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Chapter 1

Contentious Geographies: Environmental Knowledge, Meaning, Scale

Michael K. Goodman, Maxwell T. Boykoff and Kyle T. Evered

In the 'liberal' democratic spaces promised us by Fukayama's *End of History* (1992), something slightly sinister has arisen to capture the attention: the so-called *resource wars* of the twenty-first century (Le Billion 2004). These are not new phenomena as earlier inter- and intra-state conflicts for resources fostered during colonial expansion and de-colonization clearly demonstrate. However, it seems as if this over-determined consumerist moment fuelled by globalization has intensified and entrenched conflicts and violence for a multitude of resources. For example, armed conflicts have exploded for the 'spectacular' commodities of gold, diamonds and – the mother of all commodities – oil, each of which has received its own 'spectacle-ized' Hollywood treatment.[1] At the same time, violence has followed in battles over access to and extraction of the less-than spectacular. The most prescient of these conflicts includes struggles over Congolese coltan (*The Independent*, 2006; see also Cook et al. 2007), a mineral used for the manufacture of Modernity's 'necessary' gadgets of cell phones, computers, and video game consoles.

A number of volumes such as *Green Guerillas* (Collinson 1997) and *Resource Rebels* (Gedicks 2001) have grappled with the temporal and spatial aspects of resource conflicts. Insightful work on these topics (Nevins 2003; Le Billion 2001, 2004, 2007; *Retort*, 2005), particularly the *Violent Environments* collection (Peluso and Watts 2001), has sought to dispense with the simplistic, neo-Malthusian trifecta as the basis for these conflicts – scarcity, poverty, and population growth – to instead offer up more nuanced models of causation steeped in geographical and political economic reasoning. This and allied work in political ecology has contested the equally simplistic assertion that natural environments are merely the stage upon which human actors battle for epistemological and material domination. Rather, from a number of interesting philosophical and empirical angles (e.g. Blaikie 1985; Blaikie and Brookfield 1987; Braun and Castree, 1998; Castree and Braun, 2001; Robbins 2004; Whatmore, 2002), it has been forcefully argued that environments and human societies are *co-constructed*. In this way, for example, violent struggles for African 'blood diamonds' *shape* and are *shaped by* the spatial, ecological, social,

1 e.g. *Syriana* (2005) (Middle Eastern oil), *Blood Diamonds* (2006) (African diamonds),

economic, symbolic, and political characteristics that actively produce these conflicts (Le Billion 2006).[2]

And yet, so much more is afoot today and operating in parallel with the media-grabbing stories of these sorts of 'brute' armed brawls over 'primitive' accumulation and dispossession (cf. Harvey 2003). Important as these may be, this is precisely where *Contentious Geographies* fits in: the volume is concerned with the more 'subtle' contestations over not just resources but the very environments and landscapes that sustain people's *livelihoods*. While controversial geographies have long been manifest through pressing human-environment challenges, this volume explores the active and intimate material, social *and* discursive relationships underlying contemporary yet more diffuse forms of environmental conflict. Thus, these chapters – from conceptual approaches to empirical cases – work to capture the nuanced processes that shape discursive representations and material manifestations of struggles over resources, landscapes and livelihoods.

Under interrogation are the multiple ways that knowledge and epistemic framings shape and are shaped – in short, co-constructed – by environmental conflicts and environments *in the making*, embody *power* through discursive and technological regimes, and translate into political economic and ecological *outcomes*. While the spaces of environmental conflict seemingly generated by the neo-liberal economic imperatives of privatization and profit (Mansfield 2007; see also McCarthy and Prudham 2004) form the backbone of many of the stories being told, the volume looks to explore these contentious geographies in a different register. Namely, the discussions opened up here are about the specific conflict-ridden governance of the environment – and of its contested social and material constructions – through *media*, *science*, *policy* and *technology*. Under interrogation, then, is how these particular forms of environmental governance inscribe and perform 'enclosures' of the material *and* discursive kind to bound environments, landscapes and resources for some and open them up for others. Winners and losers, of the natural and human variety, can be created with the stroke of a pen (and now click of a mouse) as much as through the blade of a bulldozer or the barrel of a gun.

Environmental conflict, in all its multifaceted variety – from violent struggle, to political confrontation and direct action, to semiotic and discursive argumentation through media forms – is often produced through *resistance* to particular instances of governance and their deployment through acts of power. In short, in many cases, without some sort of resistance there would be no conflict, a point not lost on many (e.g. Bryant and Bailey 1997; Robbins 2004; Peet and Watts 2004; Neumann 2005) and certainly not the Foucauldians (Rutherford 2007). The stakes of this resistance, though, seem to be bifurcated along global lines: in the South, struggles are most often over *livelihoods* while those in the North are about *lifestyles*. Obviously this formulation is too simplistic since geographers (e.g. Bebbington 2003; Bebbington and Batterbury 2001; Bebbington and Kothari 2006; de Haan 2000; Rocheleau et al. 1997) and others (e.g. Gottlieb 2001; Bullard 2000) tell us it is not at all sensitive to

2 For allied and useful takes on theorizing about resources and resource extraction spaces, see Gavin Bridge and colleagues' recent (Bakker and Bridge 2006) and past work (Bridge 2001; Bridge and McManus 2000; Bridge and Jonas 2002).

the shifting scales of environmental and livelihood struggles, especially those based on the precepts of race, class and gender. Yet, what these environmental resistance movements seem to have in common – from California, to Columbia, to Calcutta – is the absolute importance of the *framing* and *re-framing* of environmental struggles in and through *discursive* and *knowledge* practices as part and parcel of this confrontational praxis.

These concerns over the confluences of the 'lived' environment and knowledge frames are what Escobar touches on in his plea for 'discursive materialism' to be placed at the center of what he terms a 'post-structural political ecology' (1996; but cf. Watts and McCarthy 1997). Drawing on his formulation, in environmental struggles, then, words, concept and policy formulations, and their hegemonic deployments act to construct the boundaries of the human-environment relationship to (most often) the benefit of the powerful. In confronting these enclosures, environmental movements very often now battle back on this discursive plane through a range of different semiotic and symbolic formulations. Thus, contentious environmental resistances should be thought of as the multi-form material *and* discursive/semiotic articulations of 'alternative' and/or 'different' histories, livelihoods, worldviews and policies (e.g. Peluso 1992, 1995) that work to act locally, nationally and, more often now, globally.

With all of this in mind, there are three specific aspects of environmental struggles and conflicts that inform the chapters in *Contentious Geographies*; these are *environmental knowledge*, *meaning* and *scale* and we now look to briefly discuss each in turn.

Environmental Knowledge Struggles

Struggles over environmental knowledges and their regimes are at the heart of this volume. From scientific and technological knowledge, to that of the 'Other' in 'indigenous' and local knowledge, how and what knowledge is deployed in environmental management and policy – indeed what *counts* as knowledge let alone *environmental* knowledge – is of paramount consideration. This has been a clear concern of many involved in the social studies of science and knowledge for some time now (Latour 1999, 2004; Forsyth 2003); for our purposes here in thinking about environmental conflicts and knowledge struggles, the focus of this work falls across two axes. The first concern involves the construction of scientific and knowledge networks in the material and discursive, human and 'non-human' artifacts that differentially enable things like science, policy and politics to take shape and become praxis. As a focus for many in the volume, the processes by which the 'hybrid networks' of scientific and Other environmental knowledges come to actually embody this hybridity and produce 'net-workings' are laid bare in the spaces of contentious environments and livelihoods. A second diffuse concern across this work involves the politics and political consequences of network construction; drawing on feminist re-interpretations of network formulations (e.g. Star 1991; see also Whatmore 2002), the focus is on whose knowledge counts and why but also the sorts of politics affected by particular knowledge networks. Many of the chapters, taking an implicit lead from this second theme, are concerned with the politicized

processes by which environmental knowledge(s) is/are produced through various media forms and technologies, from popular scientific texts, to news media, policy, law, and novel technologies, and the sorts of political and ecological outcomes that result. In short, this all points to the ways in which science, scientific knowledge and Other knowledges – and, indeed, most importantly, their creation and deployment – are clearly the stuff of politics inside and out.

Conflicts over Environmental Meanings

Meanings invested in everything from landscapes, to 'home', 'place' (e.g. Castree 2003b; Massey 1999), 'science', resources (e.g. Rocheleau and Edmunds 1997), commoditized resources (e.g. McSweeney 2004), and technologies (e.g. Bebbington 2004) are complicit in shaping and engendering environmental struggles. Often, conflicts – violent, political and livelihood – take shape from the constructed and shifting meanings of various environments and their constituent parts. For example, environmental struggles have arisen over the governance of which aspects of 'nature' might be suitable for extraction and commodification and which might not (Katz 1998; Neumann 1998, 2000; Peluso and Watts 2001, *passim*; Robertson 2000; Zerner 2000; *Antipode* 2007). Seeing the environment through the exclusive lens of neo-liberal economism does not always square with different competing worldviews, local or otherwise, although the tropes of 'mainstream' sustainable development and ecological economics are quickly stamping out Other worldviews in the continued name of 'green developmentalism' (Adams 1990; Castree 2003a; McAfee 1999). Through specific case-studies, this volume interrogates how meaning is constructed and manifested through *both* the ontological conditions of nature and the contingent social and political processes involved in architectures that shape the differing interpretations of this nature (Haraway 1997).

Scaled Environmental Struggles

While many have argued that scale is thoroughly socially and politically constructed (Herod 2003; Brenner 2001; Marston 2000; Swyngedouw 1997) nowhere is this more true than in environmental conflicts; the politics of scale is alive and well in environmental struggles, not the least in the 'David versus Goliath' aspects of locals-versus-global-corporation-'X'-theme seemingly repeated at every research or popular-media turn. Thus, in this, we, and many of the subsequent chapters, are not as prepared as some to jettison the concept of scale and its use as an analytical device (Marston et al. 2005). Rather, much to the contrary, *Contentious Geographies* is devoted to exploring how the politics of scale and, in particular, the politics of scale *construction* and *manipulation* are performed by actors from the grassroots, civil society and the state. In particular, understanding how scales are 'jumped' or 'shifted' is integral to assessing the multi-level power dynamics and relations that operate across biophysical and socio-political articulations of local, national, and global political ecologies (Glassman 2001; Swyngedouw 2000, Massey 2001, Bracken and Oughton 2006).

Knowledge, meaning and scale are inextricably intertwined in environmental contentions; below, in the rest of this brief introduction, they form the base of the discussion of the various organizing themes of the volume as well as the core focal point for its chapters.

Translating Contentious Environmental Knowledge and Science

Just beneath the thin yet oft-authoritative veneer of 'crisp' science and eco-political discourses are variegated messy and contentious interactions of knowledge, power and ideology. These contemporary spaces – centred as they are on Western scientific knowledge creation and dissemination – are highly contested, characterized by uncertain facts, politicized interpretations of science, disputed values and intensely debated alternatives (Funtowicz and Ravetz 1990). Indeed, in places where multifarious (environmental) scientific conflicts have arisen, the stakes and tensions of the social, cultural, political, economic and ecological kind are frequently palpable. As asymmetries of scientific 'truth' creation shape and are shaped by uneven social and political terrain, the articulations of these discourses are particularly privileged ways of knowing (Jasanoff 2004) that act on the environment in particular and contentious ways. Over time, dominant discourses and icons of science – and here in particular, environmental science – become entrenched and solidified, and consequently institutional activities and actors get tethered to surrounding storylines that, again, impact landscapes and livelihoods in specific 'good' or 'bad' ways (see Robertson 2006, 2004). Alternatives, in the often differing worldviews and interpretations of 'science' and, indeed, those of the 'dispossessed' of the global South, lurk in the crags of these landscapes; yet, more often than not, the governmentality of the environment is the domain of the privileged and now 'everyday' voices of the entrenched bodies of environmental science, policy and practice fostering, if anything, almost guaranteed contentions over landscapes, resources, and livelihoods (Rutherford 2007).

The contributions in this section call into question and critically explore key processes and effects of the translation and representation of environmental knowledge, science and politics and the subsequent conflicts that ensue. They draw from social constructions of science and critical realist perspectives (e.g. Demeritt 1998; Forsyth 2003) in order to critically analyze this dynamic human-environment interface. In these high-stakes arenas, the chapters explore how perceptions and behaviours are made (in)visible through exegetic perspectives, ideologies and values of what might be called 'environmental science'. Indeed, as mobilized by both tacit and explicit discursive frames, global environmental problems in the forms of (nothing short of) the 'collapse' of global ecological and human civilization, global warming, and water shortages, are manifest locally as well as through collective imaginaries in multiple media and policy formulations. Jasanoff and Wynne elucidate this power of framing in science policy praxis:

> [F]ramings do not flow deterministically from problems fixed by nature, but … particular framings of environmental problems build upon specific models of agency, causality and

> responsibility. These frames in turn are intellectually constraining in that they delimit the universe of further scientific inquiry, political discourse, and possible policy options (1998, 5).

Thus, fighting against these overtly 'positivist' and bounded framings of environmental science (as hegemonically constructed), more democratized approaches to scientific knowledge work to not only muddy the waters but also challenge and shift the composition of these science-practice intersections (Latour 2004). As Beck (1992) outlines in his book *Risk Society*, these other approaches represent a new epoch of challenges that thus demand new conceptualizations and novel academic and popular responses. Each chapter in this section works along this axis of 'thinking' scientific knowledge differently, both conceptually and empirically, and, through case studies, works to cast a critical eye over the spatial and temporal interstices of what counts for environmental science today.

Tim Forsyth, in particular, works through these issues in his analysis of Jared Diamond's bestselling book *Collapse: How Societies Choose to Fail or Survive*. He writes that Diamond takes a detour around many important contested and uneven social, economic and political causes of environmental conflict to instead traverse more ahistorical roads on natural limits causing collapse. As a vehicle through this landscape, Forsyth posits that the book utilized scientific lexicon and authority to give intellectual purchase to advance particular political values and perspectives. Furthermore, through the discursive traction that this best-seller has achieved, Forsyth argues that wider considerations of social vulnerability and development interventions are dangerously subsumed. Consequently, he argues that Diamond then restricts political and policy considerations and debates in a constricting and conservative manner regarding environmental change through such an approach. The chapter makes the claim that greater attention paid to the interactions of social values and environmental knowledge can regain these lost spaces.

Maxwell T. Boykoff examines struggles over the 'semantic drift' of anthropogenic climate change science as it interacts with policy discourse via US mass media. The chapter analyzes comparative as well as historical threads of discourse in order to help explain how US media representational practices have depicted conflict and contentions rather than coherence and convergent views regarding scientific explanations of anthropogenic climate change. Tracing two decades of television and newspaper coverage, Boykoff pays particular attention to various ways in which claims-makers – through asymmetrical power – have influenced media discourses. The chapter analyzes how various truth-claims about the science have gained particular visibility through mass media outlets to thereby contribute to institutional and policy conflicts and considerations at multiple scales. The chapter explores how meaning is maintained and contested through feedbacks of dynamically intertwined socio-political and biophysical processes, and how this case-study informs related environmental conflicts and debates.

Jessica Budds examines how the combined forces of discourse, socio-political and bio-physical power and agency shape conflicts in Chile's La Ligua river basin. This case-study draws upon uneven political and economic pressures as they relate to fruit plantation and small-scale peasant farmer water demands, food security

and livelihoods in this region. The chapter analyzes how dynamic and competing factors produce particular assessments of water conflicts, such as conceptions of the physical hydrology of the basin, and notions of water scarcity as well as need. She points to how the framing of solutions as primarily administrative and technical has resulted in problematic socio-ecological outcomes. Furthermore, Budds argues that insufficient attention to nuanced differences such as the heterogeneity of the water users and the spatially-divergent needs of the actors has exacerbated ongoing conflict. Through a 'hydro-social cycle' approach, Budds unpacks and critiques how basin-scale hydrology policy discourse and actions unfold through nature-society interactions, power and agency.

Conflicting and shifting environmental knowledges, livelihoods, and power

Environment and development are inextricable interconnected – and not least in the global South. Equally connected are the lines of power that stitch environment and development together as can be divined in the shifting winds of green developmentalism in institutions like the World Bank. Investigations of these lines of power in development, how they coalesce, their historiography, their broad effects on the conceptualizations and management of (Southern) landscapes, environments and people, were very much a part of the project of development scholars – often referred to as 'post-development' – through out the 1990s and into the new millennium (Escobar 1995, 1998, 2001; Crush 1995). Yet, even with a more 'radical' project of fostering local empowerment and alternative visions of development for 'the people', many felt this work suffered from a lack of theoretical and empirical engagement with the actual *hurly-burly* and *everyday-ness* of development in the shadows of a diverse neo-liberal project (e.g. Watts and Peet 2004). Thus, if anything, spatially-inflected research has become even more relevant to understanding and exploring the *geographical* and *material* specificities and connections of global economic forces to the local, situated (and often deteriorating) livelihoods of the global poor (Blaikie 2000; Hart 2001, 2002, 2004).

In the receding tides of post-development and its penchant for deconstructionism, the analytical figure of 'livelihoods' has arisen to claim the conceptual space for understanding development and environments as lived, practiced, and imagined. Drawing on Bebbington's work (2000, 498), this materialist corrective works to understand 'how people make a living and [how they] mak[e] it meaningful'. As he continues,

> [m]ore viable livelihoods will not be romanced into existence, but must instead be built up from already existing, and however imperfect strategies. Understanding livelihood thus becomes critical for theory, in order to understand how places are produced and governed, and who participates in these processes. It is also critical for practice – to understand the ways in which people have created livelihood opportunities that foster accumulation as well as the obstacles to such accumulation (Bebbington 2003, 515).

Thus, 'building livelihoods' often means, in this age of structural adjustment and neo-liberal projects, conflict and contention – environmental or otherwise – with current political economic power structures at local, regional and global scales.

And part of this task, thusly, might just mean building 'alternative' livelihoods that include everything from 'transnational' (Bebbington and Kothari 2006; Bebbington and Batterbury 2001) and 'diverse' economic networks (Gibson-Graham 2005a, 2005b),[3] to novel forms of trade (Goodman 2004) and Other identities and knowledges (Perrault 2001, 2003a, 2003b). Key, with respect to (alternative) livelihoods, is one of Geography's most sacred concepts: that of 'place'. Indeed, as Bebbington (2003: 302) puts it,

> place and livelihood clearly intersect as, to a considerable extent, places are produced out of livelihoods of people, while at the same time structuring elements of those livelihoods. But clearly neither livelihood nor place is ring fenced. Thus any discussion of place and livelihood must also be infused with concerns for *scale* and *networks* (original emphasis).

Here, then, livelihoods are always contentious, especially as they are built *in place* but also *out of place* through the myriad of connections that work to construct and, indeed, conflict with livelihoods and places.

Trevor L. Birkenholtz – through the lens of Agarwal's (2005) 'environmentality' – explores the contentious deployments of groundwater conservation regulation in Rajasthan, India. Here, he sees a fundamental rift in local and state groundwater knowledge that will make the 'roll-out' of these regulations uneasy at best and potentially disastrous (and doomed to failure) at worst in the ultimate goal of water conservation and livelihood sustainability. Framed more specifically through Agrawal's concepts of 'governmentalized localities' and 'environmental subjects', the crux of the problem springs from the different legitimized knowledges of groundwater management that circulate in local and regional management networks. In short, for a number of interesting reasons related to trust, praxis and cost, local farmers would very much rather consult *Sungha* – Hindu water diviners – and tubewell drilling firms than government engineers in locating and operating their wells. Top-down government regulation, even in the context of physical violence, has failed to grasp the importance of the 'Other' viable knowledges provided by both the *Sungha* and tubewell firms; State groundwater institutions are quite simply running rough-shod over the practices of the local farmers whose trust, Birkenholtz argues, must be gained and knowledge valued in order to promote groundwater conservation. He suggests that shifting the balance of power more into the hands of local farmers and utilizing local knowledge about groundwater management might work to develop a much more 'equal' and successful water conservation program in Rajasthan.

Logan A. Hennessey's chapter conducts a fascinating analysis of the various discourses that have sought to 'fix' the various spatial and historical identities of the Huaorani in Ecuador, not surprisingly, to the detriment of their own self-determined livelihoods. In an engagement with the literature around indigenous identities and the ties this has to the 'defense' of livelihoods (e.g. Escobar 2001; Castree 2004), Hennessey examines how various discourses of the Huaorani generated from the

3 But see Kelly (2005), Laurie (2005) and Aguilar (2005) for a critique of Gibson-Graham's return to some of the blind spots of post-developmentalism.

'outside' by others – conservation NGOs, the State, and oil firms – attempt to construct these people and their environments to the distinct advantage of powerful extra-local players and institutions. Indeed, even the 'good guys' of the Rainforest Action Network (RAN) are not innocent; here, he argues, RAN papers-over the diversity of self-constructed livelihoods that make up the 'modern' incarnations of the Huaorani, to instead construct a homogenizing discourse of the 'noble savage' and equally savage and worthy tropical nature worth saving. Thus, the contentious political and environmental projects of these outside actors – either conservation and/or oil extraction – gain traction in the contradictions of these 'fixing' yet 'elastic' discourses; it is the multiplicity and content of these discursive 'spearpoints' that works to disempower and disassemble the Huaorani's ability to determine their own development in a more cohesive manner.

Environmental movements: Contested (re)scaling of knowledges, problems, and narratives

At the core of their existence, environmental movements are contentious entities. They exist only in so far as they work to challenge privileged knowledge, meanings, and scales – ostensibly on behalf of the 'public' in total or for some other environment-related 'cause'. All of this, though, it must be remembered, is mobilized through particular notions and mobilizations of 'nature' and 'environment'. In certain cases, mobilization of such interests seeks structural re-definitions or reforms, while in other situations, movements may resist outright existing knowledge-power assemblages with re-placement or revolution being the actual goal. Thus, regardless of its intended outcomes – to attempt to re-structure or re-invent existing modes of environmental governmentality – environmental movements are greatly concerned with mobilizing real and/or discursive refutations of existing and/or would-be hegemonies. In the absence of such 'contentious' agendas, they are little more than environmental clubs or advocacy, interest, or lobby groups.

In scholarship on environmental movements (e.g. Peet and Watts 2004), they are often characterized as one of several major types of so-called 'New Social Movements' (NSMs) – along with feminist, indigenous, and other movement groups. While the 'new'-ness of NSMs might be regarded as a profound overstatement (Calhoun 1995), they are one of the most vociferous sources of alternative environmental discourse (Wolford 2005; see also Wright and Wolford 2003; Mauch et al. 2006). Moreover, their varied identities, spatialities, and intellectual, organizational, and programmatic structures reveal not only profound diversity but also wide-ranging linkages with other interests and agendas that may also be advocating for the rights of, for example, particular groups, beliefs, and/or ideologies. This diversity and variation is not only apparent when examining environmental movements but is also most apparent amid contemporary explorations of both their common grounds and cleavages with indigenous, feminist, labor, and other movements. This is particularly true as (some) environmental movements could be said to collectively constitute actors in a wider, transnational 'anti-globalization' – or, perhaps more appropriately, anti-neoliberal – movement (Bandy and Smith 2005; Curran 2006; Leitner et al. 2007; Munch 2007; Reitan 2007).

While environmental movements are often regarded as one of many elements of 'civil society' – a term with profound discursive currency in state-ist and neo-liberal rhetoric of democratization and capacity- and state-building (e.g. Jessop 2002; see also McCarthy 2005, 2006) – not all expressions of environmental civil society are environmental movements. Indeed, though civil society is often defined as encompassing a sphere distinct from state and commercial interests and authority, as growing critical scholarship on Non-Governmental Organizations (NGOs) (e.g. Bryant 2005; West 2006; Elyachar 2005) establishes, many NGOs are not so 'non-governmental' as they might seem.[4]

And yet, despite a drive to institutionalization and the mainstreaming of environmental movements, their contentious capacities to challenge state and corporate governmentality – to contest dominant paradigms and epistemologies – and to find alternative means of fostering social and moral capital are essential 'virtues' amid contemporary environmental struggles. Here we want to flag the sort of 'possibilism' (Gibson-Graham 2005a) that might be present in environmental movements to carve out spaces of action and, indeed, even political change (Routledge 2003). One of the key ongoing 'contributions' of these movements has been the 'nitty-gritty' work they have done by putting forward alternative knowledge claims about the environment, how to 'see' it, and what it might be for. Here, the power of environmental movements has been in their ability to make spatial and discursive connections between the global and the local and the local and the global when conceptualizing environmental problems and solutions. This has not only resulted in the growing 'mass-ification' of environmental movements themselves and their punctuated events – think here of the 'battle in Seattle' (see Smith 2002; Khagram et al. 2002), the G8 'actions' in Edinburgh (Routledge 2005), and the growing influence of the World Social Forum and its green tinges – but also the abilities of environmental movements to match the global nature of capital and the reach of many corporate institutions. Thus scaling up, out, and down for environmental movements has been important for not only making the movement 'work' at the pace of global environmental issues, but has been instrumental in shaping the discourses around global and local environmental problems and solutions more specifically.

Jill Harrison describes the contentious framings of pesticide drift in California's farmworker communities and the implications this has for workers' and their families' health. The social and material constructions of scale – of the terms and scope of the 'everyday' experiences of pesticide drift versus its regulation and reporting – define this story of environmental and livelihood conflict. Seen through the lens of work on the politics of scale, Harrison details how the framings of pesticide drift and normal 'accidents' (i.e. poisonings) by the State regulatory agencies makes the so-called 'dispensable' farmworkers and their health even more invisible than they already are. Thus, pesticide drift incidents become just that, discrete and isolated incidents rather than the everyday, albeit 'officially' invisible, business of California's industrial agriculture landscape. To counter these absences, activists, as Harrison puts it, 'manipulate' scale temporally and spatially by two principal means. First,

4 Much of this can be seen in the growing whimsical plethora of oxymoronic acronyms such as INGOs (international NGOs), BINGOs (business-oriented international NGOs), GONGOs (government-operated NGOs), and QUANGOs (quasi-autonomous NGOs).

they do this by fleshing out the local to provide a sort of thick description about what it means to live and work in farmerworker communities with pesticide drift on a continual basis. Second, activists shift the discursive scale of analysis 'upward' to re-conceptualize pesticide drift as a broader and more indiscriminate problem of air pollution. In the end, it is the State's dominant framing of pesticide drift as local and isolated – a politics of scale if ever there was one – that problematically (re)inscribes the social, health and environmental inequalities present in California and other farming-scapes.

Karen Schmelzkopf paints a geo-historical account of the fight for land and life on the small island of Vieques, Puerto Rico – one of the principal military depots and practice bombing sites for the US Navy for the last 60 years. She describes how activists, after the horrible death of one of the island's inhabitants from a misguided bomb, were able to 'jump scale' and develop strong ties with national and international activists and social movements. Through the connections between the local direct action 'Camp for Peace and Justice', television, movie and music celebrities, and the US Hispanic community, the movement gained enough political power to push the Navy out, an enormous achievement in the 9/11 era of just about everything being trumped by 'national security'. But neither the story nor the struggle ends there; in fact they both might just be beginning. From the Navy presence and constant bombing runs, Vieques is left with a distinctly toxic and indeed, explosive, legacy of unexploded bombs, heavy metal contamination, increasing cancer rates and destroyed landscapes and has now been designated a Superfund site. And, even with all this pollution – to add livelihood insult to environmental injury – much of the land has been designated a National Wildlife Refuge; thus, much of the island has changed hands from the Navy to the Department of the Interior and so, is still very much under the control of the original 'colonizers'. She concludes with a sober assessment of the ability of Viequenses to determine their own livelihoods let alone their own landscapes in light of the continuing powerful and contentious multi-scalar reach of the US government.

Dustin Mulvaney explores the scaling and re-scaling of contentious environmental politics in the development of 'GE-free' zones in two counties in California. While deploying a politics of scale approach similar to Harrison and Schmelzkopf, Mulvaney argues we need additional lenses to flesh out the story of the success of anti-genetic engineering activists in Mendocino County versus their failure in Butte County. Here he underscores that to understand the differential results of these campaigns, we must also understand the politics of place and the discursive storylines (Hajer 1995) that construct, inflect and reflect these material politics of scale, space *and* place. In short, the successful and politicized constructions of who *and what* is an 'outsider' versus 'insider' – from corporations and activists, to money, pests, markets and genes – are what produce the opposite reactions to the GE-free legislation in the two counties. For example, in Mendocino, the activists' campaign was able to coalesce, to a large degree, around a local distaste for 'outside' control by agri-business and corporations. In Butte County the current 'bogey-man' of the 'know-nothing', latte-sipping San Francisco liberal was deployed to garner local opposition to these 'outside' activists' supposed influence in the GE-free campaign. Mulvaney leaves us with a set of important questions about the spatially-inflected

political (and indeed, material) tactics of both activists and the biotechnology industry to 'deal' with genetically engineered organisms: namely, questions remain not only about the ecological risk of GEOs but also the discursive strategies used to 'contain' GEOs and their protests.

Contested production of environmental histories, law, and knowledge

In explorations of history and historiography, it has generally come to be recognized by critical scholars as a given that much of what constituted history in Western – and even in non-Western – contexts is reflective of power (Trouillot 1995). Indeed, an examination of simply the membership rosters of formal historical societies in the West makes this abundantly clear.[5] The multi-disciplinary field of environmental history, however, might be seen as having a rather separate genealogy – one that originates well beyond the confines of the discipline of history. Indeed, the contributions of historians like Worster (1979, 1985), Merchant (1980) and Cronon (1983, 1991)[6] stand out today as fine examples of critical scholarship that confronted matters like the exploitation of indigenous peoples and nature, gender, empire, the abuses of capitalist and socialist systems alike, and the implications of varied constructs of nature/environment. Yet, the traditions of historical analysis in the field of cultural ecology – the early grandparent of political ecology (see Robbins 2004; Watts 2000) – reflected a contentious orientation many decades prior to the rise of critical environmental history within history itself. Perhaps most noteworthy in this tradition of authoring contentious histories are some of the works of Carl Sauer and his students.

Although lacking the analytical tools of subsequent neo-Marxian and postmodernist scholars, their works were profoundly 'contentious' in the approach of listening to indigenous community voices and observing their pre-historic records, critically assessing the socio-cultural and environmental consequences of development, and communicating these lessons to the West.This tradition, coupled with later materialist and discursive approaches to environmental history (Demeritt 1994; Williams 1994), has resulted in a contemporary field that is analytically rich and diverse and cognizant of the multiple contentious interpretations of environmental history and of the conflictual legacies of the human-environment relationship in such spheres as environmental policy making.

Just as historical narratives of the environment have been re-cast and forced beyond any singular sort of interpretation through contentious re-articulations of the past, so too do laws and legal systems constitute artifacts and arenas of authority and official knowledge of ecologies that may be re-written and resisted and/or re-

5 In the case of the United States, for example, the list of past presidents of the American Historical Association includes advocates of American empire – whether proudly stated or simply functional – like Alfred Thayer Mahan, Theodore Roosevelt, and Woodrow Wilson.

6 For other important texts on this, see also Crosby (1972, 1986), Merchant (1989) and Weiner (1988, 1999).

invented through popular pressure. The scales of contestation of laws and legal systems range from the local to the international – often evidenced in increasing global linkages and effects. In many instances we may envision the typical conflicts over matters of resources, as with struggles for agrarian policy reform (e.g. Wolford 2005), at scales between individuals and/or communities and the state. Increasingly, however, we are also witnessing legal authority as exercised largely by corporate interests coming into conflict with traditional ecologies, marginalized communities, and/or even entire regions over matters of intellectual property and the rights to biodiversity (McAfee 2003), ownership of previously communal or public assets (Spronk and Webber 2007), and matters of access to markets and resources (Kuecker 2007). Moreover, regional environmental conflict is becoming apparent between the so-called South and the North over matters of global environmental governance (e.g. Najam 2005). It is here that environmental regulation through policy is at the heart of drawing the boundaries of what is possible in environmental management, making regulatory schemes one of the most powerful determinants of the human-environment relationship and environmental conflict.

Eve Vogel, in her chapter, examines how the privileging of past regional-scale planning within the United States has fostered environmental contentions up to today. She explores how the environmental regulation of the Columbia and Snake rivers has shaped prioritization and perceptions of management in the Pacific Northwest. Through this case-study that tracks the development of the 2000 decision not to breach the lower Snake river dams, this analysis demonstrates that power has been effectively leveraged and mobilized by the Bonneville Power Administration and allies through particular 'geographical framings' and 'fixing' of scale. The chapter assesses how this primacy of the regional scale has consequently impacted ongoing decision-making as well as imaginaries in the region over the last six decades. By unpacking and historicizing key political economic, social and ecological processes that have led to this institutionalization of space, Vogel strives to uncover how scalar choices shape geographical meaning. Thus, she illustrates dynamic contestations between environmental law and meaning through an examination of how river breaching decisions constrain policy choices. Moreover, through exploring these interactions in the Pacific Northwest, the chapter explains how such decisions contribute to problems that threaten the sustainability of long-term human-environment interactions.

Johanna Haas addresses how federal mining legislation has undergone uneven development and implementation in the Eastern and Western regions of the United States. She attributes this to not only different regional landscape features, but rather, as primarily a function of the regionally-distinct imaginaries and material realities of mining in the East versus the West. With a focus on the 1977 Surface Mining Control and Reclamation Act, Haas places legal trajectories and their contentious environmental effects in historical context. This analysis accounts for how power and scalar elements have contributed to spatially differentiated extractive industrial mining operations. She argues that in each region, divergent views of how legal architectures met human-environment interactions have cast Western companies as caretaker organizations and Eastern groups as destructive entities. These constructions have fed back into functionally different implementation of regulations

whereby Western groups have been held to flexible results-based standards and Eastern companies have been forced to follow more inflexible performance-based standards. Through analyses of how mining institutions and laws are constructed and maintained, Haas sheds light on the intertwined and multi-directional processes of environmental law, history and discourse as well as their inseparable material outcomes on the US environment and landscape.

Fraught spatial technologies and knowledge construction

With Geography's history of mapping empire – not to mention the associated justifications *for* empire – the discipline is no stranger to skepticism by critical scholars concerned with matters of spatial information and governmentality. In light of this history of the discipline, and a very similar one within anthropology, the appearance of critical scholarship on novel mapping technologies such as Geographic Information Systems/Sciences (GIS/GISc) should come as little surprise. Moreover, given the over-riding processes and claims to new powerful forms of 'representation' by the field of GIS, it constituted an ideal (and quite justified) target for the deconstructionist scholars of the early- and mid-1990s. Foremost among these critical works was Pickles' edited volume *Ground Truth* (1995), a work with contributions that engaged the particular and potential pitfalls of still-emergent technologies for gathering, managing, manipulating, and representing spatial information and 'data'. Through this work and others (Robbins 2001; Sheppard 2005; Schuurman 2006), came the development of *critical GIS* that sought to challenge the field and emplace accountability among practitioners, end-users, and power-holders alike. Focused on critiquing the underlying theoretical, ethical and practical framings of the field (e.g. Fox et al. 2003, 2005), critical GIS is on the frontline of the 'appropriate' use of this technology and the spatial information it generates as well as the sorts of conflicts and powerful implications the deployments of GIS might engender. Indeed, in some ways critical GIS is about making environments and landscapes *more* contentious by working towards participatory and 'counter' mapping (e.g. Peluso 1995) with usually disenfranchised locals as a way to confront the problems of representation and promote new forms of empowerment.

And yet, unsurprisingly, even with critical GIS's penchant for an analytical focus on methodology, ethics, and the politics of its technological feats, many questions remain. For example, will critical GIS – and, equally as importantly, GIS/GISc as a field – actually foster more than an over-riding obsession with collecting, storing, and representing knowledges about those communities and environments that are disempowered? In short, can participation get beyond 'consultation' of what the 'people' want and the performance of focus groups to 'share' the results of a mapping project to instead include a deeper sense of participation that might build bridges between groups that have generally been separated by socio-economic, political, education, and other cleavages? If critical GIS can be practiced as not just a form of academic critique but rather a contentious *system* of knowledge production and use, it might just make a significant contribution towards both overcoming the power divides associated with 'expert' and scientific knowledge systems (Forsyth 2003, Mitchell 2002).

In their chapter, *Fox, Suryanata, Hershock* and *Pramono* explore how multi-scale uses of spatial information technologies are value-laden, and therefore can influence community-based management in multiple and conflicting ways. Through examinations of case-studies in Cambodia and Indonesia, they examine a set of wider ethical and social questions regarding the uptake of spatial information technologies and related 'ironic' effects. The chapter looks at how the incorporation of these tools can inadvertently bound 'ways of knowing', such as ways of viewing property rights. Therefore, these actions entrench particular values and socio-ethical constructs for both the subjects and objects under study. The authors point out that these context- and scalar-dependent processes can generate conflicting effects, and the chapter draws on three inter-related dimensions where such effects raise ethical concerns. As an illustration of these interactions, Fox et al. describe how mapping can improve *insitu* understanding of community resources and ecosystem services, but also how it can also enhance *exsitu* knowledge for potentially extractive and exploitative activities. By interrogating the uses of these technologies in participatory mapping through wider social, ethical, and cultural lenses, the chapter addresses issues of (dis)empowerment (dis)enrollment and (dis)association in community and environmental mapping.

Brent McCusker examines two spaces in northern South Africa to look to how GIS and remote sensing technologies intervene in multi-scale discourses over post-apartheid property rights and claims. Situating the conflicts in both political and ecological contexts over time, McCusker traces land-rights and land-reform narratives on six farm associations in the Mahlambandlovu and Rondebosch Communal Property Associations. The chapter examines local versus expert knowledge issues and expressions of competing land claims. It then looks at how government officials and power-brokers seek to employ spatial technologies in order to 'settle' debates and discussions. However, considerations of social, ethical and cultural aspects of the issues demonstrate that these interventions are not at all neutral. Overall, this chapter addresses how local knowledges and contentions might be smoothed out through such value-laden technological interventions in order to scale-up and contribute to land reform policies and agendas. McCusker draws attention to how these particular ways of seeing spaces and places have contributed in multiple ways to understanding as well as quickening but also slowing the pace of (dis)possession and land reform in South Africa.

Conclusion: Towards Understanding Environmental Contentions

The contemporary and broad range of environmental conflicts critically examined in this volume – from contested representations of environmental science, to violent displacement, the scaling and re-scaling of environmental knowledge, protest, and regulation, to the contentious technological mapping of people and places – are united in an attempt to locate power and governance on the terrain of nature and society interactions. As the different chapters and case-studies show, in a variety of geographic and political-economic circumstances, environments become and remain contentious in often subtle ways that can threaten local and global ecological landscapes and resources, and most intimately, people's very livelihoods.

Importantly, the volume works to understand underlying discursive conditions and states of knowledge as well as forms of articulation that frame how people perceive and experience current resource and environmental conflicts. It is our hope that in clarifying the powerful and power-laden processes by which environmental knowledge is generated, framed, communicated and interpreted, this volume helps to reveal how environmental conflicts are and can be reconsidered and thus (re)opened to enhance negotiation in efforts to create more sustainable and just futures.

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