Regional Science, Political Economy, and the Environment*

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In a thoughtful commentary, Barney Warf (1995) lamented the uneasy tension between regional science and competing bodies of critical social theory. Likening regional science and social theory to twin children of the Enlightenment separated at birth, Warf blamed practitioners of both schools for an unproductive cold war of ideas, and expressed hope for the reinvigoration of regional science based on a constructive engagement with a broader theoretical canon. Although he noted the inclusion of regional science concerns (e.g. economic growth and efficiency, regional industrial formations, etc.) within a wider body of literature, he argued that regional science has been relatively impervious to issues of politics and power, class, race and gender, historical analysis, the role of the state, and human consciousness itself. Instead, regional science has largely adhered to a qualified -- specifically spatialised -- neo-classicism. Pressing for diversification, Warf concluded the essay by affirming his view that through an engagement with a wider body of social theory, "regional science would become significantly more epistemologically sophisticated, politically realistic, and historically self-conscious. Its capacity to understand regions in all of their complexity would be magnified accordingly" (Warf 1995: 192).

One might quibble with aspects of Warf's characterisation, not least

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in reference to the Canadian regional science community. Canadian regional science is generally less slavish in its adherence to the neo-classical cannon, allowing more room for geographical contextualism and often making "space" for the influence of social institutions and policies on the geography of economic processes (see e.g Nels 1993; Barnes and Hayter 1994). Nevertheless, I think Warf raises some interesting challenges for the regional science community. At the very least, he suggests a need to carefully and critically re-consider the theoretical foundations of regional science practise. Given the opportunity of contributing to this special issue concerning regional science and the environment, I would like to consider some directions that a re-formulated regional science of the environment might follow in response to Warf's comments. In particular, I wish to lay out a way of thinking about contemporary environmental issues that builds on some of the existing strengths of regional science and its practitioners, and at the same time draws greater theoretical inspiration from political economy.

The moment to re-consider regional science's engagement with the environment could not be more timely. Human-environment relations are of tremendous contemporary importance and concern. Anthropogenic biophysical changes of unprecendented scale, scope and pace have elevated the significance of studying contemporary human ecology, inspiring critical reflection on the capacity of social theory to address these changes and to inform responses (see e.g. Redclift 1987; Altvater 1993; Peet and Watts 1993; Redclift and Benton 1994; Goldblatt 1996; Harvey 1996; Braun and Castree 1998). In this context, geography and regional analysis remain central; while the spatial organisation of production is increasingly conducted and theorised at international scales, economic and environmental regulation seemingly bifurcate simultaneously toward more global and more local scales (Harvey 1989a; Jessop 1994; Swyngedouw 1997). In this profuse re-scaling of social processes underlying the production of global environmental change but also its social regulation, regional science can make important contributions in confronting the inter-relationships of social and environmental transformations. To do so, however, regional science must build from a viable theoretical foundation. This is a task that, as I hope to argue, must place politics at the centre of analysing economic-environmental interactions. This is important for a number of reasons, including:

- Environmental changes have origins that are always to some degree political in character;
- Environmental changes are always uneven in their social

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distribution;
- Responses to environmental changes and their social effects are always politically negotiated and contested, not least as they are mediated through the apparatus of the administrative state; and
- What counts as "nature" or the "environment" is always at least conditioned by political (often cultural) divisions in society.

For these reasons, I suggest that regional science should draw more influence from political economy as a way of approaching social dimensions of contemporary environmental issues.

In making this argument, I do not intend to dismiss interesting and important work dealing with environmental themes by regional scientists, including those in the Canadian regional science community (Dupont and Phipps 1991; Smit et al 1991; Semple and Ironside 1992; Cocklin 1993; Manning 1993; Nels 1993; Prudham and Lonergan 1993a, 1993b; Walker 1993; Walter 1993; Barnes and Hayter 1994; Kirton and Rugman 1998). Indeed, some aspects of regional science, and specifically Canadian regional science, offer advantages for contemporary research on human-environment relations. These include dedication to empirical research with attention to issues of validity and rigour, particularly in the conduct of extensive research; and a generally realist epistemology that can easily accommodate biophysical nature as a significant influence on human geography. However, with the exception of a special issue on sustainability (16(3)), a feature of work in this journal is that environment is incidental to rather than constitutive of regional economic processes of concern, even in examination of issues such as the regional and local tendencies of resource-based industries. My goal is to develop a more explicit theoretical foundation for a critical regional science of the environment which begins by seeing the biophysical environment inscribed in regional economic processes. To do this, I suggest building on the existing strengths of regional science with some of the advantages I see in the political economy tradition for understanding the social origins and implications of environmental change.

In what follows, I first sketch what I see as logical connections between the dynamics of contemporary human relations to the environment, and the strengths of a regional political economy approach. Specifically, I discuss three analytical themes:

- The importance of politics in the study of human-environment relations;
- The relationship between material processes of social and environmental change on one hand, and the social construction of

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nature and environment on the other; and
- Issues of method.

At the end of the paper, I briefly discuss the potential for exploring the issues I introduce via examination of the contemporary reconfiguration of environmental policy and regulation within the tradition of Regulation theory.

This plan established, I offer two caveats to consider in reading the paper. First, although I offer political economy as a theoretical starting point, I want to stress that my goal is not to dismiss competing approaches, nor do I advocate theoretical rigidity. Indeed, as I hope to make clear, I see political economy itself as a contested and pluralist tradition of scholarship. Second, although I make reference to the broad area of scholarship referred to as political ecology as a potentially vital source of theoretical and methodological influence on a reformulated regional science of the environment, I choose specifically to draw from the political economy tradition, not political ecology more broadly. This is for two reasons. First, political ecology itself as a field of inquiry draws on the political economy tradition, including the political economy of natural hazards. I discuss some of this lineage. Second, I see contemporary political ecology as both too theoretically diffuse and overly pre-occupied with epistemological questions to provide an adequate foundation for re-considering human ecology in regional science. Although as I argue in the paper, questions of the "nature of nature" are important, ultimately such issues can only be resolved by examining specific dynamics of social and environmental change, a task to which regional science's realist leanings are already well-suited.

Political Economy and the Politics of Economic and Environmental Change

It has been said that political economy is concerned with who gets what and why. There is much truth and an appealing simplicity in this aphorism, particularly when one considers the breadth of empirical and theoretical work in the political economy tradition, and the fierce ongoing debates within political economy.[F] Indeed, any definition more specific is bound to generate intense disagreement. Yet, from an historical standpoint, political economy emerged as a field of inquiry concerned

For a sample in this arena, see Anderson (1980, 1984), Gibson-Graham (1996), Escobar (1999), Walters (1999), Berman (1988), Grossberg and Nelson (1988), and Giddens (1994, 1995).

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with the origins of industrial capitalism and the determinants of economic growth among competing, newly capitalist nation-states. Thus, for scholars such as Adam Smith (certainly among the first and most important of the political economists), concerns surrounded not only markets and economic wealth *per se*, but also: the specific social origins of modern markets; the potential tensions between the generation of wealth and the interests of distinct nations; the operation of markets in relation to states and the particular politics of different factions of society; how states would regulate issues such as the distribution of wealth; and where the limits of a narrow economic rationality lay in the governance of human affairs. Although they by no means agreed among each other, it was a broad political economy addressing these themes developed by Smith, David Ricardo, Karl Marx, John Stuart Mill, and others, that comprised classical economics, and also provided much of the theoretical foundation for modern, or neo-classical economics (Hollander 1992).

In this essay, I cannot devote the space to discussing the historical development of political economy that this rich topic deserves, nor can I do justice to numerous important points of difference among classical political economists, many of which remain issues today. Yet I point to these early political economists and to the legacy of their work in order to highlight what I see as an essential facet of the political economy tradition: its attention to politics. Specifically, political economists tend to approach economics as a set of processes that are politically contested and socially embedded, placing the political divisions among different groups in society not on the margins of economic analysis, but rather at the centre.[1] Although there is a place in the neo-classical school for looking at issues of distributive justice (particularly in welfare economics), few would contest the primacy of efficiency over equity in mainstream economic thinking (see Allen and Rosenbluth 1992). Yet this is not the case with either historical nor contemporary political economy; a truly defining interest of conservative and radical political economists alike is the social basis of economic wealth and growth, i.e. the distribution of power and assets within the economy, and how this distribution in turn affects economic dynamics (Gilpin 1975; Wolf 1982). In fact the point of departure for specifically Marxian political economy is

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[1] I intentionally exclude the so-called Chicago School of "political economy" from the discussion, which sought to extend the neo-classical conception of homo-economicus and rational choice decision making to broader spheres of social life, epitomised by Becker's work on population and household decision-making (Becker 1976). Generally, this approach takes political economy and turns it on its head by investigating (i.e. asserting) the economics of politics, and this is not what I mean by political economy.

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the property relation as a defining feature of historically specific social formations (Peet and Thrift 1989). That is, social control of property as the material basis of economic production comprises the entrée for understanding the historical development of societies, not least as a result of the struggle both within and between economic classes.

Of course, Marx represents the strongest example of this among classical political economists, elevating the struggles of contending economic classes to a theory of human historical development. Yet Marx is hardly alone in prioritising contending economic class interests within a broad analysis of economic and political developments in time and space. Indeed, this has long been a key theme in the interdisciplinary scholarship of a distinct school of Canadian political economy, much of it drawing on the work of Harold Innis (Innis 1956; Watkins 1963; Hayter and Barnes 1990, 2001). Moreover, this attention to wealth and power distribution as central to understanding economic growth is complemented among progressives with more overtly normative focus on the distributive effects of production and consumption, i.e. with issues of economic justice. The salient point, however, is that examination of political divisions within society are placed at the centre of economic analysis in the political economy tradition.

That said, there are two important qualifiers to understanding issues of social division in the context of contemporary political economy and social theory. First, it is abundantly clear that class is a social category of considerable complexity. For example, even Marx's seemingly binary view of class composition apparent in *Capital* (Marx 1977) dissolves into a more historically nuanced description and analysis of existing social formations in the *18th Brumaire* (Marx 1964). Building on this more historical approach, E.P. Thompson's (1968) examination of the development of class identity in England presents a portrait of largely contingent and place-bound political negotiations and contestations underlying the emergence of class consciousness. Thus, class is by no means obvious, nor can class as a subject position be objectively "read off" from production relations. Secondly, contemporary political economy has been opened to the analysis of other social identities that do not reduce to class. It is now widely accepted that axes of identity such as race and gender are caught up in processes of economic production and consumption, and equally, that these categories interact with class divisions in complex and important ways (see also Harvey 1982, especially p 382-3; see e.g. Gibson-Graham 1996; Peck 1996; McDowell 1999). Understanding such issues is a central concern of the cultural turn in economic geography, with which some regional scientists will be familiar. In this context, considering the salience of race and gender is by no means anathema to a contemporary political economy

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(Anderson 1980; Gregory 1994: 109), despite the sometimes simplistic binaries opposing class with other axes of identity. A common theme, however, is the interplay of complex assemblages of cultural identity in the political constitution of economic activity, as well as in the politics of distributive economic justice.

Thus, what is important for this discussion is that politics are central to the analysis of economic process, however politics are framed or defined. I point to this irreducible blend of politics and economics -- what one might describe as the politics *of* economics -- as an essential difference in comparison with contemporary, more reductionist neo-classical perspectives. It is this difference, in my view, that makes political economy an important tradition of thought for studying human-environment relations, and it has two important implications I want to highlight here: emphasis on the uneven political origins and implications of environmental change; and emphasis on the role of the state.

Justice, Equity, and Environment

Emphasis on politics is absolutely essential to engaging integrated processes of social and environmental change. This is because, while economic activities are at the centre of most human induced environmental transformations, these transformations have politically specific origins and also imply differing effects across segments of society (Harvey 1996). That is, environmental change is *constituted* by the uneven social distribution of power along class, race, and gender lines, while at the same time, environmental change is itself always uneven in its human impacts. The significance of this perspective has several dimensions.

First, emphasis on the specific social origins of environmental changes avoids technocratic tendencies that downplay or obscure institutional origins of environmental change and degradation. Technological and instrumental fetishism is common in writing about the environment, perhaps best exemplified in contemporary times by the representation of global climate change as a mere product of fossil fuel dependence (Demeritt 2001a). This fetishism is a longstanding theme in narratives that attribute environmental degradation to technology rather than the social institutions and relations that produce and condition the use of particular technologies (Benton 1994; Levidow 1998). Yet a similar fetishism lies behind optimistic perspectives on environmental change (often termed neo-Cornucopianism) which, while sanguine about the capacities of technological innovation and rational, scientific thought to solve environmental problems, share in common the omission of social aspects of these problems. Dryzek (1997) has referred to such

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perspectives as discourses of "administrative rationalism" because of their emphasis on technology and rational calculation over politics in framing environmental issues. This is characteristic of neo-classical environmental and natural resource economics, and their faith in markets, but it is also apparent in the more techno-rationalist dimensions of ecological modernisation (Buttel 2000; Gibbs 2000; Mol 2000; Murphy and Gouldson 2000). As important as technology and rational analysis may be, as Judith Rees (1990: 6) writes:

> "Ultimately choices have to be made about which environmental goods and services to provide, who should receive them and who pays; inevitably these are subjective, political, social and moral choices. They will not and cannot be made by rational analysis".

This is not to suggest that the tension between rational analysis and politics is easily resolved. In fact, one of the most devastating critiques of political economy targets its excess economism (Gibson-Graham 1996). This line of critique applies particularly to structuralist political economy (see Barnes 1996), but the debate has generated a dialog about the relative importance of social structures and human agency in causation (Giddens 1979, 1995).[3] Although there remain very different views on these issues among political economists, I see a dialog on this and related issues within political economy as a strength (Anderson 1984; Gregory 1994), and one salient to understanding human ecology. With emphasis on issues of power and politics in debates about environment, political economy offers an alternative to both technology fetishism and to the construction of "optimal" prescriptions abstracted from time and space.

Emphasis on politics is important not only to avoid reifying technology and administrative rationalism, but also because time and again, specific socio-institutional contexts have been shown to be central in framing and addressing problems of environmental degradation (Liverman 1999). For example, in studies of links between economic development and environmental degradation, a persistent

3. Intense debates over the role of social structures and human agency in social change remain both within political economy or more generally Thompson (1978), Giddens (1979), Anderson (1980), and Giddens (1995). However, in my view this debate has been framed (at times) productively within political economy, and continues to provide fertile grounds for contrasting approaches to theory and research.

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theme is that strong links connect poverty with the degradation of local and regional environments when local people have few options other than to exploit resources beyond the regenerative capacity of natural systems (Blaikie and Brookfield 1987). At the same time, such linkages are not purely localised, in the sense that over-exploitation of marginal lands, and the impoverishment of locals are frequently tied closely to resource-based capital accumulation on a world scale, and prevailing patterns of income and wealth distribution across the globe (Watts 1983; Hecht and Cockburn 1989). For these reasons, the economics and politics of asset or property distribution are crucial influences shaping environmental change, and in particular, inequitable distribution of resources on global and regional scales contributes directly to environmental destruction of various sorts (Lonergan 1993).

These very notions have informed the rich and burgeoning field of political ecology, particularly in its emphasis on issues of access to and control over resources (see e.g. Hecht and Cockburn 1989; Peluso 1992b). Indeed, although it is a theoretically and methodologically diverse field, perhaps the most consistent theme in political ecology has been that environmental change must be situated at the nexus of local struggles over access to and control over natural resources and the dynamics of market integration and state resource management (Bryant 1992). These should also be important themes for a reconstructed regional science approach to human ecology.

Thirdly, emphasis on politics in relation to the environment is essential since there are wide disparities among different social groups as they are *affected* by environmental change, at spatial scales from local to global (Redclift 1987). In the development context, not only is poverty shown to contribute to environmental destruction, but perversely, impoverished people are more vulnerable to loss of environmental productivity because of their marginal status (Brundtland and World Commission on Environment and Development 1987). More generally, a central theme in human-environment relations in the contemporary context concerns patterns of unequal distribution of environmental benefits and harms across various social groupings (see Cuesta Camacho 1998; Dobson 1998; Gugliotta 2000). With an inherent emphasis on issues of social distribution, a political economy approach is a good starting place to incorporate environmental justice in the agenda, as I believe regional science should do in its engagement with environmental research. This would include, for example, more work examining systematic disparities in exposure to environmental "bads" such as air and water pollution across different social strata defined by income, gender, and race.

States of Nature

Political economy's concern with the politics of economics also involves an historical focus on the role of the state. In his concise and extremely useful synopsis of the emergence and evolution of political economy, Eric Wolf (1982: 20) notes the importance of "a concern with how wealth was generated in production, with the role of classes in the genesis of wealth, *and with the role of the state in relation to the different classes*" (emphasis added). Explicit attention to interrogating and theorising the role of the state remains a core concern in contemporary political economy (see e.g. Jessop 1990; Evans 1995). This includes how states mediate competing claims of various divisions within society over the control of production, the distribution of wealth, and the regulation of potentially destructive aspects of production and circulation (including environmental destruction). In this respect, political economy tends to represent the state as constitutive of economic production, in contrast with approaches equating the state's involvement with market failure. After all, markets do not emerge from the ether; instead, they have specific social and institutional origins, and rules that must be established and enforced. A hallmark of modern societies is the increased involvement of the state in exactly these activities. Such is true even if, to take neo-liberalism to an extreme, we are to believe that markets should have no restrictions; someone or group still needs to make that decision, which is inescapably a political one. The point is, markets are institutions created and maintained by political processes. It is therefore requisite that analyses of markets must incorporate politics, and in contemporary societies, this requires concern with the actions of states and state organisations. This was recognised long ago by the classical political economists, but it is a lesson easily lost amid the market reifying tendencies of neo-classicism, and in the more abstract strands of regional science (Warf 1995).

That said, how exactly is the state to be incorporated or "brought back in" (Evans et al 1985; Evans 1995)? Inserting the state must not take place in a fashion that subordinates it to other spheres of human activity, including for example, struggles over production between capital and labour (Urry 1981). Avoiding such "economism" in relation to the state is central to the ongoing project of post-structuralist political economy, under which social structures and human agency are balanced in explanations of historical outcomes, and through which everyday politics -- including those of the state -- may be substantively engaged (Corbridge 1989). Considerable current scholarship draws inspiration from neo-Weberian and Foucauldian perspectives on the development of modern state administrative capacities, seeing these as

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social tendencies that cannot be circumscribed by recourse to class politics and struggles over property and the like (Foucault 1991; Scott 1998). From this standpoint, states embody their own logics and must be confronted as such in sociologically informed analyses. Many regional science practitioners may be reluctant to fully embrace the analysis of states on such terms. Yet, as Barney Warf specifically notes in his essay, one of the great silences setting regional science apart from competing bodies of social theoretical practise is the question of the state, including issues such as state capacities, and state interventions. As Warf suggests, regional scientists may want to turn to the planning literature for inspiration on drawing the motivations, actions, and changing capacities of states into the scope of explanation (see e.g. Lawrence 2000; Law 2002), even if only in reference to the changing articulation of states vis-à-vis markets in the era of neo-liberalism.

Concern with the role of the state -- along with other arenas of social action -- in relation to economic processes is all the more significant to engaging issues in the human-environment realm. Environmental regulation has taken on added importance for states over the last century as the seriousness and complexity of environmental effects stemming from industrial production have increased, and as associated political struggles over nature have intensified (Frank et al 2000). Within political economy there are specific theoretical foundations for explaining the structural origins of environmental change, why the state is an important arena in which tensions surrounding environmental politics are contested, and how the state acts in creating a regulatory foundation for sustained production and the reproduction of markets (see e.g. Polanyi 1944; Beck and Ritter 1992; Goldblatt 1996; O'Connor 1998). Such perspectives are crucial in engaging the ways that state roles are changing under what Swyngedouw (1997) has called "glocalization", the simultaneous re-scaling of economic and regulatory processes to the global and the local levels.

Neo-liberal restructuring and downsizing of the regulatory state along these lines includes fundamental changes in state capacities to regulate environmental harms. There is a vital need to examine the social and environmental implications of such changes, including how they contribute to the social production of new 'natures' (Smith 1984; FitzSimmons 1989) and environmental risks (Davis 1998). A rather dramatic example is provided by the May 2000 outbreak of E-coli infections in Walkerton Ontario,[4] traced to contaminated water, but

4 . See "E-coli epidemic hits almost 600", The Toronto Star, May 24th, 2000, p. A1; "Bacterial outbreak kills four in Ontario", The Globe and Mail, May 25th, 2000, p.A1.

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thereby to industrial agriculture and its regulation, and to recent changes in the provincial regulation of water quality reforms (e.g. outsourcing of water testing to private firms). As I argue subsequently in greater detail, the research agenda entails documenting neo-liberal restructuring of the regulatory state, and the implications. But it also includes examining the ways political mobilisation in response to new environmental damages and risks -- in the context of and in response to neo-liberal globalisation -- shapes the re-regulation of environment at various spatial scales.

The Contested Terrain of Knowledge and Nature

If regional science is to address politics in contemporary economic-environmental interactions, a particular challenge arises in how to mobilise biophysical nature and knowledge thereof in examinations and explanations given that knowledge claims about nature are themselves inescapably political. I have not the adequate space here to devote to this complex issue, one of considerable contemporary multi-disciplinary interest and debate. Geographers, sociologists, anthropologists, environmental historians, and others have grappled in recent years with how to approach nature and environmental politics, with two related problems emerging. On one hand, it is now widely recognised that environmental impacts and constraints of various kinds pose challenges to the continuation of certain human activities, for example climate change and its implications for fossil fuel based-hydrocarbon dependent societies. At the same time, recourse to biophysical nature and natural science to provide guidance on how to proceed runs into the problem of which natures are more natural. Put another way, if nature itself is always changing, how is it possible to evaluate better and worse environmental outcomes resulting from anthropogenic change? On the other hand, this raises the issue of what might be called the cultural politics of nature, i.e. the realisation that what counts as nature, and what is considered desirable and undesirable in the natural world, are inseparably products of culturally specific perspectives. Together, these ideas have radically subverted the possibility that evaluating environmental impacts can unproblematically provide a moral map for future actions. Yet, despite the very real ontological and epistemological challenges posed by nature and knowledge claims, I argue that biophysical nature can and must be afforded some meaningful role in shaping and constraining regional economic processes, and that this is possible without reifying nature as either ahistorical, nor naively objective. This does, however, require careful consideration.

There are some particularly dangerous pitfalls in this arena for regional science and the environment. The strongly positivist tradition in

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regional science has produced an affinity for efficient outcomes determined via technical means and formal rational modeling. Applied to problems of environmental and natural resource policy, and mirroring neo-classical approaches to these topics, this can obscure the political dimensions of resource management by asserting "objective" truths or outcomes that "should" be pursued (see Rees 1990), as I have already discussed. Yet, in contesting different policy prescriptions, there is also a seductive tendency to invoke nature itself as an alternative "objective truth", i.e. to make prescriptive statements based on apparently superior states of nature. Statements of this kind draw on science-based environmentalism and another kind of administrative rationalism, proceeding via a logical sequence of the following kind: this action causes this change in nature, therefore it is good or bad. David Demeritt (1994) refers to this as a "search for foundational authority" in nature. Historian Richard White (1995b) provides a poignant example of the dilemma this poses in the case of the Columbia River, where decades of dam construction and various land based activities in the Columbia Basin have converted the river from a swift flowing river habitat ideal for salmon to a series of reservoirs ideal for species like chad. We may have our preferences, as indeed White does himself, but is it possible to say which river is objectively superior?

Arguments based on explicit or implicit assumptions of natural decline have played a powerful role in research on human-environment interactions. This includes, for example, much early work in environmental history in the United States, a field that relied on Clementsian ecology to provide a moral compass for evaluating landscape change, and its social origins and implications (Worster 1994). Such recourse to nature's foundational authority is common in environmental politics and discourse, and draws on western ideas of nature conservation and preservation, and ultimately on Romantic transcendentalism. Yet, this strategy in political and academic discourse has recently suffered intense criticism because it constructs nature as pristine and timeless. It is now widely accepted among natural scientists that natural systems change even in the absence of human interference, sometimes quite rapidly and with dramatic effect (Lewontin 1991). Accordingly, contemporary ecological science tends to emphasize change more and reify stability and "climax" ecosystems much less (Demeritt 1994; Worster 1994). At the same time, rigid dualisms between nature and culture tend to obscure the interplay of social and natural histories in most landscapes (see Williams 1973; Benton 1994; Cronon 1995).[T] Not only is much of the globe the contemporary product

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To appreciate how this line of thinking has influenced environmental history, consider the contrasting approaches to nature in Cronon's (1983) *Changes in*

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of past human intentional and unintentional manipulations, but the very ideas and representations of nature mobilised to characterise these manipulations are partial and political; they thus constitute a form of social knowledge production that cannot be reduced to nature as unmediated reality. In this context, the idea of "real" nature as something pristine and outside of or prior to culture has been challenged not only intellectually, but also politically, in favour of a more humanistic ecology and environmental politics (Guha 1990; White 1995a).

As I have noted, one of the merits of a political economy approach to human-environment relations is its commitment to political analysis, including specific human-environment relations. One school of thought specifically influenced by Marx, but developed more recently by Neil Smith (1984), emphasises the ways that nature is socially produced, that is, increasingly the ideological and material "artefact" of environmental representations and transformations, particularly under the global reach of industrial capitalism. After all, in the context of globalisation, what natural systems can we now point to as untouched by the impacts of economic activities? Although this terminology has its shortcomings -- the idea of a socially produced nature has been characterised as counter-intuitive by Smith himself -- notions of socially produced nature avoid removing nature from culture (for discussion, see Castree 1995). This points in the direction of analyses that emphasize nature as a contested category at both material and ideological levels, and that therefore invite the interrogation of specific landscape transformations as historically and geographically specific outcomes produced by politically constituted actions.

Unfortunately, this seems to downplay the significance of environmental degradation at a time when the rapidity of global environmental change and the urgency of environmental politics create a strong demand for fresh analyses of human environment relations. Moreover, the idea of socially produced nature seems, at least superficially, to deprive non-human nature of any role in shaping and constraining social outcomes. As Ted Benton (1989) has argued, this derives in part from Marx's ideas of nature, impoverished by an over-riding social determinism that seems to preclude any causal role for natural limits in shaping and constraining social outcomes. In turn, this is reproduced by a more general tendency in the social production school to give short shrift to what Castree (1995) calls "nature's materiality", i.e.

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the Land and his more recent writings *The Trouble with Wilderness* (Cronon 1995). Similarly, contrast Richard White's earliest writing on environmental change in Island County, Washington (White 1980) with his treatment of human-induced changes in the Columbia River (White 1995b).

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the capacity of the natural world to operate according to its own logic in time and space, with significant implications for structuring human activities and relationships. The social production school thereby in turn falls short of differentiating itself from a strand of contemporary social theory that would seem to assert a form of idealistic relativism denying nature any real ontological status whatsoever, what DeMeritt (1998) calls a strong social constructivist view.

This is not at all the approach I advocate. Instead, I argue for a more dialectical epistemology that sees ideas of nature as the product of social engagement with the environment as a set of real material phenomena, yet at the same time never reduces knowledge construction to an exclusive one-to-one mapping between ideas and nature (for discussion, see Proctor 1998). From this, I argue for the reinsertion of nature as a causal influence on social outcomes, but one that does not collapse to environmental determinism. Benton's (1989) notion of eco-regulatory processes is useful along these lines in suggesting nature as a realm of constraints on human action, even if the translation of these constraints onto specific outcomes must always be approached historically. Certain parallels can be gleaned from Latour's (1988; 1993) engagement with natural phenomena using actor-network theory, under which "objects" of nature take on a certain agency of their own. Similarly Haraway (1997) refuses to allow natural phenomena to be relegated to causal bystanders even while making an otherwise strongly social constructivist position. Although there is a clear need for more work to render legible Demeritt's (1998) notion of "conjoined materiality" (a kind of partnership in causation between society and nature), this is a potentially useful framing for regional science to address environmental issues using an epistemologically nuanced, realist approach to the biophysical world. A good deal of promising, theoretically informed empirical work in this direction has actually been undertaken within agrarian political economy, examining how agriculture's nature centred character shapes capitalist penetration of the sector. Drawing on Kautsky's (1988) seminal work, prominent contemporary examples include Mann (1990), Goodman et al (1987), Goodman and Redclift (1991), and Kloppenburg's (1988) classic study of corn and American agro-industry. This cluster of scholarship could be a fruitful point of departure for regional studies of natural resource industries, and for that matter any analysis of human environment relations that seeks to "take nature seriously" (see Boyd et al 2001; Prudham 2002).

What then, of the role of natural science in environmental politics, and critical social scholarship in human-ecology? Just because claims about superior states of nature are always political claims does not make these claims less legitimate, nor does it obviate a role for science in debates about the environment. The only implication of accepting a

politicised epistemology of nature is the necessity of accepting that no arguments about superior states of nature can achieve a final status above or prior to politics (Demeritt 1994). As biologist Richard Lewontin (1991: 93) writes:

> "…any rational environmental movement must abandon the romantic and totally unfounded ideological commitment to a harmonious and balanced world in which the environment is preserved and turn its attention to the real question, which is, how do people want to live and how are they to arrange that they live that way".

It follows from this that choices between competing states of nature are thoroughly political decisions based on evaluating what environments are more desirable, not inherently superior. I advocate a critical realist perspective (see Sayer 1992; Proctor 1998) as the foundation for a political economy of the environment that accepts the intertwining of politics and knowledge in truth claims, but that does not thereby reduce all truth claims to equivalence. From this standpoint, there remains a vital role for science in evaluating the consistency of competing arguments about environmental management, and in explaining human-environment interactions and thus informing politics more generally. Science can and should continue to play such roles, and a political economy approach to environment should critically engage scientific understandings of the environment on an ongoing basis. After all, despite the sometimes dichotomous tone of debates about the politics of science, it seems obvious to point out that differing claims about the environment vary in the degree to which they are politicised and to the degree to which they are based on credible science.

Issues of Method

A third theme I wish to address is that of research methods. It is in this arena where I think the existing strengths of regional science can be melded with a re-oriented theoretical foundation to make strong contributions in understanding contemporary environmental issues.

Within regional science, albeit less in the Canadian context, a premium has been placed on quantitative analysis using formal mathematical tools and based on a positivist epistemology inherited from neo-classical economics. Within political economy as I have defined it here, much less emphasis has been placed on the use of formal models. This is not to suggest that such techniques are

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anathema to political economy, as some prominent examples indicate (see e.g. Sheppard et al 1990; Webber and Rigby 1996). Certainly, the relative paucity of formal modelling in political economy is not because it's practitioners "can't do it", and indeed some of the most effective critiques of regional science and quantitative economic geography have been internal critiques (Gregory 1994: 90). There are, however, certain challenges to taking a more formal, quantitative approach, among them the temptation of using ahistorical, foundational categories of analysis. Some might argue, for instance, that the whole notion of an independent variable is rendered meaningless by an historical political economy, which in turn undermines the appropriateness of common techniques such as linear regression. However, as Barnes (1996) indicates, it may be possible to reconstruct more formal mathematical approaches without sacrificing contextualism, as for example in the minimalist tradition of Sraffa, but also in more recent work by Alan Scott. I certainly believe that a political economy of environment within regional science could make room for formal modelling, not least as an heuristic device for identifying tensions and exploring possible dynamic relationships. For example, few have been able to demonstrate the inseparability of biological and economic dynamics in the composition of human-environment dilemmas as neatly as Colin Clark (1990). As a complement to historical and geographical contextualism, simple models such as these can be highly illustrative. At any rate, I do not wish for this paper to be interpreted as an implicit condemnation of formalism.

However, to conduct empirical research that is sensitive to context, both historical and geographical, regional scientists will have to working within frameworks that are "grounded in time and space" and using what Trevor Barnes (1996) refers to as "local models". How is this to be done? I would argue that regional science must first make a commitment to contextual specificity. This is particularly important in dealing with problems of human-environment interaction.

Drawing attention to socio-historical context is one key to achieving specificity in analysis, allowing for more critical and comprehensive evaluations than might otherwise occur. This is a theme emphasized by Eric Wolf who stressed that the point of departure for political economy is analysis of the specific social organisation of material production in different kinds of societies, e.g. feudal, capitalist, mercantilist, or state socialist. This approach helps point to explanation based on contextual factors that might otherwise be unexamined and thereby naturalised, e.g. the market economy itself and specific market formations. Here then lies one of the principal contrasts between neo-classicism and classical political economy, in that neo-classicism has been seen to assume, affirm, and reify trans-historical notions of market capitalism in its emphasis on more abstract forms of reasoning. By examining only

such static “snapshots”, there is a danger of omitting critical institutional influences on phenomena under study, and of identifying but not explaining patterns (correlation, not causation). By contrast, historical, contextual analysis points in the direction of process and explanation (Warf 1995; Barnes 1996). The goal, I stress (and paraphrasing Foucault) is not history for history’s sake, not a history of the past, but instead a history of the present. By opening up the history of the present, we tear aside the pretence of inevitability, making the present contingent. This is a crucial methodological step in prioritising the role of politics in explanation.

That said, I am aware of critical debates within the political economy tradition over the role of history in explanation, and in particular the role of specific historical forms of human agency versus more generalised social structures in explanations of social processes. More abstract forms of political economy have indeed developed, and have been rightly and roundly criticised (Thompson 1978). This dialogue continues to the present (Gibson-Graham 1996). Again, however, a strength of the political economy tradition is the very fact that this dialog *is* ongoing. Moreover, emphasis on historical reasoning offers a strategy for balancing social structures (e.g. wage relations of production) and human agency (e.g. organised labour) by drawing attention to how such structures operate in specific circumstances. In this way social structures, though they seem enduring, also become subject to change. As Marx famously put it:

> “Men (sic) make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past. The tradition of all dead generations weighs like an Alp on the brains of the living” (Marx 1964: 1).

Balancing structure and agency is a tricky issue, one I cannot hope to resolve here. But this only reinforces the significance of considering historical context, a theme no less important to problems in human ecology. One need only consider the consequences of not doing so. An example is provided by Garrett Hardin’s (1968) (in)famous analysis of common property resources. Pondering the contemporary neo-Malthusian conjuncture of an apparently finite nature and rapidly expanding human population, Hardin developed the well-known narrative of a pasture open to and used by a collection of self-interested herders as a parable for the social origins of and solutions to over-exploitation of renewable resources. For Hardin, without formal

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exclusive property claims governing access to the pasture, and apparently without the ability to communicate and co-operate with one another, herders using the pasture (and by extension, all users of common property) are destined to wreak the Tragedy of the Commons, i.e. to destroy their resource base purely through self-interested rational behaviour. Hardin, and many since, invoked this Hobbesian parable in order to indicate the need for formal property rights over natural resources, either in the form of state control, or exclusive individual rights of access. Only the state is capable of coercing conservation, reasoned Hardin, while private property rights would create an incentive among each user to conserve and protect the resource.

This is a powerful and compelling narrative. It is also fraught with problems, including a misrepresentation of the commons problem both in relation to the history of English land tenure systems from which the "commons" terminology originates, and in terms of actually existing common property regimes in other geographical contexts, to which Hardin tellingly made no reference. By using the term "commons", Hardin unreflexively draws on a term with a long history in England referring to lands held by lords which were to varying degrees open to local tenants of a community in order to provide fodder for their herds (Cox 1985). These commons likely predate modern notions of transferable private property. But they were not open access, and the records from England dating back centuries prior to the Industrial Revolution indicate very specific limits on their use, including penalties for abuse of the system. It appears that in many local contexts, such systems lasted hundreds of years without collapse from degradation, begging the question where was the tragedy of these commons? In actual fact, it seems the system of regulating commons broke down around about the time of the Industrial Revolution, for a number of complex reasons, not least technological change in agriculture. With increasing returns to scale and growing markets for farm exports, affluent farmers tended to graze larger and larger herds at the expense of less affluent farmers, aided and abetted by English legislative reform which actively pursued enclosure as a means of enhancing agricultural productivity (Williams 1973). Hardin's error is that he failed to note that such village commons were *not* open access, but were rather shared lands for village members, controlled and managed according to traditional rights and privileges, and that their historical collapse was more a product of the creation of private rights and marketisation than it was the absence of these factors. Recourse to this history thus invites an inversion of Hardin's narrative, suggesting that it is at least possible that resource depletion may originate in the more complete enclosure and commodification of the land which Hardin blithely prescribes. At the very least, this suggests the need to carefully consider the specific

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institutional context in which resource access is regulated.

Secondly, Hardin erases considerable cultural diversity in both time and space by naturalising a version of *homo economicus*, a conception of economic identity that is quite distinct to the modern era. For Hardin, it is simply given that each individual is a utility maximising, rational, and entirely self-interested producer....in short, a capitalist. This amounts to an ideal type of bourgeois ethos, which is not likely to correspond to most individuals' rationality even in the most thoroughly industrialised, market economies (Bowles and Gintis 1993). Yet, Hardin never specifies that an industrialised, market economy is the context for his parable. Rather, it is implicit in his construction of the herders. With this slip, Hardin both assumes the context of industrial market capitalism, and at the same time ignores a multitude of historically developed institutional contexts in which communal property regimes have evolved in order to allow people to regulate their natural resources (Ostrum 1990). What difference might it make if we assume that the neighbours are able to communicate, and maintain some level of social cohesion through more communal forms of rationality (Feeny et al 1990)? Might they then appreciate their mutual dependence and develop modes of social regulation and enforcement that stop short of either state coercion or individual allotment of the pasture? Not surprisingly, one tends to find in actually existing common property regimes, particularly at localised scales of interaction, that users do exactly these things (Berkes and International Union for Conservation of Nature and Natural Resources. 1989; Berkes et al 1998; Berkes 1999; Gibson et al 2000).

This example indicates that contextualism in human ecology requires not only historical but also geographical specificity. After all, geographic differentiation is endemic to the intersection of social and environmental change (Liverman 1999). This is because, first, as regional science practitioners know well, the social organisation of economic activities is geographically specific, and space is one of the crucial media in which social processes are constituted (see e.g. Harvey 1982, especially chapters 12 and 13; Gregory and Urry 1985). Thus, in spatial processes too may the tensions between social structures and human agency be made apparent (though not resolved) through sensitivity to local and regional difference, but in the context of processes that operate across wide geographic expanses with significant effects, e.g. capital accumulation and market integration (Harvey 2000). Attempting to both theorise and remain sensitive to place is a large part of what Barnes embraces by advocating "local models". With this notion, he draws on the corpus of Harold Innis's work, and the Canadian political economists and economic geographers who have drawn inspiration from it. After all, as Innis emphasized, while aspects of

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Canada's economic development paralleled processes in other places (market expansion, increasing scale and pace of capital accumulation), at the same time, the country's pattern resource dependent development needed to be approached as a distinct phenomenon, not least to cast off the mantle of colonial economic theories that conveniently ignored issues of institutional dependency and imperialism.

Sensitivity to distinct local and regional processes is also important when dealing with human-environment interactions because of the combination of variation in the biophysical environment with highly specific cultural and institutional relations between people and the land. Thus, Blaikie and Brookfield, in their seminal study on the social origins and implications of soil erosion, advocate a regional approach:

> "...because it is necessary to take account of environmental variability and the spatial variations in resilience and sensitivity of the land, as different demands are put on the land through time. The word 'regional' also implies the incorporation of environmental considerations into theories of regional growth and decline" (Blaikie and Brookfield 1987: 17).

In this context, it is salient that Hardin's abstraction obliterated both historical *and* geographic specificity. By contrast, more empirically sophisticated studies of local resource management systems highlight the ways that social institutions evolve over time in response to natural and social dynamics in highly place-specific ways, involving social processes with important geographic dimensions. In fact, attention to the ways that local social formations and relations with landscapes articulate with a broader political economy is one of the main themes of political ecology, certainly as defined by Blaikie and Brookfield in their seminal work (see also Watts 1983; Hecht and Cockburn 1989). Many contemporary political ecologists in my view demonstrate an excessive pre-occupation with epistemological questions (see e.g. Willems-Braun 1997a; Robbins 2000) along with a predilection toward locational versus relational geography in the study of the local politics of resource access (Peet and Watts 1993). Nevertheless, the field offers important theoretical and methodological clues to a re-vamped regional science approach to environmental issues; this is not surprising, since political ecology draws heavily on political economic theory. For example, Nancy Peluso's (1992a) study of the political and ecological dimensions of rattan extraction and management in East Kalimantan is based on a careful rendering of local dynamics within a broader regional political economy. Looking at historical and geographical context for local struggles over resources allows her to indicate the significance of regional and global market integration and expansion as a source of

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increased commercial pressure on local resources, yet she also points to the related imposition of increasingly formal state rules and regulations governing access to rattan in place of pre-existing village level management regimes, a shift that has acted to disrupt social regulation in important ways. Peluso specifically draws on historical political economy in outlining her approach to research methods in which shifts in local institutions and social relations are framed in reference to broader historical and geographical conjunctures of social change.[F]

I believe this is a very fruitful methodological avenue for regional scientists to pursue. This is not least because this approach provides some potential for the use of formal inferential statistical analysis and mathematical modeling, hallmarks of the field. Of course, there are difficult but vital issues pertaining to temporal and spatial scale in analysis. But regional science can and should take on these challenges, not only because they are vital concerns in the study of the human-environment interactions, but also because regional scientists tend to excel in quantitative analyses of economic and demographic patterns, and are or should be sensitive to issues of scale. Here again, I echo Warf in arguing that for regional science to embrace a broader social theory, it is not necessary nor advantageous for regional science to abandon its roots, particularly the commitment within the regional science community to rigorous empirical analysis. Rather, application of these tools in the tradition of commitment to empirical research in regional science is an asset in the study of human environment relations. To fully capture local specificity in both social and biophysical systems, however, the extensive work more typical of regional science will have to be complemented with more intensive, case study based research which can deal with specificity, and which is better suited to addressing causal questions (Sayer 1992). In short, I advocate neither extensive nor intensive research to the exclusion of the other, but rather the conduct of both in dialog with the other, and always with an eye to building locally specific models and theories of human-environment interactions.

Toward a Concrete Research Agenda

How might practitioners of regional science build on some of the ideas and themes I have identified here in undertaking concrete research in contemporary human ecology? Obviously this remains to be seen.

For another example of this approach, and one from which Peluso also draws for inspiration, see Scott (1976).

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However, it might be useful to consider some possibilities. Based on my own, entirely subjective sense of priorities, I offer one avenue of potential inquiry: coming to terms with the politics of recent environmental re-regulation. I stress that in no way is this agenda meant to be exhaustive or exclusive: instead, I offer these thoughts only as potential launching points to further pursue ideas I have discussed in this paper.

Post-Fordism, Regulation, and the Environment

Contemporary environmental regulation is at a significant cross-roads. A powerful combination of increasingly integrated and accelerated global economic activities and their attendant environmental effects coupled with (and perhaps assisted by) the retrenchment of the neo-liberal state poses interesting challenges to the social regulation of natural resource access and environmental quality. In the context of fierce debates about the political, economic, and cultural origins and implications of contemporary globalisation, there is a pressing need for research on its environmental dimensions, including the changing dynamics of regulation and governance. Regional science practitioners, drawing on some of the theoretical issues I have identified in this paper, can and should make greater contributions in this area. A good place to start would be with the pre-eminent political economic theory of contemporary capitalism and its social regulation, i.e. with Regulation theory.

Regulation theory is a diverse body of theory and scholarship aimed at understanding the social organisation and political dynamics of economic processes. One of Regulation theory's projects is to engage the institutional combinations that, even if in contingent fashion, provide some degree of macro-economic and political stability in relation to the contradiction or crisis prone tendencies of capitalist market economies (Aglietta 1979; Corbridge 1989; Boyer 1990). There are variations in how this is approached; however, a prominent theoretical strategy deploys the twin notions of regimes of accumulation in combination with modes of social regulation. A regime of accumulation refers broadly to historically specific tendencies in the organisation of production and the allocation of social product. Key issues include divisions of labour and the hierarchical organisation of labour and management within the firm; production, information, and communication technologies; patterns of vertical and horizontal integration, and the predominance of large versus small firms; investment time horizons for firms and their decisions about the deployment of fixed capital; the social distribution of income;

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markets; and relations between capitalist and non-capitalist production. A mode of social regulation refers largely to the institutional context of the economy. This includes wider patterns of capital-wage relations (e.g. industry-wide collective bargaining frameworks, labour laws); property relations; the credit system; the rules governing inter-firm competition and market power; the relationship of the domestic and international economies; and various other dimensions of state and non-state intervention in managing the economy and its social effects (e.g. affirmative action programs, state educational and health care provisioning, social movements and citizen groups).[F]

A common theme among Regulationists is to understand the essential technological, institutional, political, and cultural dimensions of globalisation, and how these dimensions set the current period apart from the past. Many have contrasted so-called Fordist and post-Fordist regimes of accumulation and modes of social regulation (Boyer 1990). What these terms mean is subject to considerable debate. However, Fordism refers most often to the period stretching from the late 1940s to the early 1970s. It is commonly defined by the dominance of mass production and circulation of standardised commodities produced in large batches for relatively stable markets, by the dominance of large firms, and by a corporatist institutional model of social regulation (e.g. collective bargaining in labour markets). In comparison, post-Fordism is a broad concept meant to embrace a disparate set of widely recognised -- though contested -- phenomena, including: increases in competitive pressures attendant with greater international economic integration; an increase in the significance of small firms producing more customised commodities for niche markets; an erosion in the power of organised labour and a coincident restructuring of labour markets, including the proliferation of production contracting; and a sustained assault on the welfare state resulting in greater emphasis on international governance and market-based competition (Piore and Sabel 1984; Sayer and Walker 1992; Amin 1994). Yet, as Barnes (1996) notes, there is more agreement on post-Fordist tendencies in capital accumulation than the post-Fordist mode of social regulation.

Given the diversity of national experiences (Hirst and Thompson 1996; Webber and Rigby 1996), and some of the contradictory evidence offered both within the Regulationist camp, and by its critics (see e.g. Brenner and Glick 1991; Walker 1995), I do not want to be taken as reifying the Fordist/post-Fordist dichotomy, conceptually or historically. Rather, I invoke Regulation theory as a potential entrée into the analysis

For more on regulation theory, see Boyer (1990), Dunford (1990), Aglietta (1979), Aglietta and Boyer (1986), Lipietz (1987) and Jessop (1990).

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of contemporary capitalist market economies and their social regulation, emphasising contingent, historically and geographically specific social formations (Tickell and Peck 1995). Considerable recent work has attempted to come to terms with changes in the social regulation of economic activities attendant with and constitutive of globalisation. On one hand, international regulatory instruments have proliferated (Porter et al 2000), while on the other, more and more emphasis is placed on the reproduction and regulation of economic activities at local levels of government (Harvey 1989b). The result is a pronounced re-scaling of regulatory activities termed 'glocalization' by Swyngedouw (1997). Many have noted that these dynamics tend to be at the expense of nation-state regulatory capacitites, inspiring Jessop (1994) to refer to a "hollowing out" of the national welfare state.[8] However, an important theme, and one regional scientists will be ready to acknowledge and develop further, is the uneven geography by which overarching neo-liberal tendencies articulate with specific regional political and institutional considerations (Peck and Tickell 1992; Tickell and Peck 1992).

Yet, despite this proliferation of research on new combinations of economic activities and their social regulation, it is puzzling that Regulationists, on the whole, have not adequately addressed the question of nature, and specifically the issue of environmental regulation (though see Altvater 1993; Bridge and McManus 2000).[9] This is odd when one considers the deeply problematic relationship between capitalist economies and the environment, manifest at all geographic scales from the local to the global. Moreover, contemporary dynamics of regulatory "glocalization" revolve in no small part around re-regulating nature. At the international levels, for instance, many new environmental governance agreements have been negotiated in recent decades, dating from the International Law of the Sea to the most recent attempts to

8. There is no consensus on this, or seemingly any aspect of globalisation. As Hirst and Thompson (1996) note, by no means is the welfare state model moribund, nor is the diversity of national models clearly diminishing in the contemporary international political economy.

9. Lipietz (1992) discusses some of the ecological costs and dimensions of Fordism, but he does not formally develop this line of thinking within a regulationist analytical framework. Some tentative steps are taken by Marsden et al (1993) in the context of analysing production and regulation in British agriculture, but this falls short of a discussion of regulation theory and the environment more broadly. Bridge and McManus (2000) discuss Altvater's (1993) work as some kind of phantom regulation approach to the political economy of environment, however this is a stretch to say the least.

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forge a climate change accord in Kyoto, Japan. At the same time, regulatory deregulation and devolution to local state and non-state entities commonly targets environmental regulations and programs (Benton 1997; Bakker 2000), the social significance of which was witnessed to tragic effect in Walkerton, Ontario in May of 2000. Moreover, as non-governmental organizations assume greater and greater quasi-regulatory functions, some of the most dynamic social movements are mobilising around environmental issues, as the current fight over genetically engineered food attests. All of these developments, shaped in important ways by neo-liberal retrenchment in state environmental regulation (Watts and McCarthy 1997) effectively re-jig the social regulation of nature. Clearly, Regulation theory's omission of environmental regulation is particularly problematic.

Yet this gap in Regulation theory is an opportunity for practitioners of a new regional science of environment. One approach to this project would be to explore how contemporary dynamics of environmental regulation can be understood in relation to existing notions of Fordist and post-Fordist regulation. What are the limits of this line of thinking, and how do these limits articulate with the existing debate about changing modes of social regulation? How exactly is the hollowing out of the nation state predicated on changing regulatory regimes in relation to natural resources and the environment?

Some tantalising possibilities are apparent. For example, looking at twentieth century environmental regulation in the United States, there is an apparent break beginning in the late 1960s and early 1970s between what might be termed a "productivist" period of environmental regulation, concerned primarily with regulating resource access and control, and an emerging emphasis on the regulation of environmental quality *per se*. Key legislation such as the Taylor Grazing Act of 1934 and the Sustained Yield Management Act of 1944 reflect New Deal attempts to confront environmental degradation, but were also out-growths of industry-state politics surrounding crises of over-production in natural resource commodities (Robbins 1982; Rajala 1998). As such, these and other contemporary approaches to regulating the American landscape, particularly the public lands of the West, came down firmly on the side of a rationalised commodity production. They may be viewed as reflecting and reinforcing the orientation of Fordist regulation in as much as they helped enable mass production of resource commodities during the post-War, e.g. standardised lumber produced from public forests. By contrast, legislation such as the National Environmental Policy Act, the Clean Air Act and the Clean Water Act, and to some degree the Endangered Species Act, are less oriented toward enabling rational commodity production and more toward confronting the social

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and environmental costs of economic production. Such laws marked a new orientation in environmental lawmaking, positioning the US at the forefront of legislative attempts to curb the negative environmental consequences of economic activities (Harrison 2000). Intriguingly, these laws also coincide closely with the onset of a crisis of the Fordist model, and may well belong in the lexicon of post-Fordist regulation. More thorough examination along these lines is clearly required. But of course, this will have to include more recent backlashes against the environmental regulatory state under neo-liberalism, given that neo-conservative administrations in several western industrialised nations (including the US, the UK, and Canada) have drastically reconfigured the fiscal and regulatory capacities of states vis-à-vis the environment (see e.g.Benton 1997).

While research on the US is of central importance given that nation's geopolitical position, there is also rich potential for research in Canada, as well as for comparison between the two nations. One important facet of exploring this avenue in Canada would be to come to terms with the traditional significance of the provinces in environmental regulation, using this as the context in which regulatory restructuring has proceeded. Among other things, this would help contribute to an identified need for Regulation theorists to begin to explore the geography of social regulation more carefully, including issues of scale (Tickell and Peck 1992, 1995; Swyngedouw 1997).

For example, an approach to social regulation of the environment in BC's forest sector would ideally address a range of issues. This includes changing styles and scales of government intervention in the management of forest resources during recent decades, propelled on the one hand by the decline of old-growth resources and the associated Falldown effect in timber volumes, and on the other by changing political and cultural conceptions of sustainable forestry (Willems-Braun 1997a; Marchak et al 1999; Reed 1999; Hayter 2000). It does appear that an important transition from a narrowly productivist, commodity driven mode of social regulation to one emphasizing ecological sustainability and regulatory re-scaling both "upwards" and "downwards" is underway. The productivist era of provincial forest regulation dates to the second provincial Royal Commission on Forest Resources and the subsequent 1947 revisions to the province's Forest Code, which in turn drew on an emerging tradition of scientific forestry in North America (Demeritt 2001b), establishing the modern sustained yield forest management paradigm in the province (Dellert 1998; Rajala 1998; Hayter 2000; Cashore et al 2001). This approach to forest regulation privileged and underpinned large-scale capital and Fordist commodity production, but its social and environmental limits appear to have been reached. In a paper published in the *Canadian Journal of Regional Science*, Trevor

Barnes and Roger Hayter (see also 1992, 1994) elucidated an emerging emphasis on community entrepreneurialism alongside industrial restructuring, deeply undermining the corporatist productivist model (see also Barnes and Hayter 1992; Hayter and Barnes 1997; Burda et al 1998; Hayter 2000) At the same time, environmental social movements in BC have assumed increasing importance in influencing the regulation of forest practices through such tactics as eco-certification. All the while, environmental and economic governance of BC forests have been increasingly re-scaled not only to the level of communities, but also to an international scale, through mechanisms such as the Softwood Lumber Agreement, NAFTA and GATT provisions on forest commodity trade and environmental regulations, and the Intergovernmental Panel on Forests (Porter et al 2000).

There is a clear need for more research on the changing political economy of forest governance in BC, both to understand the various influences on these deep changes, as well as their political, economic, and environmental implications. One important theme from a theoretical standpoint is to understand the changing ways in which regulation underpins the making and re-making of nature as a commodity (Willems-Braun 1997b), i.e. how environmental regulation renders and distils natural inputs, and socially produces them as commodities. Along such avenues, it would be highly useful to critically assess the parallels between forest regulation in BC, and contemporary scholarship on post-Fordist social regulation more broadly. At the same time, there is a genuine need for scholarship that "unpacks" the politics of environmental regulation (Rees 1990; Adkin 1998), particularly in the context of increasingly politicised questions of access to and control over forests in BC and throughout the Pacific Northwest. How are we to understand these politics in relation to ideas of state governance under neo-liberalism, and how do these dynamics re-configure questions of community in relation to the landscapes around them? I believe regional scientists could make important in-roads on these and related questions in BC and elsewhere by critically examining the restructuring of environmental regulation and governance.

Conclusion

I have attempted to establish a basis and suggest avenues for the pursuit of a political economy approach to environment within regional science. This is based on perceived strengths of political economy vis-à-

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vis issues of human-environment relations -- including emphasis on politics and attention to historical and institutional specificity -- as well as the strengths of regional science -- including emphasis on geographic context and differentiation, and a strong tradition of empirical rigour. Certainly some difficulties continue to present themselves to a political economy of environment, difficulties I have barely suggested here. One difficulty is the challenge of explaining social change in human-environment relations vis-à-vis ongoing debates regarding the role of social structures and human agency. Another concerns the “nature” of knowledge claims regarding nature, and what it means to view nature as both socially produced and constructed. These and other issues have been productively engaged within the political economy and political ecology literature during the last two decades, and I believe regional science can gain by drawing on these sources more extensively in coming to terms with contemporary human ecology.

I have argued for a political economy of environment within regional science, and have suggested one avenue of research as a possible point of departure, drawing on and extending Regulation theory to deal with the reconfiguration of environmental regulation and governance. I stress, however, that research needs to address and explain the social origins and implications of environmental change and its politics, while at the same time taking nature seriously enough to engage how environmental differentiation acts to shape and constrain social processes. Echoing Barney Warf’s call to arms for a more critical regional science, I think practitioners of regional science can and should pursue research along these lines in enhancing what is already a strong tradition of scholarship.

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