transforming nature, and of being transformed in the process—rather than a set of rules or customs and their application. If socioeconomic change and environmental change are mutually constitutive, then regulation is the act of mediating this relationship, an act undertaken by both nature and humans.

Interrogating the Role of the State If we view resource regulation as the social negotiation of the metabolism of a dynamic resource landscape, a term such as "de-regulation" becomes a misnomer. Regulation does not refer to a quantity of rules or norms; rather, it is a practice in which we always (and inescapably) engage. Redefining regulation in this way displaces the analyst's gaze. Rather than an analytical focus on correct "frontier" between state and market and a reliance on the public-private binary, a political ecological approach understands water as a stubbornly uncooperative resource—difficult to marketize—and scrutinizes the diverse forms of regulation of which private corporate and public corporate (i.e., state) control are only two examples.[28] Rather than perceiving privatization as an act of deregulation, attention is brought to bear on the ways in which the state strategically repositions its allegiances and commitments.

Marketization, from this perspective, entails the (re)introduction of markets and market mechanisms into a resource subsector from which they were previously excluded, yet this process is not controlled by market institutions; it is a process initiated and guided by the state in response to specific strategic dilemmas which can no longer be managed within the current political-economic conjuncture. Marketization should thus be understood as a process of reregulation rather than deregulation, characterized by an emergent form of governance of natural resource allocation, which entails mutually constitutive organizational change (in the structure of government) and institutional change (in forms of governance). In the case of water supply, marketization is often characterized by both the devolution of responsibility for water supply to the private sector, and a greater level of state involvement in environmental regulation and extension of control over raw water sources.

What drives this process of reregulation? To rephrase the question: why are we observing a shift from the "state hydraulic" to the "market conservation" paradigm across so different resource sectors? From a political ecological perspective, marketization is implicated in the more generalized process of the "greening" of capitalism underway since the last quarter of the twentieth century.[29] This process is characterized by two tentative, incomplete, interdependent attempts by different segments of capital to cope with the environmental "bads" of industrial development. The socioeconomic dimension of the greening of capital entails a reconversion of modes of accumulation which valorizes rather than exploits nature, in part by internalizing and seeking to profit from negative environmental externalities. This occurs concomitantly with a sociocultural transformation in which the role of the state is one of allocation and mitigation of the "bads" rather than allocation of the "goods" of development.[30] One of the most important "bads" arising from the industrialization and urbanization of water is the production of water scarcity, a generalized phenomenon in humid as well as arid countries, resulting from increasing pressure on water resources in terms of quality (increasing pollution) as well as quantity (increasing demand for water). Given that water is an indispensable lubricant of industrialization and urbanization,[31] the production of water scarcity represents a significant threat to continued capital accumulation, to which capital responds in a variety of diverse, creative and constantly evolving ways.

In the case of water, scarcity is frequently deployed as a justification for marketization. From a political ecological reading, proponents of marketization are successful in blurring the distinction between "second-order" (human-created) and "first-order" or natural water scarcity, enabling the assertion not only of the desirability, but also the necessity and inevitability of marketization. The production of scarcity is, in this reading, both structural to and highly functional for capitalism. To paraphrase Vandana Shiva, water marketization is "capitalism's way of turning a threat into an opportunity."

Within this contested process of reregulation, the state, as an ensemble of forms of government and institutions of governance, is a strategic terrain, or what Jessop terms a "site of

struggle:" an object and generator of current strategies as well as the product of past political struggles.[32] As a "key site in the strategic codification of power relations,"[33] the state responds to and also generates political strategies in mediating the process of reregulation of governance institutions via organizational forms which embody past as well as present political struggles. An analysis of marketization, as a process of reregulation of the social metabolism of nature undertaken by the state, must thus be contingent on analyses of specific political-economic conjunctures faced by specific states at particular moments in time.

Here it must be emphasized that the utility of any particular scale to political ecological-economic analysis is highly contingent. Environmental change, our changing metabolism of nature and socioeconomic restructuring are mutually constitutive processes. Yet not all of the articulations between nature and society are equally integrated into either market transactions or state functions. It is only with reference to those aspects of the metabolism of nature which were taken under state control (for example, in the case of water, in the twentieth century Keynesian welfare model or hydro-autarkic irrigation model), that the concepts and analytic tools developed by the regulation school to link intermediate-level phenomena (e.g., a national economy) with more abstract conceptions of economy and society are useful.

What Might a Political Ecology Approach Contribute to the Debate? Extensive political economic analysis has been undertaken of the privatization of public services and the restructuring of state functions in the final decades of the twentieth century.[34] This paper has attempted to outline what a political ecological analysis might contribute to political economic studies of water supply privatization. In particular, it has discussed three ways in which political ecologists rework certain aspects of the political economy tradition: acknowledging the materiality of nature; re-theorizing resource regulation; and interrogating the role of the state from a different perspective than that of much political economy.

What does this contribute to the debate? First, in beginning from the assertion that political economic analyses must incorporate not some idealized "nature," but rather analyze

specific resources in all of their particularities and complexities, a political ecological perspective can generate useful insights into the process of resource commodification. By analyzing adaptive as well as transformative labour processes, for example, we can better identify and explain the various types and degrees of barriers to commodifying and capturing differential rents from different resources. In particular, a political ecological perspective can help us retheorize resource regulation and understand why water privatization is re-emerging at the turn of the 21st century despite the fact that water remains a liminal resource for capitalism. This may, in turn, contribute to a more sophisticated articulation of alternatives when confronted with a menu of privatization and private-public partnership options which treats water as being little different from, say, electricity, telecommunications or roads.[35]

Second, in acknowledging the coproduction of socioeconomic and environmental change, a political ecological approach may generate new insights into contested and complex periods of transition between modes of regulation. Defining resource regulation as the social negotiation of the metabolism of a dynamic resource landscape implies the need for an analysis of the mutually constitutive interrelationships between the discursive, social and material dimensions of environmental change and socioeconomic restructuring. Detailed understanding of the implications of commodification in particular historical-geographical contexts requires analyses of specific modes of regulation of specific resources. These quotidian practices of regulation develop within and reinforce but also sometimes contradict broader macroeconomic patterns of resource regulation. In addition to the "unintended consequences" of resource exploitation which stem from and threaten to undermine sustained resource production, nature's agency may intercede. Weather patterns may shift; solar radiation levels may fluctuate; rivers may change course; tectonic plates may move. Regulation should thus be understood as the social negotiation of the metabolism of a dynamic resource landscape upon which we depend in a myriad of ways, of which we have imperfect understanding, and over which we have incomplete control. It is thus ironic, perhaps, for a research tradition that engages explicitly with the

nonhuman, much political ecological work employs ethnographic methodologies, confronting the issue of agency—of both humans and non-humans—in a way that much political economic research does not.

Third, a political ecology perspective may enable a more nuanced analysis of the "winners" and "losers" of privatization. Political ecology wrestles simultaneously with questions of social justice and environmental justice, and thus approaches the impacts of water privatization and commercialization rather differently than a strictly political economic perspective. This is because political ecology not only begins from the assumption that socioeconomic and environmental change are co-produced, but also broadens the set of actors—non-humans, as well as humans—who are considered both as objects of study, and also as holders of legitimate claims to equitable treatment. Privatization and commercialization of water often occur together with a simultaneous commodification and (re)valorization of the environment—prioritizing environmental protection over consumer's ability to pay, or industrial demands for water. The "market conservation" paradigm, when applied to water management, produces clear gains for the environment in some cases; hence the frequent disagreements between environmental groups and consumers groups in contemporary debates over water privatization.

Fourth, and closely linked to the previous point, political ecology provides an alternative vantage point from which to evaluate the role of the state, particularly in redistribution. My claim here is not that the "interrogation of the state" is a move unique to political ecology. Rather, political ecologists approach the state in a manner somewhat distinct from political economists. More precisely: the "retreat of the state" is a very ambivalent process when its environmental impacts (rather than the redistribution of the social surplus to humans) are considered. The state has in some cases rationally administered massive environmental degradation and systematic under-provision of environmental goods. 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."[36] Attitudes toward the state becomes 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, in many cases, as the territorialization of state power through an imposition of control over local resources.

More generally, acknowledging the critical role of the state in resource allocation allows us to transcend the public/private binary often invoked in debates over resource privatization, and to appreciate the active, strategic role of the state in marketization—not a "retreat" but a repositioning of the state—as an active agent in the transition from a "state hydraulic" to "market conservation" mode of water supply regulation. This interpretation of marketization as a process actively led by the state raises an important question: why would the state seek to cede water management functions to the private sector—a question which can only be answered in specific contexts. A political ecological framework sets the stage for responding to this question, reminding us that water privatization reconfigures the relationships between the state, the market, our water environments, and one another.

Notes

1. This paper benefitted from presentation and discussion at the annual *SPE* conference, organized by Roger Keil and Simon Dalby (Ottawa, February 2002). Greg Albo, Andrew Biro, Philippe leBillon, Alex Loftus, Bob MacDermid, and Ben Page provided helpful comments on various drafts. Funding received during the course of this research from the British Academy, the Nuffield Foundation, Jesus College, Tarmac plc, and the School of Geography and the Environment (University of Oxford) is gratefully acknowledged.
2. On the Canadian debate: for a public sector union perspective, see CUPE's WaterWatch campaign (http://www.cupe.ca). For an NGO perspective critical of water privatization, see the Council of Canadians' Blue Planet Project (http://www.canadians.org), and for a business perspective supportive of water privatization, see the Canadian Council for Public Private Partnerships (http://www.pppcouncil.ca).
3. The literature on water supply privatization is extensive. For analyses of specific cases of water privatization, see, for example, K. Bakker, "Paying for Water: Water Charging and Equity in England and Wales,"

Transactions of the Institute of British Geographers 26/2 (2001), pp. 143 – 164; K. Bakker and D. Hemson, "Privatizing Water: Hydropolitics in the New South Africa," *South African Journal of Geography* 82/1(2000), pp. 3–12; R. Batley, "Public-private Relationships and Performance in Service Provision," *Urban Studies* 33/4-5 (1996), pp. 723–751; P. Bond, "Privatization, Participation and Protest in the Restructuring of Municipal Services," *Urban Forum* 9/1 (1998), pp. 37-75; M. Drakeford, "The Poverty of Privatization: Poorest Customers of the Privatized Gas, Water and Electricity Industries," *Critical Social Policy* 17 (1997), pp. 115-132; D. Haarmayer and A. Mody, "Private Capital in Water and Sanitation," *Finance and Development* 34 (March 1997), pp. 34–37; N. Johnstone and L. Wood, (eds.), *Private Firms and Public Water: Realizing Social and Environmental Objectives in Developing Countries* (London: Edward Elgar, 2001); A. J. Loftus and D. A. McDonald, "Of Liquid Dreams: A Political Ecology of Water Privatization in Buenos Aires," *Environment and Urbanization* 13/2 (2001), pp. 179-199; J. O'Connell-Davidson, *Privatization and Employment Relations: The Case of the Water Industry*. (London: Mansell, 1993); D. Rivera, *Private Sector Participation in Water Supply and Sanitation: Lessons from Six Developing Countries* (Washington: World Bank Directions in Development, 1996); P. Saunders and C. Harris, *Privatization and Popular Capitalism* (Buckingham and Philadelphia: Open University Press, 1994).

4. J. Winpenny, *Managing Water as an Economic Resource* (London: Routledge, 1994), p. 110.
5. This is truer for water supply (i.e., water supplied in reticulation networks) than for water resources (i.e., bulk water). There are many more examples of water supply privatization than resources privatization and commercialization; Chile, the southwestern United States, and the Canary Islands being the most frequently cited examples.
6. For a discussion of different modes of public and private management and ownership, see M. Blokland, O. Braadbaart, and K. Schwartz, *Private Business, Public Owners: Government Shareholdings in Water Enterprises* (The Netherlands: Ministry of Housing, Spatial Planning, and the Environment, 1999); R Franceys *Private Sector Participation in the Water and Sanitation Sector* (Loughborough and London: DFID Water Resources Occasional Papers. Water and Engineering Development Centre and the Department for International Development, 1997); T. Lee, "Alternatives for Private Participation in the Provision of Water Services," *Natural Resources Forum* 20/4 (1996), pp. 333-341; A. Nickson, "The public-private mix in urban water supply," *International Review of Administrative Sciences* 63/2 (1997), pp. 165-186; R. Noll, M. Shirley, and S. Cowan, "Reforming Urban Water Systems in Developing Countries," in Krueger, A., (ed.), *Economic Policy Reform: The Second Stage* (Chicago: University of Chicago Press, 2000), pp. 243-291; R. Petrella, *The Water Manifesto* (London: Zed Books, 2001); M. Shirley, (ed.), *Thirsting for Efficiency: Experiences in Reforming Urban Water Supply Systems* (London: Elsevier, forthcoming); G. Silva, N. Tynan, and Y. Yilmaz, "Private Participation in the Water and Sewerage Sector—Recent Trends," *Public Policy for the Private Sector* (Washington, DC: World Bank Group, Note 147, 1998), pp. 1-8. For academic studies critical of the privatization process, with a focus on developing countries, see the Municipal Services Project website (http://qsilver.queensu.ca/~mspadmin). For an international union perspective, see the very extensive Public Services International Research Unit's website

(www.psiru.org). K. Bakker (forthcoming) "Urbanization and Water Privatization: Megacities and Urban Nature," Paper forthcoming in a special issue on "landscapes of change in the developing world" in *The Geographical Journal.*

7. K. Bakker, "From Public to Private to...Public? Re-regulating and 'Mutualizing' Private Water Supply in England and Wales," *Geoforum* (forthcoming 2003).
8. *Ibid.*, footnote (iv).
9. The term "institution" is here understood in its sociological sense of rules, norms, and customs.
10. Batista Medina, J. A. *"Respondiendo a la escasez de agua de riego: cambio institucional y mercado de agua. Estudio de un caso en las Islas Canarias" Revista española de economía agraria* 175/1 (1996), pp. 167-198. C. J. Bauer, "Bringing Water Markets Down to Earth: The Political Economy of Water Rights in Chile, 1976-95" World Development 25/5 (1997), pp. 639-656.
11. *Ofwat Prospects For Prices: A Consultation Paper on Strategic Issues Affecting Future Water Bills* (Birmingham: Office of Water Services, 1998).
12. DETR, *Competition in the Water Industry* (London: Department of the Environment, Transport and the Regions, 2000).
13. A key component of commercialization is the shift from a prioritization of social equity (the "ability-to-pay" principle) to economic equity (the "benefit principle") in water supply pricing (Bakker, 1999, 2001). In the former case, water charging mechanisms take into account the relative wealth of classes of consumers; in the latter case, water tariffs are related to the costs each individual consumer imposes on the water supply system.
14. World Bank *The State in a Changing World: World Development Report,* 1997 (Oxford: Oxford University Press, 1997), pp. 61-62.
15. *Ibid.*, pp. 64.
16. P. Gleick, (ed.), *Water In Crisis: A Guide to the World's Fresh Water Resources* (Oxford: Oxford University Press, 1993)
17. J. Ernst, *Whose Utility? The Social Impact of Public Utility Privatization and Regulation in Britain* (Milton Keynes: Open University Press, 1994); Graham, S. and Marvin S., *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition* (Routledge: London and New York, 2001).
18. K. Bakker, *From State to Market: Water mercantilización in Spain, Environment and Planning A* 34 (2002), pp. 767-790.
19. C. Hay, *Re-Stating Social and Political Change* (Milton Keynes: Open University Press, 1996).
20. T. Benton, (ed.), *The Greening of Marxism* (London and New York: Guildford, 1998); see also J. B. Foster, *Marx's Ecology : Materialism and Nature* (New York: Monthly Review Press, 2000); J. O'Connor, *Natural Causes: Essays in Ecological Marxism* (New York and London: The Guilford Press, 1998).
21. P. Burkett, *Marx and Nature: A Red-Green Perspective* (New York: St Martin's Press, 1999); D. Harvey, *Justice, Nature and the Geography of Difference* (Oxford: Blackwell, Oxford, 1996).
22. E. Swyngedouw, "Territorial Organization and the Space/Technology Nexus," *Transactions of the Institute of British Geographers* 17 (1992), pp. 417-433.
23. I. Illich, *H_2O and the Waters of Forgetfulness* (London: Marion Boyars Publishers, 1986).

24. R. Roberts and J. Emel, "Uneven Development and the Tragedy of the Commons: Competing Images for Nature-Society Analysis," *Economic Geography* 68/3 (1992), pp. 249-271.
25. *Ibid.*, pp. 267.
26. E. Swyngedouw, "Neither Global nor Local: 'Glocalization' and the Politics of Scale," *Spaces of Globalization: Reasserting the Power of the Local*, K. Cox, (ed.), (New York: Guilford Press 1997), pp. 137–66.
27. T.R. La Porte, "Large Technical Systems, Institutional Surprises, and Challenges to Political Legitimacy," *Technology in Society* 16/3 (1994), pp. 269-288.
28. K. Bakker, "From State to Market: Water *mercantilización* in Spain," *Environment and Planning A* 34 (2002), pp. 767-790.
29. N. Castree and B. Braun, (eds.), *Remaking Reality: Nature at the Millennium* (London: Routledge, 1998); A. Escobar, "Constructing Nature: Elements for a Poststructural Political Ecology," in *Liberation Ecologies: Environment, Development and Social Movements* R. Peet and M. Watts, (eds.), (London: Routledge, 1996), pp. 46-68; C. Katz, "Whose Nature, Whose Culture? Private Production of Space and the 'preservation' of nature," *Remaking Reality: Nature at the Millennium* B. Braun and N. Castree, (eds.), (London: Routledge, 1998), pp. 46-63.
30. U. Beck, *Risk Society: Towards a new Modernity* (London: Sage Publications, 1992).
31. E. Swyngedouw, M. Kaika and J. E. Castro, "Urban water: A Political Ecology Perspective," *Built Environment, Special Issue on Water Management in Urban Areas* 28/2 (2002), pp.124-137.
32. B. Jessop, "Regulation theories in retrospect and prospect," *Economy and Society* 19/2 (1990), pp. 153-216.
33. *Ibid.*, p. 248.
34. See, for example, C. Leys, *Market-driven Politics: Neoliberal Democracy and the Public Interest* (London: Verso, 2001).
35. For discussions about the of privatization of utility services in general, see T. Clarke and C. Pitelis, (eds.), *The Political Economy of Privatization* (London: Routledge, 1993); P. Cook and C. Kirkpatrick, *Privatization in Less Developed Countries* (New York, St Martin's Press, 1988); C.D. Foster, *Privatization, Public Ownership and the Regulation of Natural Monopoly* (Oxford: Blackwell, 1992); D. Newbery, *Privatization, Restructuring and Regulation of Network Utilities* (Cambridge: MIT Press, 2000); J. Vickers and G. Yarrow, *Privatization: An Economic Analysis* (London: MIT Press, 1988).
36. K. Bakker, *Privatizing Water in England and Wales* Ph.D. dissertation (Oxford: University of Oxford, 1999).