

Urban Sustainability and Environmental Research in Canada: Prospects for Overcoming Disciplinary Divides?

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1. Introduction

Between the commissioning of this report in December 2006 and its completion in April 2007, the environment exploded onto the Canadian political scene. Beginning in January 2007, Prime Minister Stephen Harper worked hard to establish his environmental credentials through a series of press releases and promises of budgetary allocations for environmentally related projects. By mid-March, however, criticisms began to mount: the press corps began to point to both local and more global shortcomings in the greening of the Prime Minister's vision. On the global front, Canada's backing away from its Kyoto Treaty commitments became an embarrassment to many starting in the fall of 2006. In early February 2007, concern was further amplified with the Paris release of the fourth and most authoritative report yet from the United Nations International Panel on Climate Change (IPCC).

More recently and more locally, the latest Statistics Canada census figures told a different but related, urban-environmental story. What many of us have observed in the course of urban environmental struggles was confirmed: suburban and exurban sprawl in Canada — while not perhaps as far-flung as it is in the United States --- is more rampant than ever.¹ Meaningful reductions in the country's excessively large per-capita ecological footprint will require a national urban strategy and more focused and thoughtful, long-term budgetary commitments.

This report will not attempt to unravel the future of funding commitments to the environment and the ongoing research that is needed to better shape it. But it will work to situate the present environmental moment in Canada in relation to past such moments. This history includes the Federal Green Plan of 1990 and the all-

¹ In response to the March 2007 release of the latest Statistics Canada census reports, Canada's national newspaper of record ran the following headline: "We have seen the future, and it's sprawl and emissions" (*The Globe and Mail*, March 16, 2007). The statistical underpinning of this headline focused on low-density suburban and exurban spread across the southern reaches of Canada, especially in the Toronto-centred 'Greater Golden Horseshoe,' with a population of 8.1 million.

too-brief era of eco-research that followed, wherein Canada's three main research funding agencies supported innovative interdisciplinary teams of as many as 30 university academics each, with community partners in urban and regional settings. To speak to the origins, contents and management of funding programs such as this goes hand in hand with the terms of reference for this report. In a proposal that we made to Olivier Coutard, Director of France's Laboratoire Techniques Territoires Social (LATTTS), the research plan for this paper was to examine:

- i) the recent history (mid-1980s to present) of interdisciplinary research funding in Canada, particularly concerning overlaps between urban sustainability and the environment.
- ii) questions of "good practice" in program management. Here key research questions include the following: "Did/does interdisciplinarity occur at the program or individual project level or both? And for what purposes and expected benefits?"
- iii) research objects or themes that might or should be emphasized in future research funding programs.

That work program of this proposal has entailed cross-Canada interviews and related research into interdisciplinary research concerning Canada's three largest city regions; i.e., those sprawling regions surrounding Vancouver, Montreal and Toronto. One of the related finds, in large part thanks to unpublished work that John Robinson (a senior associate with the University of British Columbia's Institute of Environment, Resources and Sustainability) has shared with us, is that the high water mark of interdisciplinarity in Canada -- at least as it regards the important realm of urban-environmental research -- is to be found in the Tri-Council Eco-Research Program. This is not to say that more positive futures are not in the works, but their realization is an open and contingent matter.

Since the mid-1990s funding for interdisciplinary research of all kinds has grown in Canada, along with the so-called knowledge economy. Canada is of course not alone in this regard: environmental concerns continue to come second to

economic ones, the recent warnings of Sir Nicholas Stern to Prime Minister Blair about the costs of inaction on the environmental front, being one very recent exception that proves the now dated and dangerous rule.²

As to the matter of how growing pools of public research monies are allocated, our daily newspapers include opinion pieces proclaiming the need for management and counter-management regimes to ensure that these monies are well invested. One of our celebrated Nobel-science laureates recently wrote that

The European Union is launching a revolutionary move to free the market in scientific ideas. A new pan-European funding agency, the European Research Council with a budget of \$11-billion ... will engage in 'bottom-up,' investigator-driven research, supporting the best ideas of researchers in all fields, since "researchers themselves are best placed to identify the new opportunities and ... directions at the forefront of knowledge." This is a far-sighted and civilized policy that will require the have-not nations of Europe to subsidize the laboratories of the haves. It recognizes that the scientific enterprise brooks no compromise in the support of merit, for it is in the interest of all that the ship of science be steered by those who see furthest (John Polanyi in *The Globe and Mail*, February 21, 2007 A21).

We too share a concern with the 'bottom up.' But it has us looking a little further down, below the heights of those who, as Polanyi proclaims, "see furthest."³ At the same time, we are perhaps not as dismissive of elements of top-down

² On October 30, 2006 we woke up to this front-page headline out of the UK: "\$7-trillion warning - Leading economist says climate change could cost more than two world wars and Great Depression combined" (*Globe and Mail* A1). Around the same time, millions of people were viewing Al Gore's *An Inconvenient Truth*. To President Clinton's now famous 'It's the economy, stupid,' Gore might go down in history as the originator of the counter line: 'It's the environment, stupid' ... for without the environment we will have no economy. Still, this did not stop Canada's current Environment Minister from warning us that "Canada would face economic collapse if the federal government pushed harder to meet its Kyoto targets." *Globe and Mail*, February 9, 2007, A4

³ Michael M'Gonigle, Eco-Research Chair of Environmental Law and Policy at the University of Victoria, and one of our interviewees, shared his interests in "looking down" with us. For one fascinating interpretation of this way of looking relative to others, see Kwa 2002.

funding agency management of public funds as is this nobel laureate. Last but not least, just as Canada has lessons to learn from Europe, so too might Europe – which by some counts is itself now sprawling (Maas, van Rijs and Koek 1998, Sieverts 2003) -- have lessons to learn from Canada. The contents of this report are, we hope, tailored well to that end. Sections 2 through 5 build a narrative around both the recent history of environmental concern in Canada, and some ways that such concerns have been translated into urban thought and action. Sections 5 and 6 build on this research to convey related lessons for research managers, as well as some emerging research themes and research infrastructures that need support. That is the case, at least, if we are to better ensure less dire and more hopeful urban environmental futures, here and elsewhere.

We should acknowledge our biases, the places from which we have written this report, and the support that has helped it. On biases, we are very much wed to the notion that despite the ongoing prevalence of disciplinary regimes in Canadian academia, interdisciplinarity is a thing of the past, present (see e.g., Jantsch 1972; Nowotny, Scott, Gibbons 2001) *and future*, as challenging and contentious as this cover term remains.⁴ The question is in turn begged: What *kind* of interdisciplinarity?⁵ This question is especially germane to our current

⁴ We follow John Robinson and others in using “interdisciplinarity” as a cover term for all those who proclaim the merits of alternative prefixes in a still disciplined world: “multi-, cross-, inter-, pluri-, trans- and meta-” (thanks to Robinson, interviewed in January 2007, for this) -- recognizing that one can go to considerable lengths to argue for the latter distinctions. That said, we find language games less engaging than the more substantive normative, ontological and political questions to which they point: Is ours to be a world of singular transdisciplinary knowledge claims? Or do moves in this direction not take us back to the 1940s (see Bowker 2005) or even to the still more totalizing visions of an imperial archive (see Richards 1993) of late-19th century vintage? We hope not, given the environmental significance of early-20th century turns from ‘matters of fact’ to more fluid and multiple ‘matters of concern.’ For more and less succinct North American and European ‘takes’ on the latter Whiteheadian matters and important distinctions between them, see e.g., Ford 2002 and Latour 2004.

⁵ One basic underlying distinction is that between Mode 1 and Mode 2 knowledge production, with the later being characterized by research that cuts across disciplinary

environmental moment. While the 2,500 or so scientists who brought us the IPCC's *Physical Science Basis of Climate Change* report in February 2007 may be "very certain" about the anthropogenic causes of global warming, uncertainties abound as to how to collectively curb and adapt to the path-dependent effects of three centuries of greenhouse gas emissions. On this socio-natural front more than on the former "[bio-]physical" one, moving from interactive science to still more interactive research paradigms is more pressing than ever – strange weather, urban sprawl and all.

Now we should acknowledge the more local, spatio-temporal context. In the territorial unit that is Canada, the federal governmental arrangement of the country is significant. Unlike more unitary states such as Britain and France, Canada consists of a central state, ten constitutionally entrenched provinces, three territories with near provincial status, and municipal entities that are deemed to be administrative "creatures of the provinces." This has had profound implications for the status of the "possibility spaces" that are Canada's urban and regional environments — inclusive of possibilities for urban-environmental research. We write this report from two points within the sprawl of North America's fifth-largest urban agglomeration: inner-city Toronto (McMahon) and the still vital, if now rusted, steel manufacturing center of Hamilton (Oddie), 65 kilometers southwest of Toronto's gold-laced and black-faced downtown commercial banking towers. The central Canadian urban life we have mostly lived and breathed is reflected in this report, along with our ongoing research on the political ecology of scale within the Great Lakes Basin and wider North American, Canada-U.S. contexts. Building on this foundation, we conducted interviews with politicians and academic researchers engaged with urban-

boundaries and hierarchies in the effort to address specific "real world" problems. Mode 2 interdisciplinarity also entails engagements with and accountability to those who utilize the knowledge produced by academic research (Gibbons 1999, 2000; Nowotny et al. 2001). Much of the research we discuss in this report involves or aspires towards this kind interdisciplinary practice yet, as many of the academics we interviewed pointed out, there are many institutional obstacles to doing so. These range from time constraints to criteria of accreditation and career advancement that continue to privilege research that remains within established disciplinary boundaries.

environmental and related issues (see Appendix 1 for a full list). Due to limitations of time and space, we distributed our efforts across global, national and a select number of urban and regional spaces, realizing that we without doubt were missing a good deal in between – inevitable given the depth and breadth of research in this field, both within and outside academia.

2. Canadian Environmental Moments: Urban Environmental Research and Policy Spin-offs?

The language of *moments* comes from France's Henri Lefebvre. According to one Canadian appreciation of Lefebvre's work, "moments outflank the pretensions of worldly theories, rules and laws, and challenge the limits of everyday life" (Shields 1999: 58). Such moments were alluded to in section one and are taken up further below, the key question being the varying degrees to which Canadian city regions have (and will again) become matters of research and policy concern. In turn this chapter becomes a vehicle for revealing Canadian contextual concerns, running from federal-provincial relations as they concern cities to the significance of more 'bottom-up' civil society perspectives, especially in relationship to urban environment and related research agendas. Here government and environmental governance entail a politics of scale that has both local and more global dimensions.

2.1 Earth Day 1970

This moment, the first Earth Day, was both global and local in scope, in Canada and elsewhere. Across North America and beyond, people gathered in city squares and parks under the banner of the modern environmental movement's powerful new slogan: "think globally, act locally." The prospects for translating this popular phrase into a country-wide set of urban environmental policies did not look promising in Canada circa 1970, nor are the signs for federal urban policy necessarily much better today. In 1968 a revealing assessment of central government positioning vis-à-vis cities in Canada went as follows: "A discussion

of urban policy currently being implemented in Canada requires little space. There is in fact no such thing” (Lithwick and Paquet, quoted in Andrew, Graham and Phillips 2003: 3).

Now, more than three decades after the modern environmental movement went into full swing, what are Canada’s prospects for national urban policies with strong environmental components? As of 2003, three of the country’s political scientists with urban interests (a relatively rare breed) concluded that those prospects remained dim (Andrew, Graham and Phillips 2003: 18). But more optimistically, they added, “there has been real policy action at the urban level. Urban governments in Canada have shown remarkable resilience and capacity to innovate in the wake of the challenges of the last thirty years” (19). What were some of these challenges on the environmental front? And how did they entail entanglements with both the provincial and the federal levels of the Canadian governmental system?

While urban policy research and action was not high on the Canadian government’s horizon of concern in the lead-in to Earth Day 1970, academics such as Harvey Lithwick and Gilles Pacquet – influenced perhaps by the urban riots exploding in U.S.-Canada border cities such as Detroit – proclaimed an “urban crisis.” In their words, “increasing population density has created our slum crisis, our pollution crisis, our unsafe city streets. At the same time, this [urbanization] process has led to our accelerating suburban sprawl, creating our transportation crisis, our municipal revenue crisis, our municipal service crisis and our housing crisis” (1968, quoted in Andrew, Graham and Phillips 2003: 4). All this talk of crisis may have even influenced a progressive Liberal administration’s actions. The era of Prime Minister Pierre Elliot Trudeau (1968-1979) was marked both by the creation of Canada’s first federal Ministry of the Environment – now known as Environment Canada -- as well as a Ministry of State for Urban Affairs (1971-1980). The short life of the latter ministry points us back to Canadian constitutional arrangements, by which power over cities remains with the provinces.

It is revealing that the main on-the-ground response to the federally commissioned Lithwick Report of 1970 came, not via the federal government, but through the Province of Ontario with its so-called Toronto Centred Region Plan. This plan proposed to contain and direct urban growth in and around Canada's biggest metropolitan entity (the two-tiered Municipality of Metropolitan Toronto), with the help of a green belt, provincial planning of new towns (growth poles) beyond this belt, and associated infrastructural supports. But follow-up was problematic: when Canada's long post-World War II economic boom came to an end in 1973, already sprawling cities such as Toronto were encouraged to sprawl even further by provincially mediated federal subsidies for water, sewage and roads infrastructure.

So ended Canada's first environmental moment insofar as the environment of Canada's largest city was concerned. Large-scale infrastructure systems — starting with big-pipe sewers -- conceived as growth-management tools in the Lithwick Report of 1970, again became the leading edge of what environmentalists on Toronto's fringes have come to think of as “pipe-driven sprawl” (Underhill 1998). It was no particular compensation that the end-of-pipe treatment plants were enlarged for the sake of a Great Lakes clean-up, given that this extra capacity — while it may have led to improvements in select point-source emissions -- was part of the extension of piping systems to service low-density sprawl. The environmental dimensions of this form of development, in turn, were seen in the destruction of older hydrological regimes along with increases in non-point sources of water and air pollution.⁶

Only in very recent years has the federal government, through an agency known as Infrastructure Canada, started to fund academic research pertaining to the strategic significance of infrastructure for environmental and other ends (see

⁶ Studies pertaining to the pollution of water from land use took off in the 1970s, following the 1972 passage of the Canada-U.S. Great Lakes Water Quality Agreement (see International Joint Commission 1979). The related modeling of complex, anthropogenic interactions between land use, air and water pollution informed the ecosystem approach which became a formal part of the 1978 version of the latter agreement.

section 4.2). However, declines in the degree to which infrastructure is publicly financed has probably diminished the ability of the federal and other levels of government to use infrastructure as a tool to shape the urban environment. Indeed, the creation of agencies such as Infrastructure Canada and its provincial counterparts was initially to a great degree about the need for public-private financial partnerships in the wake of cutbacks to more publicly led forms of infrastructure finance. For more on these interrelated points in the context of our sketch of Canada's third and present environmental moment, see below.

2.2 Canada's Second Environmental Moment: 1987-1992

The still-emerging retrospective view of this period comes as a surprise to many Canadians. One of the country's less-loved Conservative leaders is now deemed to have been our greenest prime minister to date. The middle years of Prime Minister Brian Mulroney's two-term mandate (1984-1993) were especially noteworthy. In 1987 alone, the Montreal Protocol pertaining to the reduction and elimination of ozone-depleting CFCs was passed, an acid rain treaty was negotiated with a recalcitrant Reagan-era U.S. administration, and an important annex to the Canada-U.S. Great Lakes Water Quality Agreement was signed. The 1978 version of the latter treaty helped institutionalize ecosystems planning in a territorial domain where the federal government could act: the international freshwater system known as the Great Lakes (Regier 1995). The 1987 version of the Canada U.S. Great Lakes environmental treaty entailed actions that went well beyond the above-mentioned point-source, end-of-pipe federal infrastructure subsidies. It instituted so-called remedial action plans; i.e., procedural plans explicitly designed to allow scientists *and* citizens to jointly take on the complex challenges of urban ecological clean-ups. Section 5 below will speak further to these plans, through the lens of follow-up eco-research funding concerning one of the 43 areas of concern that became Great Lakes RAP sites: the Hamilton Harbour toxic hot spot. In this area of concern amongst others, science- and engineering-led environmental actions of the 1970s and 1980s were given a distinct civil-society edge.

The year 1987 also saw the Brundtland Report published, and the Mulroney government soon responded by convening the National Task Force on Environment and Economy. This report, which emphasized “win-win situations and the need for voluntary actions rather than coercive measures” (Gale 1997: 101), led to the creation of Canada’s National Roundtable on Environment and Economy (NRTEE).⁷ It also laid the foundations for the development of Canada’s first and only comprehensive national environmental strategy in 1990. The Green Plan was undoubtedly motivated as much by political opportunities for Environment Canada and the new Minister of the Environment, Lucien Bouchard, as it was a response to growing public concern and NGO pressure (Gale 1997). The \$3 billion plan was widely criticized by environmentalists for placing too much emphasis on “information development” and too little on new regulations and policy instruments, but its fruits for sustainability research were substantial.

The Tri-Council Eco-Research program is the most notable, both for an explicit commitment to supporting interdisciplinary research on regional or urban ecosystems, and for the unprecedented collaboration it encouraged between Canada’s three largest academic funding agencies: the Social Sciences and Humanities Research Council (SSHRC), the Natural Science and Engineering Research Council (NSERC) and the Medical Research Council. Particular emphasis was placed on multi-year, team projects that involved both crossings of disciplinary lines between the natural and the social and bio-medical sciences, and some public participation in the development and/or dissemination of research (Robinson 1999). Between 1991 and 1995 millions of dollars were

⁷ Ann Dale, one of the two federal government workers who led the way in adapting the round table model to Canadian circumstances, comments that NRTEE “deliberately created a void,” the filling of which occurred by way of an “amazing [two to three year] dialogue of peers” that, as late as early 1992, involved senior government cabinet ministers, industry leaders and environmental activists and academics. When this model morphed into advisory status, Dale left the relative security of senior bureaucratic life, for a further career centered on research into sustainability and the environment (Dale, interviewed March 21, 2007).

allocated, some of the specific academic results of which will be examined in greater depth in section 3 of this report.⁸

The stated aims of the Green Plan included “requiring all departments to take environmental considerations into account when developing policies and programs” (Lucien Bouchard, quoted in Gale 1997: 106). While the success of this goal is questionable at best, it is certainly true that various governmental organizations and ministries adopted the language of “sustainable development” during this period and many, such as the Canadian International Development Agency and the International Development Research Centre, began targeting academic research funding in this area, with lasting impacts. However, the Green Plan itself was soon cancelled after the election of a new Liberal government in 1993. This new government, which remained in power until 2004, would go on to oversee a decade of economic austerity and funding cutbacks in the name of “deficit reduction.” While piecemeal investments in environmental programs and initiatives continued, the idea of a national environmental plan was abandoned. However, during this same period, environmental organizations continued to grow across Canada, with the 1992 United Nations Conference on Environment and Development (UNCED) influencing a shift toward more locally-developed and often explicitly urban understandings of “sustainable development.” Notable efforts here, inspired by the UNCED’s Local Agenda 21, include the Toronto-based International Council for Local Environmental Initiatives and various municipal planning projects, Vancouver’s International Centre for Sustainable Cities, and *Le Projet de Société*, a collaborative effort to develop an Agenda 21

⁸ Of the \$27-million allocated under Green Plan’s Tri-Council Eco-Research program, a significant sum went towards university faculty chairs of the sort that Ann Dale — Canada Research Chair on Sustainable Community Development — still holds with the help of post Eco-Research era endowments. The latter era died prematurely with the neoliberal austerity cuts that began in 1993/1994, and continued on into the new millennium.

action plan for Canada that involved representatives from various government agencies, non-governmental organizations and the private sector.⁹

2.3 *Our Present Moment*

Many strands weave into our present moment. They range from local opinion polls that have helped catapult climate change onto Canada's national political agenda to a host of more global, inconvenient truths. Picking up on the notion of Andrew, Graham and Phillips (2003) and others (Bradford 2002) that urban affairs are "back on the policy agenda" in Canada, one response might be that in the larger context of global trends, cities never went away (see, e.g., Boudreau 2000). Quite to the contrary: during the 1980s and 1990s the world cities phenomenon became a leitmotif of wider economic and cultural globalization (Friedman 1986; Keil 1995; Sassen 2001). And in many respects we are still catching up with this sea change.

But to follow this line of logic through in Canada would be to potentially ignore both the dark cloud and its silver lining. In this country there is a particularly pronounced disconnect between the center and its sprawling urban, city-regional territories, even if one can argue that Ottawa (i.e., the federal government) – through various financial mechanisms amongst others – is to a significant degree responsible for the trajectories that underpin the sprawling shape of Canadian urbanization, North American style. To invoke one thread of the current public

⁹ *Le Projet*, like the National Roundtable and its more regional and local versions, exemplified another Green Plan goal: "co-operation and sharing of responsibilities by establishing new partnerships, and by renewing those that already exist, between all elements of society: governments, companies, unions, non-governmental agencies and citizens" (Gale 1997:101). This roundtable model of environmental governance, based on consensus-based decision-making and the involvement of diverse "stakeholders" by means of public forums and advisory bodies, has proven particularly influential in Canada, at national and sub-national levels. However, as suggested by the very name of the National Roundtable on *Environment and Economy*, the roundtable model often tends to bracket out or downplay the social equity dimensions of sustainability in favor of a focus on "win-win" scenarios for promoting "Canada's long-term economic competitiveness and environmental sustainability" (National Roundtable 2007).

conversation, Canada is the only Group of 8 (G8) country that does not have a national transportation strategy. As to the silver lining, the 19th-century constitutional barriers to a 21st-century New Deal for Canadian cities have underpinned a five-year mobilization of the country's big-city mayors around a campaign to better align urban financial and other capacities with the economic, social and environmental responsibilities that have been downloaded onto Canada's cities over the past decade of neoliberalism.

A second major strand of the present moment is best taken up as a question: If cities are indeed back on the policy agenda — and the present debate in Canada suggests they may well be -- is the environment in this picture? The negative answer is that the urban-environmental debate remains underdeveloped next to that on the needed recognition of cities for more socio-economic reasons.¹⁰ More positively, but less prominently, the results of federal engagements with urban questions by way of the activities of academic funding agencies are to some extent cumulative. Here the results of the above-mentioned Tri-Council Eco-Research era of the 1990s have been built on in the present interdisciplinary era, as seen in the SSHRC's Major Collaborative Research Initiative grants. We take up some of these results in section 3 below.

A third strand of our present moment is interdisciplinarity itself. Interdisciplinarity has long been a prominent feature of environmental research in Canada, on paper if not always in practice, with the oldest interdisciplinary faculty of Environmental Studies at York University dating back to 1968. But by the year 2000, this term was associated as much or more with knowledge economy,

¹⁰ One sign of this with respect to the urban milieu is found in three of the more noteworthy, recent collections of essays concerning urban Canada (Bunting and Filion 2000; Fowler and Siegel 2002; Andrew, Graham and Phillips 2003). Of the 55 essays collected among these respective volumes, only four have titles that point to explicit urban-environmental ("ecological," "energy" and "sustainability") concerns. In turn, the follow-up collection from two Canadian-based and one Japanese-based academics --Sorensen, Marcotullio and Grant (2004) -- while as much international as North American, is aptly titled *Towards Sustainable Cities*. We may be slowly moving towards urban sustainability, but we (especially in North America) have far to go.

innovation and economic sustainability concerns. Still, with respect to more environmentally inflected thinking in Canada, the new millennium was opened with statements such as these:

Formal research, experimentation, and testing (i.e., systematic observation, theory forming and experimentation as a scientific activity) are needed to produce generic knowledge, but they are not always needed for problem solving. The challenge of sustainable development increasingly presents itself as a problem-solving activity. It is also about the production of useful knowledge; that is, it is inherently applied research. *The nature of sustainable development issues requires, at all levels, expanded decision and research contexts [italics added]*" (Dale 2001: 37)

Sustainable development issues are scale, place and time dependent [to the point that] communities must define the specifics of sustainable development according to their unique ecological, social, and economic imperatives. [These imperatives] will vary greatly from nation to nation and region to region. [And of equal or greater importance, understanding of sustainable development issues within a paradigm of] transdisciplinary research [necessarily entails] integration among disciplines .. *in the design and conduct of the study* (Dale 2001:39)¹¹

Regarding environmental sustainability, amongst others in the domain of the emerging transition from "the culture of 'science' to the culture of 'research'" (Latour 1998), various combinations of strategic (i.e., more state directed) and

¹¹ Through the writings of Dale and others before her (e.g., Rothman and Robinson 1997; Rees 1992), sustainability thinking from within the Canadian university system has tended to be "strong" rather than "weak" (Neumayer 2003). Notions of "natural capital" and related concerns for bio-physical limits to growth have meant that the oxymoron of Brundtland-style "sustainable development" could be critiqued. Yet the language of sustainable development lives on to this day, helping keep disparate parties at the table, for better or worse. But where sustainable development research is concerned, deeper issues of integrity — conceptual and otherwise -- keep raising their heads. As the website of the Canadian Consortium for Sustainable Development Research puts it, additive notions such as "multidisciplinarity" are no longer sufficient. To the degree that sustainability entails the integration of imperatives across social, ecological and economic lines, nothing less that a fuller "interdisciplinarity" will do, along with the "unifying concepts that foster and reinforce understanding across" disciplinary and other lines. For signs of some of the promise and limitations in this area, go to <http://ccsdr.crcresearch.org/index-hp.htm>, or read to the end of the next sub-section of this report.

investigator-led (so-called ‘free’) research need to be considered. As to the spatial anchoring of environmentally oriented research, Dale goes on to highlight the significance of “socio-politically bounded region[s]” (2001: 37). We follow suit in our analysis of federally funded research in Canada’s larger city-regions and bioregions, factoring in a “political ecology of scale” (Swyngedouw 2003) along the way.

3. Vancouver and the Georgia Basin Futures Project

Vancouver has long been a key staging ground for prominent elements of the modern environmental movement. It was the city from which Greenpeace, the world’s best-known environmental non-governmental organization, was launched in 1971. As an outgrowth of the 1972 United Nations Conference on the Human Environment held in Stockholm, Vancouver played host to Habitat, the UN Conference on Human Settlements in 1976, and the World Urban Forum in 2006. Paradoxically, however, Vancouver did not itself become a sustained object of environmentally inflected thinking until the 1990s.

While all too short-lived in terms of focused high-level political energies, Canada’s second moment of environmentalism circa 1990 (for further contextual analysis, see Section 2) gave rise to a Federal Green Plan, discussion forums and publication vehicles such as the National Roundtable on Environment and the Economy, and new governmental research funding conduits such as the Tri-Council Eco-Research program. The products of these programs in the context of Canada’s west coast metropolis in the wilderness live on to this day.

First, the beginnings of a sea change in environmental sensibilities was inaugurated. The environment, previously seen as separate and apart, sublime and ‘out there,’ began to be more widely regarded as one of a number of interacting systems inclusive of the economy and human society. To invoke the language of ecological economics, the fate of natural capital on multiple scales came to be strongly linked to the fate of economic and social capital. Second,

Vancouver as a local place came to be conceptualized as being interwoven with larger bioregional and global environmental spaces. These intersections are evident in the publications of both better- and lesser-known academics based in Canada's Pacific northwest. Their contributions include notions such as "the ecological footprint" (Wackernagel and Rees 1996) and thinking about sustainability that bridges into an emphasis on social capital (Roseland 1999; Dale and Onyx 2005). Furthermore, Vancouver is home to innovative bioregional projects that combine virtual possibility spaces with goals of social mobilization and emergent, regional transformation (Robinson 2003; Robinson and Tansey 2006). This sub-section recounts some of the details and dynamics of these developments.

3.1 *From the Sublime to the Sprawl*

One early-1990s example of local and more global forces converging in Vancouver can be found in Mark Roseland's *Toward Sustainable Communities: A Resource Book for Municipal and Local Governments* (1992). Of the initial publications of Canada's National Roundtable Series on Sustainable Development, this was the first with an explicit urban focus. The local academic activist pedigree of this publication is perhaps as important as its list of informational "resources" for municipal and local governments. Roseland's involvement in a 1988 Environment Canada-sponsored, student-organized conference on planning for sustainable development needs to be noted (see Rees 1989) Along with his acknowledgments of financial support from "the Forum for Planning Action, the University of British Columbia Centre for Human Settlements, the University of British Columbia Task Force on Healthy and Sustainable Communities, and Friends of the Earth" (Roseland 1992: ix). Roseland's *Resource Book* was the product of both local and non-local forces, governmental and non-, with the accent on the local. As to its particular urban focus in the context of a region of North America that promotes itself as *supernatural* (see Sparke 2005 for some recent views on this cross-border

marketing venture), the foreword to Roseland's work, written by Jeb Brugman, Secretary General of the UN's International Commission for Local Environmental Initiatives, is noteworthy:

The intellectual roots of the North American environmental movement in Anglo-Romantic traditions of the 19th century have inspired many battles to protect a pure and wild nature, but they have failed to guide humankind on a course that is sustainable. While we have tended to nature's ecosystems, we have permitted our cities and towns to become engines of resource extraction and exploitation, waste generation and release, so much so that even the chemistry of the Earth's atmosphere is no longer spared from their effects. (Roseland 1992: vii)¹²

We will return to the third edition (2005) of Roseland's 1992 book, particularly regarding the ways that it elaborates the now well-traveled notion of *social capital*.¹³ As for Brugman, his follow-up statement concerning urban sprawl is particularly germane to North American — and perhaps now western European city-regions (see, e.g. Sieverts 2003). He observes that “during the period that environmentalism became a force in North American public life our cities have sprawled without consideration for resource efficiency. Infrastructure has been constructed — housing, roadways and sewage systems, for instance — which encourages disregardful resource consumption” (Brugman, as quoted in Roseland; *ibid.*).

¹² Canada's second environmental moment circa 1990 had its high point in 1992, in the view of Mark Roseland (interviewed on January 24, 2007). ICLEI's work to apply the ideas that came out of the Rio Earth Summit of that year (Local Agenda 21 being particularly significant), in communities and municipalities across Canada and elsewhere, was part of it. ICLEI made Toronto its world headquarters, with an office set up in that city from 1993.

¹³ Ann Dale captures some of the diffuse dimensions of “social capital,” saying that it “refers to the shared knowledge, understandings, and patterns of interaction that people bring to any productive activity” (2001: 179-180). This definition is supported with references to the influential if not controversial (see Fine 2001) works of Coleman (1988) and Putnam (1993). Roseland's “community capital” appears to stand in for social capital, being a product of interactions between “natural or environmental capital [alongside] physical ... economic ... human and cultural capital” (Roseland 2005).

The early 1990s also saw the launch of national state-of-the-environment indicator reporting under Canada's Green Plan. Rising national per-capita car ownership, highlighted in the 1950s as an index of the good life, began to receive a very different and more negative, environmentally based inflection. In the city-regional domain, the freedom of travel associated with the individual family car began to be reframed in terms of 'auto-dependence' and 'gridlock.' More importantly, the latter terms factored into municipal attempts to move "beyond sprawl."¹⁴ In Vancouver these attempts may have helped mitigate some tendencies towards low-density, suburban and exurban spread. Yet the environmental effects of sprawl in terms of rural-to-urban land conversion, toxic runoff, smog days and greenhouse gas emissions, have grown both relatively and absolutely. One snapshot of such effects can be seen in calculations of the ecological footprint of Vancouver and its city-region. Having examined that region with the help of one of the first Tri-Council Eco-Research grants, Rees and Wackernagel would state that "at least 90 percent of the ecosystem area needed to support [Greater Vancouver in its Lower Fraser Basin context] actually lies outside the region" (1999: 224). Rephrasing the same point and giving it a global spin, they point out that generally "the geographical locations of high-income regions and countries no longer coincide with their ecological location" (Ibid.). Hence the titling of their end-of-millennium contribution: "Our Ecological Footprint: Where on Earth Is the Lower Fraser Basin?"

3.2 *New "Possibility Spaces" for More Sustainable Futures?*

¹⁴ In North America, the late 1990s saw growing debate over the terms *smart growth* and its converse, *dumb growth* in the form of sprawl, usually defined as low-density, auto-dependent development. In no small part, the Bank of America's publication of *Moving Beyond Sprawl* in 1995, with inputs from San Francisco Bay Area activist groups, can be read as the beginning of a sea change in sensibilities around this land-use issue. From 2000 the number of English-language academic publications with "sprawl" in their titles began to explode. In 2002 Canada's Toronto-Dominion Bank followed the Bank of America in condemning sprawl, on both environmental and economic grounds. See Toronto Dominion Bank 2002.

A little more than a decade after *Our Common Future* was published (Brundtland 1987), a collective of researchers at the University of British Columbia (UBC) in Vancouver concluded that despite all the good intentions entailed in such visions, “one would be hard pressed to demonstrate that we have achieved or even made progress towards sustainable development in any particular sector or region” (Healey, Robinson, Shearer, Wernick, Woolard, 1999: 4). This bleak statement opened an essay collection that arose out of one of the last funded projects associated with the Canadian Tri-Council Eco-Research Grants program of the early 1990s. A key concluding statement then followed:

“A [global and urban ecological] future based on extrapolation of present trends appears brutish and gloomy. But we know that there are other possible futures. We also know that forecasts of the future based on present-day trends are almost invariably wrong. This is because our behavior and the choices we make change in response to the changing world around us, and in response to our understanding of the implications of those changes.” (1999: 294)

One of the first set of beneficiaries of a Canadian Eco-Research monies, Rees and his former student Wackernagel, might well be more pessimistic in light of their warnings that global ecological deficits are both uneven and accelerating. That said, their ecological footprint tool was deemed to be as much educational as analytic; i.e., it was predicated on the notion that social changes could be facilitated, if not from on high, then by way of enhanced everyday understandings. And despite talking of growing “ecological deficits” as a means to this end, they would likely concur that the apocalypticism of the Western world’s first moment of environmentalism did not serve particularly useful ends.

On Canada’s west coast, one of the country’s more reflexive quantitative modelers, John Robinson, who had worked with D.H. Meadows of Club of Rome fame (Robinson and Meadows 1985), would be the first to agree. Furthermore, he helped lead an effort to build local alternatives to predictive and positivist *modeling as usual*. This brings us to a five-year, SSHRC-supported Major

Collaborative Research Initiative (2000-2005) which built on the Lower Fraser Basin study alluded to above. Initiated by Robinson and others in 1998, this was the Georgia Basin Futures Project. This sub-section of our report gives it a central place, both because of its fundamental concerns with interdisciplinarity and because of the Vancouver-based, urban research infrastructure initiative it helped foster (the Centre for Interactive Research on Sustainability, profiled in Section 4.2).

The Georgia Basin Futures Project was “a five year interdisciplinary research project to explore regional sustainability in the bioregion that surrounds Vancouver” (Tansey et. al. 2002: 98). This project and some of its spinoffs (e.g., the Georgia Basin Digital Library) are well documented in a range of international academic journals (see the Robinson references in the bibliography, and others below). Before discussing some highlights of this documentation, a brief word about the so-called Georgia Basin. In North America the notion of hydrological basins and bioregions with major urban ecosystem components began to win official recognition starting with the Great Lakes freshwater basin in the 1960s and 1970s. In the wake of the first moment of environmentalism spoken of in section 2, the Canada-U.S. Great Lakes Water Quality Agreements were signed in 1972 and 1978. In the wake of the second moment circa 1990, Canada and the Province of British Columbia launched the Georgia Basin Ecosystem Initiative in 1998, leading to the principal environmental agencies of the U.S. and Canadian governments signing a “Joint Statement of Cooperation on the Georgia Basin and Puget Sound Ecosystems” in January 2000.¹⁵ The population surrounding this bi-national saltwater basin more than doubled between 1975 and 2000, the Canadian component of which is today approaching three million people spread over 46,000 square kilometers.

¹⁵ The related Georgian Basin Action Plan is profiled by Environment Canada with the help of a map at http://www.pyr.ec.gc.ca/georgiabasin/basinFacts/basinFacts_e.htm.

The Georgia Basin Futures Project (GBFP) as initially proposed had two major goals: 1) “Through scenario analysis, to understand better the interrelated dynamics of the ecological, economic and social systems in the Georgia Basin, and to identify policy interventions which could enhance human well being, while reducing the adverse environmental effects of human activities”; and 2) “To evaluate the role of game-like simulation tools in enhancing public understanding of these dynamics, and of the complex trade-offs involved in sustainability” (Tansey et. al. 2002: 98).

In terms of the first goal, policy possibilities in the study area ranked high, with implicit and explicit links to Mode 2-type interdisciplinary concerns (see Gibbons et. al. 1994) written in from the beginning (see, e.g., Rothman and Robinson 1997; Robinson and Tansey 2006).¹⁶ Indeed, the study, conceived in the same year that a new national bioregional entity was inaugurated, may have subsequently received federal funding to help aggregate information about an area that remains divided among five regional land-use planning jurisdictions. But here the GBFP initiators took a substantial risk: they bargained on the hope that their study might help build momentum towards policy coordination among the latter regional jurisdictions. To the degree that this has not yet happened, the GBFP’s benefits began to shift to the more conceptual yet by no means insubstantial realm of “possibility spaces” (see, e.g., Tansey 2005).

This brings us to the second goal and to some of the more innovative dimensions of GBFP modeling relative to what might be dubbed *modeling as usual*. In 2001 Europe-based environmental thinkers Chunglin Kwa and Leen Dresen observed

¹⁶ References to Robinson’s work before the GBFP are germane for several reasons. Not least of these are the pivotal place of his long-term concerns with modeling as usual (see Robinson 1988 and 1992) in the directions of the GBFP and its spin-offs continue to take out of the University of British Columbia’s Sustainable Development Research Initiative. The work of the latter institute continues to this day, albeit under the larger mandate of its successor, the Institute for Resources, Environment and Sustainability.

of Integrated Assessment Models (i.e, IAMs of the sort championed by the UN-sponsored IPCC from the late 1980s) that

The current dominance of a systems analysis-derived framework as the integrative concept behind IAMs makes their implicit readers above all technocrats: those for whom energy and substance flows are amenable to control and management [from on high]. A challenge for the integrated assessment community could therefore be to consider whether it is possible to conceive other integrative frameworks, which would appeal to different groups of readers/users. (2001: 41)

A similar challenge was being taken up within the GBFP from the late 1990s. Robinson's *backcasting* approach (1992, 2003) began to be deployed and further developed as an explicit counterpoint to the predictive and positivist "truth-machine" tendencies of predictive *forecasting* models. Here the possibility-space of the Georgia Basin took on virtual form in GB-QUEST, a computer-based model and game that entailed both sub-model archetypes pointing to different Georgia Basin economic and environmental futures, and an interface designed to engage citizen users and make them aware that the latter futures were not singular and fixed, but subject to the effects of citizen mobilization, everyday life-choices and political decision making at multiple scales. GB-QUEST, in combining both expert and popular inputs, was designed to engage sustainability imperatives in a bottom-up, normative and democratic way. As such, the GBFP study team's work existed "in the space between science and policy" (Rothman and Robinson 1997: 36). More will be said about this interdisciplinary space in the following section, especially as the thinking that has gone into the QUEST modeling work is now informing work to launch the Centre for Interactive Research on Sustainability at the University of British Columbia. But to round out this sub-section and help launch the next, the place of "social capital" in Canada is spoken to from two different angles, both based in Vancouver/Georgia Basin.

3.3 Sustainability, 'Social Capital' and Beyond

In the Canadian context, one of the best summary statements on the concept of social capital and sustainability is that of Mark Roseland (2005: 3-14). Declining returns to both 'natural' and 'economic' capital, he shows, might be countered by increasing returns to 'social' capital. While the latter term is amorphous, the implication is that moves towards sustainable communities might be facilitated by letting bloom the flowers of tens of thousands of local environmental projects, from higher-density neighborhoods to green-roof gardens to living machines. If that description contains a hint of skepticism, it comes from the failure of this talk of social mobilization to bridge from ecological to more explicit, political economic concerns. To echo Britain's Ben Fine (2001), a sophisticated Marxist whom Ann Dale and Jenny Onyx had the good graces to cite in their *A Dynamic Balance: Social Capital and Sustainable Community Development* (2005), few if any social capitalists grapple with the fact that capital itself is a politically loaded, social relation. Mark Roseland goes partway, however. While espousing the need to "figure out how to harness market actors and forces" to ecological projects locally, Roseland at the same time critiques weak (Brundtland-style) versions of sustainability and the dangers they bring of political co-optation at more macro levels (interview, January 24, 2007). In more conventional terms, his lucid if still conceptually challenged (see Fine 2001) uses of the language of capital, goes hand in hand with his statement that "multiplying and using social capital is not without its problems. By its very nature, social capital can tend to mirror existing power structures" (Roseland 2005:11-12). We turn to some of these problems in the next section.

First, however, a brief spin on our present environmental moment, via the big winds that devastated Vancouver through mid-December 2007. On the night of December 15, 2007, Canada got a little taste of a post-Hurricane Katrina environmental moment. One of the country's most celebrated urban wilderness parks, Stanley Park, saw hundreds of its five-century-old giant trees toppled in

the wake of hurricane-force winds.¹⁷ This was one of the punctuation marks to months of climate change debate in Canada, provoked in October and November by the limits of the federal governments so-called Clean Air Act, and followed by opinion polls showing that Canadians rank environmental issues high on the list of their political concerns.¹⁸ Strange weather and seemingly random events ranging from expressway interchange collapses (see section 4.4) to viral invaders (see 6.1) to electricity blackouts factor into what has come to be dubbed the *new normal* to everyday life in North American cities, post 9/11. This is the popular turn of phrase to emerge more than a decade after Bruno Latour's "imbroglios" (1993), in which the dividing lines between nature and society are broken down or at least challenged in conceptual and other ways.

4. Montreal, Urban Ecology and Comparative Regionalism

Articulation of the state and civil society around urban ecological and other projects is at issue in some of the more exciting research initiatives now underway in Canada. The history of social movements and radical urban activism in Montreal – one of Canada's three largest city-regions -- underpins statements such as this:

Overarching social and technical infrastructure issues such as the control of sprawl, the easing of transportation gridlock, and the provision of water and sewerage services stretch the regional imagination and policy making capacities of politicians, experts, corporations and activists across the urban region. Citizens everywhere cross traditional urban/suburban, ethnic, racial and class divides in fashioning a new urban political ecology

¹⁷ For a fascinating literary excursion into the depths of Stanley Park and the bioregional imagination (with a French-influenced set of culinary twists), see Taylor (2001). Timothy Taylor's glocal narrative begins thus: "They arranged to meet at Lost Lagoon. It was an in-between place, the city on one side, Stanley Park on the other."

¹⁸ The opinion polls started to go against the Harper government around the environment, starting in November of 2006 around Kyoto. In late January 2007 Canadian's were surprised to learn that opinion polls had "Climate concerns .. top[ping] security and health." *Globe and Mail* January 26, 2007, A1.

that encompasses notions of environmental justice and regional ecological integrity (Boudreau et al. 2006: 44)¹⁹

In this section we provide a sense of the detailed texture of Montreal as a socially sustainable city, before broadening our scope to comparative dimensions of regional imaginary and the related “global city metabolics” (Boudreau, Hamel, Jouve, Keil 2006: 39) to be found there.

4.1 Montreal as a Distinctive Urban Place

The largest city in the francophone province of Quebec, Montreal has long been regarded as distinctive within the province and Canada as whole. This distinctive character is based in part on its physical geography, with the original Island of Montreal at the centre of the larger city region, and its unique history as a major metropolitan centre with a diverse mixture of Anglophone, Francophone, and many other cultures in a province that is considerably more homogenous. Despite high levels of poverty (more than 22% of the Montreal Metropolitan Area’s 3.6 million residents are considered “low-income” by Statistics Canada) and the growing obstacles to economic integration facing new immigrants and other marginalized groups, Montreal has gained a reputation as a “socially sustainable” city that has managed to avoid the ethnic ghettos and acute concentrations of poverty found in many other North American cities (Séguin and Germain 1999). Its extensive and efficient public transit system, pedestrian-friendly neighborhoods and tradition of community activism on issues of green-space protection, social justice and municipal democracy have also garnered Montreal a reputation as a “green” city -- despite growing problems with waste management, continuing pressures for suburban and exurban expansion, and challenges posed by aging infrastructure and vacant industrial lands.

¹⁹ Page numbers for this article are taken from an uncorrected proof. Our apologies if the published article differs.

4.2 *Research in Action: Community Engagement and Social Mobilization*

A wide range of urban sustainability research initiatives are under way in Montreal, including familiar approaches to environmental studies that focus upon the science of ecology. But perhaps most notable are many community-based research projects that explore public engagement and urban environmental governance, often creating links between academia and grassroots initiatives in the process.

McGill University's School of Urban Planning has engaged in collaborative community initiatives such as the *Montreal Vert* ecological inventory of urban parklands, green spaces and ecological corridors and the Eco-Montreal "green map" project, which uses geographical information software to explore and publicize ecological interconnections within the city and to the surrounding bioregion.²⁰ With support from the International Development Research Centre's Cities Feeding program, McGill's schools of urban planning and architecture are completing *Making the Edible Landscape*, a "collaborative research, design and construction project" to demonstrate the importance of urban agriculture through case studies and design projects in three cities, located in Sri Lanka, Uganda and Argentina. This project's report on urban agriculture includes an analysis of Montreal's rich history of community gardens, along with the more recent growth of food security and community-supported agriculture networks that emphasize small-scale farming and affordable, organic food (Bhatt and Kongshaug 2005).²¹

²⁰ For more information on the Eco-Montréal project, see <http://eco-montreal.mcgill.ca>.

²¹ Community Supported Agriculture (CSA) is a worldwide phenomenon that has emerged in response to ecological problems and health concerns associated with industrial agriculture. It involves partnerships between farmers and city dwellers, with participants purchasing organic food from local farms. Food security refers to the reliable provision of nutritious food to all people, and often concerns the social and ecological consequences of food production systems. Advocates often promote localized production, living wages for farmers, detailed labeling systems for food products, and the preservation of land for food production within and outside urban centers. Food security is becoming a prominent theme in urban sustainability initiatives within Canada, promoted by non-governmental networks such as Food

This focus on community engagement and social mobilization is also evident in social science research that is concerned with the social construction of urban environmental conflicts, public participation, and the relationships between public policy and environmental science within emergent forms of urban-environmental governance. These issues are explored by interdisciplinary research units affiliated with the *Institut des sciences de l'environnement* at the Université du Québec à Montreal (UQAM). *La Chaire d'études sur les écosystèmes urbains* -- a project involving UQAM, the City of Montreal and the Quebec Ministry of Municipal Affairs is particularly noteworthy as it is explicitly centred on the interdisciplinary analysis of urban environmental policy, with emphasis on public engagement in decision-making (see, for example, Gauthier and Lepage 2005; Simard and Lepage 2004; Gagnon et al. 2004). Related work in environmental sociology problematizes traditional conceptions of environmental science as “value free,” and explores how science and politics shape each other within conflicts over environmental governance, often in an urban context (Guay et al. 2005; Guay et al. 2004; Gendron and Vaillancourt 2003).

4.3 *Social Ecology and Participatory Democracy: The Urban Ecology Centre*

The prevalence of urban sustainability research that foregrounds the political dimensions of ecological knowledge, public participation in environmental governance, and community mobilization can be understood in part as emerging out of Montreal's rich history of social movements and environmental politics. Influenced by an emergent international environmental movement and rapid

Secure Canada. Food security is also an emergent theme in academic research, as demonstrated by UBC's Centre for Sustainable Community Development, Ryerson University's Centre for Food Security, and the newly created Canadian Association for Food Studies. Food security and urban agriculture were also prominent themes at the World Urban Forum and World Planners' Congress meetings held in June 2006 in Vancouver.

social and institutional changes that swept through Quebec during the 1960s,²² struggles over the preservation of urban green space and opposition to large-scale infrastructure projects grew during the '70s and '80s and have continued into the present (Oljemark 2005). These movements have grown alongside and frequently overlapped other urban social movements concerned with poverty, social inequality and the democratization of municipal politics (Lustiger-Thaler 1992).

One of the most long-standing and well-known manifestations of this flourishing of municipal activism during the 1970s and '80s is the Montreal Citizens Movement (MCM), a municipal party founded in 1974 to oppose the administration of Mayor Jean Drapeau. The MCM would soon expand to include support from a broad range of grassroots community activists influenced by the civil rights and radical student movements of the 1960s and committed to “new left” principles of participatory democracy and social justice (Roussopoulos 1978; Schechter 1979). The MCM won major electoral victories in Montreal, including a landslide victory in 1986 that led to an eight-year majority on City Council. However, the party had begun to splinter into factions by this time, and long-standing conflicts between electoral reformists and the movement’s more radical, activist membership came to a head (Thomas 1997). One faction born in this conflict was Ecology Montreal, the first green municipal party in North America. Established in 1990 by long-time peace activist and public intellectual Dimitri Roussopoulos, Ecology Montreal promoted a more radical platform of decentralized participatory democracy, social and economic justice, feminism and sexual freedom, non-violence, ecological humanism and community-based economics (Lustiger-Thaler 1992; Biehl and Bookchin 1993). This platform, like many of the products of Roussopoulos’ influential publishing company, Black Rose Books, was explicitly informed by Murray Bookchin’s writings on social

²² This period is frequently described as a “Quiet Revolution” that involved a widespread rejection of traditional authorities and institutions such as the Catholic Church, a turn toward more liberal social norms, and growing public support for new programs of social democratic state planning and governmental reform.

ecology – a current of environmental thought that emphasizes the inseparability of ecological and social problems, and promotes development of alternative social, economic and political structures based on principles of communication, mutuality and cooperation (Bookchin 1989, 1991).

Bookchin's notion of "libertarian municipalism" envisions the city "as a humanly-scaled, self-governing municipality," and calls for decentralization of decision-making power through mechanisms such as citizen forums and neighborhood assemblies (Bookchin 1995; Biehl 1997). These ideas, through the efforts of Roussopoulos and others, influenced the community organizing efforts of the '70s, progressive municipal parties such as the MCM and Ecology Montreal, and environmental activism within the city region more broadly, helping to establish enduring linkages between struggles for social justice, local democratization and ecological health. The fusion of environmental concern with "libertarian municipalism" is nowhere more evident than in the work of the Urban Ecology Centre (UEC) and its parent organization, Société de développement communautaire de Montreal (SODECM). Founded in 1994 by Roussopoulos, SODECM is a non-profit community organization with the mandate of promoting "social ecology in the neighbourhoods of Montreal, as well as in the city as a whole, and to advance change through sustainable development and healthy alternatives to current city lifestyles" (Urban Ecology Centre 2007). Unlike the more apolitical conceptions of "social capital" and community participation described elsewhere in this report, SODECM's mandate and its central aim of developing the knowledge and tools to build more sustainable and equitable cities was conceived in explicit opposition to the depoliticization of urban development and the socially and ecologically regressive policies associated with the rise of neo-liberalism. This agenda and approach is reflected in the methods and activities of SODECM's flagship project, the Urban Ecology Centre.

Centrally located in Montreal's Milton-Parc district, within Canada's largest complex of non-profit cooperative housing, the Centre provides a physical space

to share information on urban sustainability. Here, SODECM and affiliated community organizations present public workshops, conferences and round-table discussions on sustainability, and a large document library is available for public consultation. In addition to various reports and position papers, SODECM publishes *Place Publique*, a popular biweekly newspaper on social ecology and municipal affairs. The UEC also serves as a central organizing space for local community organizations and the coordination of urban sustainability projects for both local neighborhoods and the wider city (bio)region. The surrounding Milton-Parc neighborhood has been designated as a “sustainability lab” for community-based action plans on transportation, water, energy conservation and waste management. These plans are developed in collaboration with NGOs and university researchers, and in consultation with local community groups.

SODECM is an independent, non-profit institution that receives funding from a variety of sources including Environment Canada, Environment Quebec, the City of Montreal and various private foundations. Interdisciplinary research and collaborative work that crosses the boundaries between academia and community organizing are central features of the Urban Ecology Centre and the value of collaborative environmental planning is highlighted by many of their campaigns and projects. This is particularly evident in the Montreal Urban Indicators project, an initiative with McGill’s School of Urban Planning that involves developing and implementing sustainability indicators at a neighborhood level. Community engagement also figures prominently in the UEC’s other sustainability demonstration projects such as green-roof construction and assistance for sustainable design, renovation and retrofitting of local homes, provided through the *Groupe-ressource en éco-design* program.

Public engagement and environmental responsibility on the part of both citizens and the local state is also emphasized in SODECM’s Municipal Democracy and Citizenship program. This program encourages public participation and the democratization of urban governance through community organizing and public

forums such as the ongoing series of Citizen Summits organized in cooperation with local community groups and academics. This vision of collaborative urban environmental planning aims to bring together and assist the efforts of citizens, including the creation of better avenues for direct participation in municipal decision-making, rather than the focus on elite actors and top-down consultation exemplified by governance models such as the National Roundtable on the Environment and Economy. With this vision of bottom-up democratization in mind, SODECM was instrumental in establishing the Montreal Charter of Rights and Responsibilities adopted by the City of Montreal in 2005 and is now promoting the adoption of municipal decision-making processes such as participatory budgeting. These efforts are grounded in and guided by the history of previous successes and failures with municipal democratization in Montreal, stretching back to the era of the Montreal Citizens Movement and the earlier proposals for radical democracy in which Roussoupoulos and other members of SODECM were directly involved.

4.4 The City-Regional Scale and Comparative Urban-Regional Research

Public engagement at the local scale is indeed a prominent and promising feature of urban sustainability research and action in Montreal. However, at the scale of the larger city-region, many challenges remain to be worked through, urban-environmental and otherwise. How do capacities for developing an ecologically sustainable Montreal city-region compare with city regions and bioregions elsewhere in Canada and further afield? Important questions such as these have recently been posed by a cosmopolitan group of researchers from English- and French-speaking Canada. This country's "two solitudes" are being bridged with the help of a modest standard (three-year) research grant from the Social Science and Humanities Research Council of Canada, the research products of which are now out or about to be.

The comparative regionalism of Boudreau, Hamel, Jouve and Keil (2006 and 2007) is inspired by North American-led research on new state spaces in Europe,

with Neil Brenner (2004) and the so-called “politics of scale” (see Brenner et al. 2003) building the larger frameworks. More empirically, the recent history of regionalism from above and below in Montreal and Toronto is where their work is brought down to (discursively mediated) earth. The moment of empowerment of Montreal social movements in the mid-1980s happened to be the moment of a key shift in spatial imaginaries. Of Montreal and Toronto, Boudreau et. al. point out that, “the configurations of actors and institutions at the metropolitan scale evolved strongly in the last 20 years ... [T]he metropolitan [city-regional] level, beyond the municipal, progressively became the new territory of reference for political and economic leaders” (2007: 6). But here elements of convergence, by way of the heavy hand of state (provincial) interventions, have combined with significant elements of divergence. In the case of Montreal, and of Quebec more generally, social democracy lives on – or, at least neo-liberalism’s effects have been softened -- with the help of a provincial welfare state that effectively allied with progressive social forces at the core of the province’s largest urban agglomeration. In turn the fringes of the city-region, again through the auspices of the province and its municipal creatures, have to date been left to the work of technocrats in municipal bureaucracies and arm’s-length (less than fully democratic), public-private state agencies.²³

In and around Toronto, by contrast, the hard edges and contradictory dimensions of neo-liberalism starting in the mid 1990s created a void that civil society actors from the left and elsewhere struggled to fill. One silver lining in this dark historical cloud – where the many riots and baton charges during the reign of Premier Mike Harris (1995-2002) were unprecedented in Ontario history – is to be found today

²³ Pierre Hamel (2005) argues that “while urban movements were numerous in Montreal and were mainly responsible for the election of the Montreal Citizens Movement to City Hall in 1986, they were unable to secure new alliances on a metropolitan scale.” And as Hamel and colleagues (Boudreau et al 2006:15) state, “the institutionalization of relations between these progressive social movements and the provincial and federal governments was one of the causes of their disempowerment on the Montreal scene. Being integrated into the management of programs and policies elaborated by upper tiers of government, they lost part of their autonomy and became organizations providing services on behalf of the State.”

in “pitched discursive and legal battles between the provincial government and the [land] development industry” at the urban-rural fringe (Boudreau et al. 2006: 40). In a province where the Toronto-Dominion Bank (2002) has issued warnings about the confluence of sprawl and gridlock and their nightmarish transportation implications for just-in-time deliveries in a globalized (or at least now firmly continentalized) urban-industrial economy, is it little wonder that social mobilization around bioregional concerns have gained a certain traction?

Comparative work of the above sort is valuable, especially to the degree that it is conceptually housed in a “new regionalism” (see Boudreau et al. 2006, 2007 relative to, e.g., Sancton 2001) built around emerging political economies and ecologies of scale. Here environmental and economic concerns go together in recent expressions of a post neo-liberal (if still very much capitalist) agenda in Canada and beyond. The Conference Board of Canada, headquartered in Ottawa, is now proclaiming the need for Canada to learn from more unitary states such as the United Kingdom. A national urban agenda is called for, translated into more money for infrastructure projects (e.g., a Montreal to Toronto TGV-type rapid rail service) that would further blur the lines between conceptions of Montreal and Toronto as distinct units of analysis. Indeed, comparative methodologies that assume such distinctions are challenged by Boudreau and company. Their comparative work invokes more-encompassing state spaces, along with the many economic, cultural and other flows that both crosscut and collapse them into kalaiedesopic, topological arrays (see, e.g., Amin and Thrift 2002).

One of the strengths of the above comparative work is its nuanced teasing out of the convergences and divergences of on-the-ground regional trajectories in the largest urban agglomerations in Quebec and Ontario. A weakness, however, relates to what Canadians have come to speak of as “asymmetrical federalism.” While more than a quarter-century of federal transfer payments has left Quebec at least as well off as most of the other Canadian provinces -- and probably

better off in per-capita transfers -- Quebec has not been able to escape a generalized shortage of funds for infrastructure maintenance. Montrealers have paid the price by way of the collapse of portions of two expressway interchanges in recent years.

The most recent of these paranoia-inducing events had political implications for the future of cities in Canada. In the midst of the March 2007 provincial election campaign, Quebec Premier Jean Charest, the Ottawa-supported Liberal incumbent, was caught off guard with “allegations” by Mario Dumont, leader of the *Action démocratique du Québec* party, “that his government was negligent when a Montreal-area overpass collapsed and killed five people” five months earlier.²⁴ In retrospect this front-line news item is regarded as a turning point in a campaign that gave rise to the first minority government in Quebec since the late 19th century. Charest was not ready for the heat from what Dumont would describe as the “atomic bomb” (ibid.) he lobbed into the campaign. It did not get any better for Charest when, in the wake of very public promises of large transfer payments from Prime Minister Stephen Harper, he promised tax cuts. After years of talk within Quebec and beyond of infrastructure deficits, reports of lead in drinking water and the need to invest in cities to better avoid global warming, this was not the news Quebecers wanted to hear. It remains to be seen whether the Prime Minister will learn from Charest’s mistake in the national campaign his party is now planning.²⁵

5. Toronto, the Greater Golden Horseshoe and the Great Lakes Basin

²⁴ “Quebec Election: Charest campaign hits snag.” *The Toronto Star*, March 15, A7.

²⁵ Whereas Charest’s government went into the recent election with a majority (and came out with a minority), the Harper government in Ottawa will start with a minority in an election that could be called for as early as June 2007. From reports in February we know that Harper does not want, with heat waves expected in summer, to campaign on his environmental record to date. He will prefer to avoid the spectre of power blackouts of the sort seen in recent years in northeastern North America.

During the 1970s the Toronto Census Metropolitan Area overtook Montreal to become the most populous urban agglomeration in Canada. Since 2000, Toronto has come to be seen increasingly as an *alpha*-scaled global city, at the center of the fifth largest metropolitan complex in North America (Bourne and Simmons 2003). Toronto and the so-called Greater Golden Horseshoe comprise a massively sprawling entity that housed more than eight million people by 2006. The morphology of this rapidly growing city-region includes an urban edge structured by the western shores of Lake Ontario, a U-shaped greenbelt echoing these shores, and large-scale residential and commercial development that is now leaping over the greenbelt. Development on this scale poses many questions of urban sustainability. Below we take up some of these questions, starting with the interplay of civil society activism and matters of urban form in the wake of Canada's first big environmental moment circa 1970, and ending with the global positioning of Toronto relative to new environmental health threats such as Severe Acute Respiratory Syndrome (SARS).

5.1 Multiplication by Subdivision

1971 was a big year for urban environmental prospects in Canada. In the country's most urbanized province of the time, these prospects were firmly echoed in grey and green infrastructural developments.²⁶ At the grey end of the color spectrum, the premier of Ontario responded to over two years of intense social mobilization -- marches, arts-based fundraising, protests and media events involving luminaries such as Jane Jacobs and Marshal McLuhan -- by cancelling a major expressway project in inner-city Toronto. This provincial move against metropolitan technocrats (both land-use planners and traffic engineers) and their elected municipal masters, was explained by with this loaded symbolic statement: "If the city is to be designed around the car, the Spadina Expressway would be a good place to start; if it is to be a place for people, infrastructure

²⁶ Today British Columbia holds this title, with 85 percent of its population deemed urban, while the overall Canadian average is 80 percent. Still, in absolute 'urban' numbers, Southern Ontario trumps the rest of Canada.

projects such as this one would be a good place to stop” (Premier William Davis, speech 1971). And so it was. In the same year the Province of Ontario was also attempting to plan regionally with the help of a greenbelt, combined with a variety of infrastructures (a federal airport, a related new town and a supportive big pipe, amongst others) designed to both direct and contain urban development in environmentally friendly (i.e., non-sprawling) ways.

So formative early-'70s developments in and around Toronto entailed hopeful, urban-environmental prospects. Yet these prospects were not evenly realized and would soon turn negative at the city-bioregion level. Looking to the positive side, the City of Toronto came to be acclaimed as a central-city success. While New York City was on the verge of bankruptcy, Toronto Mayor David Crombie made the cover of *Time* magazine (circa 1975), billed within as the leader of “the city that works.” Crombie, a self-effacing man, readily acknowledged that his city’s relative success was the product of a historical trajectory that benefited from newcomers such as Jane Jacobs, an exile from the United States. The intellectual face of urban activism in Toronto from the late 1960s, Jacobs was never officially affiliated with any of Toronto’s universities but while living in the city complemented her seminal *Death and Life of Great American Cities* (1961) with influential books such as *The Economy of Cities* (1970), *Cities and the Wealth of Nations* (1984) and *Dark Age Ahead* (2004). She was a celebrated iconoclast to the end, an outsider to the academic mainstream who has inspired many thinkers within it.

Yet the central city citizen mobilization of the sort to which Jane Jacobs was party did not extend to the larger city-region, which helps explain the end of the first environmental moment in Canada. In and around Toronto through the 1970s and '80s, this had negative bioregional consequences. One of the keys to this negative environmental reversal was alluded to in section 2: with the global economic downturn after 1973, Canada once again turned to using urban infrastructure to stimulate what a 1950s Canadian metropolitan leader (Fred

Gardiner of Toronto) once dubbed *multiplication by subdivision*, Keynesian multiplier effects and all. In Toronto this economic development took the form of the path-dependent effects of extending a massive (York-Durham) sewer from the east into the greenfields and headwaters areas north of Toronto. With services on the way, speculative suburban and exurban developments were created, inclusive of damage to water quantity (the very base-flows of area rivers) and quality, along with the erasure of centuries-old rural green spaces on Toronto's urban fringe. These speculative developments in turn became part of the second moment of environmentalism in Canada, inclusive of a rich political ecology of scale. The latter politics have us once again invoking David Crombie's name.

5.2 Bioregional Politics in the Greater Golden Horseshoe

By the late 1980s, Crombie had moved from his political base in Toronto to Ottawa as a member of Parliament, which ended with him being federal Minister for Northern and Indian Affairs. That job had him working across Canada with First Nations (indigenous) leaders – and left him wanting to return to his roots in Toronto. The soon to be 'greenest' prime Minister of Canada then offered him a job of his choice and Crombie proposed a royal commission on Toronto's waterfront. This inquiry utilized a full complement of expert, academic and citizen advisers to produce a series of reports demonstrating the interdependencies of the Toronto waterfront with the rivers and streams that feed it. The bioregional vision that the royal commission helped enact through public hearings and publications has proven influential. Titles like *Watershed* and *Regeneration* (Crombie 1990, 1992) arguably helped seed and legitimize the large-scale mobilization of citizen-environmentalists to protect Toronto's headwaters area, the Oak Ridges Moraine north of the city. By the late 1990s, popular understandings of regional hydrological flows had grown by leaps and bounds, as a result of both this flourishing of civil society action and efforts to protect other sites along the Niagara Escarpment. The former 10,000-year-old glacial

“rain barrel” of south-central Ontario was catapulted into the bioregional imagination, thanks to citizen activist and media responses to speculative, “pipe-driven sprawl.”²⁷ In the wake of an exciting convergence of citizen actions, media-mediated biophysical understandings, and supportive state (i.e., City of Toronto) interventions, the academy is only now catching up. York University’s Faculty of Environmental Studies is one of the emerging centers of study of civil society mobilization at this bioregional scale (Wekerle, Sandberg and Gilbert 2007), building on a tradition of interdisciplinary research on the social, political, economic and cultural dimensions of environmental change.

This surge of bioregional activism and the renewal of sustainability discourse should be understood, both in relation to royal commissions such as Crombie’s, which helped raise environmental expectations, and to the neo-liberal political economic restructuring of the post-recession (after 1992-1993) period that shattered them. As in Quebec, the forced amalgamation of major cities in the Province of Ontario during the late ‘90s was met with strong public resistance (Boudreau 2000), as was the larger program of neo-liberal reforms introduced by the Conservative government of Mike Harris (Camfield 2000; Conway 2002), which included dramatic reductions in the budget and staffing of Ontario’s Ministry of the Environment (Winfield and Jenish 1998). While this resistance failed to overturn the amalgamation of Toronto, Hamilton and other municipalities, it did result in greater politicization of the metropolitan scale, involving both business interests and community activist networks, environmental and otherwise. And here bioregionally scaled concerns began to bridge into provincial ones. As Boudreau et al. note, there is evidence of an emergent “regional consensus around growth” that contrasts with Montreal’s “mostly state-

²⁷ This was the term that otherwise conservative residents of the exurban town of King City (located to the northwest of the City of Toronto) came up with in their fight against state-led speculative development. In the wider fight to ‘save not pave’ the Oak Ridges Moraine, links between surface sprawl and subsurface infrastructure were not initially made much of, until the construction of new big-pipes trunk sewers began to have direct, short-term biophysical impacts on surface streams in 2004. (Macaraig and Sandberg, manuscript).

centered strategy, which has kept both business and civic actors at bay” (2007: 21). (2007: 21).

In Ontario environmental activists and citizens took a leading role in enacting a bioregional vision around a 12,000-year-old land form known as the Oak Ridges Moraine. Bioregionally scaled citizen actions at the headwaters of Toronto’s rivers circa 2000 forced Ontario’s Harris regime to pass the Oak Ridges Moraine Conservation Act in 2002. Then the political stripes of the Ontario government changed. The Liberal government elected in 2003 – initially hurt politically by underestimating the power of the land development industry – nonetheless proposed a greenbelt. This proposal built on and to some degree co-opted the civil society momentum around the Oak Ridges Moraine and an even more ancient landform --- the Niagara Escarpment (see Sandberg and Chambers 2007). A Greater Golden Horseshoe greenbelt became provincial law in 2005, and the government has been struggling since then to stave off developer assaults, knowing that it will suffer political consequences if further promises on the environment are broken. And now – amidst our third environmental moment of the past half-century – the Liberal government is proposing to go the polls on a platform that could help develop the bioregional imaginary at the scale of the Great Lakes. In December 2005 Ontario, Quebec and ten U.S. Great Lakes states signed a framework-type Great Lakes-St. Lawrence River Sustainability Agreement.²⁸ In early April 2007 the Ontario government promised follow-up actions as part of its attempt “to paint itself environmentally green in the run-up to the provincial election in October” (*Toronto Star*, April 3, 2007, A1).

²⁸ The late-90s decision of Ontario’s Harris government to permit bulk-water shipments from Lake Superior to Asia was met by a storm of cross-border, bioregional protest. So began the half-decade of basin-wide (so-called Annex 2001) negotiations that led to the signing of The Great Lakes-St.Lawrence River Sustainable Water Resources Agreement in late-2005. That agreement is now making its way though the legislatures of the eight U.S. Great Lakes states, and two Canadian Provinces. If there is light at the end of this long tunnel, it will depend on the further mobilization of citizen support on a transnational, bioregional scale, city by city and watershed by watershed.

5.3 *Crossing Boundaries: The Great Lakes and Ecowise*

The question of sustainability at the scale of the Great Lakes Basin is very much an urban-environmental question, as recent environmental titles concerning the lakes make clear: e.g., the excellent albeit journalistic work in Peter Annin's *The Great Lakes Water Wars* (2006) and Andrew Nikiforuk's *Political Diversions: Annex 2001 and the Future of the Great Lakes* (2004). Such titles may appear to be a diversion from the terms of reference for this report; i.e., a highlighting of issues and approaches to urban-environmental research in Canada. But these accounts center on the implications of urban metabolic flows as they concern water, in a bi-national bioregion, if not a strict national setting. The population of the Great Lakes basin is approaching 40 million people, most of whom live in sprawling urban areas such as the Greater Golden Horseshoe. The basin joins Chicago with Toronto and even Montreal, given that the defined boundaries of the Great Lakes watershed have recently been expanded to include the St. Lawrence River that drains these lakes to the Atlantic Ocean.²⁹

By way of the auspices of the Governments of Canada and the United States, the Great Lakes basin has been the subject of a great deal of scientific study. But by the mid-1980s there was an emerging consensus that science, while necessary, was not sufficient to the clean up of the Great Lakes in the wake of a century of urban industrial development on the one hand, and agro-industrial, fertilizer and factor-farming rich rural development on the other. In 1987, Canada-

²⁹ Thinking at this scale is an old story in this country: the Canada-U.S. Boundary Waters Treaty of 1909 is arguably the by-product of lake-lowering controversies centered on Chicago's 100-year old reversal of the Chicago River into the Mississippi basin via the Chicago Sanitary and Ship Canal. The story carries on in titles such as Karen Bakker's edited collection *Eau Canada: The Future of Canada's Water* (2007), but unfortunately, the urban *and* related transnational dimensions of this collection's excellent essays are not fully fleshed out. But for some of Bakker's other water-related projects --- including "transboundary water governance" --- go to <http://www.geog.ubc.ca/~bakker/Projects/index.htm#transboundary> (accessed April 15, 2007). Karren Bakker is currently with the Geography Department at the University of British Columbia.

US Remedial Action Plans were introduced to encourage the participation of citizen stakeholders in the rehabilitation of the city of Hamilton's badly polluted harbour and some 42 other toxic hot spots around the Great Lakes. Half a decade later a political scientist named Mark Sproule-Jones was funded to become a principal investigator and participant observer in the Hamilton Harbour Remedial Action Plan (RAP). The Ecowise program, one of Canada's ten major Tri-Council Eco-Research funded projects of the 1990s, emerged as an interdisciplinary research project involving a team of thirty researchers, ranging across the natural and social sciences. Ecowise aimed to assist the development and implementation of Hamilton's RAP, based on an integrated analysis of the pollutants afflicting the Hamilton Harbour; the possibilities for biotic recovery; human uses, perceptions and evaluations of the Harbour; and the impacts of governmental policies and governance structures (Sproule Jones, comments as recorded in Skea, Robinson, and Shove 1998).

The project included a strong element of public involvement through means that ranged from participatory workshops to public theatre performances on local environmental issues. It also generated spin-offs into other related research projects and community initiatives (ibid). Nevertheless, the ultimate results of this project were mixed. In addition to the institutional hurdles of coordinating interdisciplinary research across seventeen disciplines and five faculties, internal studies of the project revealed difficulties in communicating and collaborating across the divisions between social and natural sciences. Biophysical interpretations and natural science methodologies, centered around the Harbour ecosystem, were often privileged over the analyses of human behaviour offered by the social sciences (Stefanovic 1996). Further, while Ecowise was very successful in raising public awareness and fostering citizen participation, the Remedial Action Plan itself remains an ongoing process. De-listing of the Hamilton Harbour as a Great Lakes toxic site is presently stalled by the steep costs of further rehabilitation of Randle Reef, Canada's second worst coal tar contamination, and the lack of financial support from both the federal government

and local industries that are primarily responsible for the contamination (*Hamilton Spectator*, January 17, 2007, A15).

5.4 *Sustainable Cities or “Sustainable Prosperity”?*

Given the centrality of water and watersheds to the urban-environmental thought and action outlined above, the following statement from chemist John Polanyi, becomes that much more enticing:

The central perversion ... is the proposition that science operates in isolation from the remainder of human experience. When, for example, the scientist narrows his field of view to one molecule, he is regarded as doing science. In fact, this describes only an aspect of science ... The scientist is in the situation of a swimmer who, holding his breath, plunges deeply to examine the sea bed. Such activities, though necessary, must be temporary. Before long, the scientist must resurface in order to integrate his experience with all that he knows of the world through every avenue open to him – including his experience of life, literature, religion and art. It is only then that his findings can illuminate thinking.” (Polanyi, quoted in Stefanovic 1996: 85-86)

But are such thoughts of the mid-1990s being translated into collaborative, interdisciplinary research today? The assumption in this question is that no one scientist, no matter how far seeing, has the resources to do what in turn is necessarily a more collective project. And if this is the case, as it most surely is, how is the related socio-natural project to be managed? And to what urban-environmental ends? The Tri-Council Eco-Research program of the early to mid-1990s had nature-society relations written into its core objectives, as have failed attempts to revive some of the spirit of this program as recently as 2002 (SSHRC /NRTEE). Related programic concerns are captured in Latour’s de facto question: “How [are we] to bring the sciences into democracy” (2004)?. But whereas Latour offers up an amodern constitution in answer, we have questions that are predicated on one of his follow-up titles: “How to Make [and Keep]

Things Public” (2005).³⁰ While the Georgia Basin Futures Project in Vancouver (see section 3 above) builds on the eco-research era that unfolded in the wake of Canada’s second environmental moment, this is one of the exceptions that proves the rule of program discontinuity. The Tri-Council Eco-Research program was cut-down in its early years as part of a much larger diversion of public monies from environmental to more purely knowledge economy investments – investments which have grown steadily since the mid-1990s (John Robinson, interview,) in partnership with private funds. What’s happening to urban-environmental research in this knowledge economy?

In February of 2007 Canada’s largest newspaper ran the following front-page headline: “INVEST IN MAJOR CITIES NOW OR PAY PRICE, REPORT WARNS,” with the sub-heading “Environment, global competitiveness, arts and culture at risk, board advises” (*Toronto Star*, February 6, 2007 A1). This report, *Mission Possible: Successful Canadian Cities*, was put out by the Conference Board of Canada, an agency billing itself as a “not-for-profit Canadian organization ... independent from, but affiliated with, The Conference Board Inc. of New York.”³¹ Concerning interdisciplinarity, this report is as interesting for its genesis as for its concerns with “strategic investment today to assure sustainable prosperity tomorrow” (see the foreword by Janice Gross Stein: iii). “External contributors” to the report included some academics to whom we have referred above, followed by a presumably more influential “advisory group” including researchers whose work we take up briefly below.

³⁰ Sympathy with such sentiments with respect to knowledge production (public or patented?) can be found in Nowotny 2005. In Canada, the tension between public ‘knowledge transfer’ and the privatization of knowledge via any number of public private partnerships, is alive and well.

³¹ Some related global dimensions on the ‘knowing capitalism’ front (see Thrift 2005) are evident in the Conference Board of Canada’s self-presentation. Following statements about their non-partisan and independent “business-like approach,” the New York-based Conference Board, Inc., of which the Conference Board of Canada is a franchise, is billed as an entity that “serves nearly 2,000 companies in 60 nations” with offices in Brussels, Hong Kong *and* Ottawa (Brender, Cappe, Golden 2007: inside cover)

With respect to the three E's of late-80s sustainability talk – Environment, Economy and Equity -- *Mission Possible* clearly puts the emphasis on a market-mediated “sustainable prosperity” (Brender, Cappe, Golden 2007: 2, 23).³² Urban ecology of the sort portrayed in section 4 above becomes “industrial ecology” and “eco-industrial” (2007: 40) networking between private sector firms. Horizontal equity concerns are given a very private sector, social capitalist spin, in the context of wider concerns with technological innovation. In turn *Successful Canadian Cities* recognizes one of the documented failures of the urban dynamism of the past decade: knowledge economy-driven economic growth has gone hand in hand with rising income disparities in Canada and beyond (2007: 48), perhaps especially in the big cities.³³ In turn equity concerns are relegated to an ethical netherland, the main “cornerstones of competitive cities” being deemed to be “1. a [still] strong[er] knowledge economy; 2. connective physical infrastructure linking people, goods and ideas; [and last but perhaps not least] 3. environmentally sound growth” (2007: 23)

The lead investor in the above report was one of Canada's largest banks (the Canadian Imperial Bank of Commerce), followed by a long list of private and public corporations, with a bias towards private funds. The lead “academic research funding partner,” however, was the Social Sciences and Humanities

³² Here it is worth noting that *Successful Canadian Cities* comprises Volume III of the three-year Canada Project of “research and dialogue designed to help leading decision-makers chart a policy course that will improve Canada's standard of living and position within North America and the world” (Brender et al. 2007: inside cover). The economic dimensions of North American regional integration and more are in part captured in the titles to Volumes I and II: *Mission Possible: Stellar Canadian Performance in the Global Economy* and ... *A Canadian Resources Strategy for the Boom and Beyond*. The latter report no doubt speaks to the place of the Alberta oil sands in Canada's current fossil-oriented future. That future remains open to question given the larger issue of global climate change.

³³ The GTA [Greater Toronto Area] section of the *Toronto Star* (April 11, 2007, B1) recently ran the headline “Urban dream deferred,” the follow up story being one concerning the dire economic straights of huge swaths of Toronto's “inner suburbs.” These are clusters of poverty which have to date eluded the knowledge economy.

Research Council of Canada, contributing a cool \$1 million CAN. Some contours of the latter funding coup are not difficult to discern. The urban-related research work of the University of Toronto's Program on Globalization and Regional Innovation Systems, with David Wolfe and Meric Gertler as co-directors,³⁴ is central. Much enamored of creative class and social-capital guru Richard Florida in the United States, Wolfe and Gertler were also key advisors to the Conference Board's Mission Possible initiative – the key background and foreground story here probably being a \$2.5 million Major Collaborative Research Initiative (MCRI) grant they won in a SSHRC peer-reviewed competition in 2001. In sharing the limelight associated with this award's announcement, the then president of the SSHRC stated that

Getting an MCRI award from SSHRC is like getting to the moon. And indeed this project made me dream. In your project, you are telling us that, in this day and age, innovation comes in clusters, in groups, with people learning to trust each other on a local or regional basis. In your project, you are telling us that with globalization countries that succeed in capturing market shares internationally are those where strong clusters develop at the regional level. In other words, the competitive advantage of a nation would lie in the economic specialization of each region and also in the trust the various regional elites have in each other. If true, this goes counter to the view that globalization is like a bulldozer demolishing regional differences and cultural diversity. (Renaud 2001: 2-3)

Thus the regional-spatial focus of research funding in Canada was sustained into the current millennium. But in the case of this work on *Global Networks and Local Linkages* (Wolfe and Lucas 2004), cross-boundary environmental flows were clearly subordinated to more economic ones. The understatement here is that doyens of more bioregional forms of thought and action, including the University of British Columbia's William Rees, would not be pleased! While it might be and was argued in the late 1990s that knowledge-economy "dematerialization" might provide openings to more locally beneficent if not global environmental gains, this talk is dropped above in favour of a focus on building social capital for regional

³⁴ See <http://www.utoronto.ca/isrn/clusters.htm> for further details.

competitiveness. And while even the ecological footprint idea has been taken up by the business elites at the centre of this narrative,³⁵ wider bioregional concerns continue to be ignored in Canada, particularly in cities that do not share the growth regimes of the areas where Wolfe and Gertler focus their energies.

6. Emerging Research Themes

Canada is in the midst of one of its bigger environmental moments of the past half-century. In no small part, this is due to the tensions that have emerged between global environmental imperatives and more localized Canadian environmental actions and inactions, policies and politics, research strategies and research.³⁶ But whatever the contours of this moment, research trajectories do not shift in a month or a day. Biases towards economics and competitiveness over the past decade have tended to marginalize more environmentally oriented urban sustainability concerns. Still, the cumulative benefits of the Tri-Council Eco-Research era of the early 1990s, and select successor Major Collaborative Research Initiatives (MCRIs) and standard research grants since then continue to unfold. Resulting publications, extant and forthcoming, in turn inform a good deal of what we will say about emerging research themes pertaining to urban environmental issues in Canada. Four overarching theme areas are highlighted below, along with some of the larger research infrastructures, strategies and traditions associated with them. Please be advised that this is a highlighting only. Where possible, website addresses and other information is provided to allow readers to follow the details elsewhere.

³⁵ In “Guilt-Free Emissions, For a Price” (*New York Times* – Science Times front page, February 20, 2007), James Kanter tells of the carbon offset game, with reference to William Rees’s ecological footprint, scaled up to the world’s jet setters and the particular contributions of those wanting to somehow compensate for the tons of greenhouse gas emissions that go with modern-day air traffic.

³⁶ For one damning account of the state of environmental research in Canada today, particularly as it relates to the issue of social adaptation to global warming, see “Top climate fund runs dry as UN stresses research” (*Toronto Star*, April 11, 2007: A). The Canadian research fund alluded to is one administered by the Canadian Foundation for Climate and Atmospheric Sciences. With respect to the United Nations call for more research on adaptation, see IPCC (2007b).

6.1 Healthy or Sick Cities --- and the Canadian Institutes of Health Research

Since 2003, globally inflected health concerns and related urban issues of environmental and food security (see section 6.3) have grown in Canada and elsewhere. The SARS (Severe Acute Respiratory Syndrome) crisis and the response to it are seen as something of a “stage rehearsal for what many public health experts believe will be a much larger epidemic once the H5N1 [bird-flu] virus mutates and leads to direct human-to-human infection” (Keil and Ali forthcoming).

In the 1990s the notion of healthy cities was put on the agenda through the work of Canadian physicians such as Trevor Hancock (2002). By the last years of the old millennium, a movement advocating wider social determinants of health had put down still deeper roots in Canadian cities such as Toronto, partly given the visible effects of homelessness and poverty, and hospital emergency rooms being filled with choking senior citizens on the city’s many summer smog days. In official circles, health was seen as more than a bio-medical problem. By 2000 Canada’s Medical Research Council had been disbanded, with bio-medical research becoming but one “pillar” to be supported through the new Canadian Institutes of Health Research (CIHR). From 2000 to 2005 in this research-funding organization, bio-medical research continued to get the largest chunks of health-related research funding. But the highest year-over-year percentage increases went to researchers on social determinants of health, along with epidemiologists and political scientists conducting comparative studies of health policy and population health outcomes within and beyond Canada’s borders. This overall distribution of health-related research funding is perhaps not surprising in the era of the “new normal” (see Ali and Keil 2006). The emerging norms of our time appear to include both a race to translate knowledge into commercial patents by way of interdisciplinary research of all sorts (but especially in hard sciences and

engineering), as well as shock-to-the-system events such as the above-mentioned SARS crisis in Toronto.

The first five years of the CIHR's work has been profiled online, including in the generally favorable *Year Five International Review Panel Report* (Canadian Institutes of Health Research 2006). In addition to speaking to "necessary governance and management structures" to achieve a mandate for funding innovative, interdisciplinary research, this report states that "It is too early to make conclusive judgments as to the effectiveness of this model of health research funding based on the currently available objective outputs." On the other hand, it observes that "Evidence of the benefits of a more strategic approach to health research is apparent and multidisciplinary activity is widespread. Canada is beginning to enter into health research activities that have been previously inadequately resourced and underdeveloped" (ibid: 4). This review will be taken up further below in the context of our belief that the main meta-research issue is not so much one of disciplinarity vs. interdisciplinarity, but rather: What *kind* of interdisciplinarity?

Integral to this question is our concern for a good mix of investigator-driven, as well as more strategically directed, forms of interdisciplinarity. Immediately below, we briefly take up one provocative example of the former to point to ways that emerging concerns with urban-environmental health can and need to be connected with the idea of both the global city and more global infrastructures of the sort that thinkers such as Geof Bowker and Leigh Star began to highlight from the mid-1990s (see Star and Ruhleder 1996; Bowker and Star 1999, Edwards et al. 2007). The latter includes the realm where the material infrastructures of urban and regional systems give way to the softer and more virtual infrastructures of international classificatory, communications and standards systems (see section 6.2 for more on the increasingly inextricable nature of these systems).

Working atop a good deal of interdisciplinary research in the domains of both political science and geography --- metropolitan governance (Sancton 2001), and the political economies and ecologies of geographical scale (Brenner et al. 2003; Swyngedouw 2003) --- York University's Roger Keil and Harris Ali point out that

When SARS hit major metropolitan regions in Asia and North America the need to rethink both global and sub-national health governance was exposed. The reliance on the hierarchical and hermetic systems of nationally-based health policy was put to the test as the WHO attempted to carve out a novel activist role in protecting global health beyond national interests and as sub-national governments, economic and civil society players moved to react to a localized global health crisis ... We rely on the rich and productive output of urban governance studies but will argue that this literature has a particular blind spot: the relationship between urban governance restructuring and emerging infectious disease. Urban governance must be prepared to deal with infectious disease. As a consequence, overall global health governance may be improved by realizing the possibilities that rest in metropolitan governance.”
(forthcoming: 4-5)

Metropolitan and still wider forms of bioregional governance around the world become key in a topological time (see Serres and Latour 2005; Smith 2003) in which urban entities such as Toronto are, by way of modern infrastructure-mediated connectivity, often closer to distant regions of the world than to more spatially proximate areas within the vast reaches of Canada. Work of the sort that Ali and Keil have initiated fits into a larger discourse of environmental change in which issues of local vulnerability, flexibility and subsidiarity, on top of environmental trajectories that already contain more surprises than we can possibly imagine, are the name of the game.³⁷

³⁷ Understandings of the significance of local urban-environmental response capabilities, both to long-term climate change and shorter-term local shocks, appear to be gaining rapid ground. Vancouver Mayor Sam Sullivan spoke recently of the need to plan for volatility in the fossil-economy. We need to work back from shocks in energy prices and supplies of the near future, he claimed, to speed further integration between land-use and transportation planning in the favor of more viable public transit systems (2007). On another front, Toronto is revamping its heat emergency plans to better avoid heat deaths of the sort that have been like those evident in Great Lakes basin cities such as Chicago, now in a more southerly climate zone that

6.2 *Infrastructure and the Centre for Interactive Research on Sustainability*

Above we reported that Canada has no central government ministry of urban affairs. But it does have Infrastructure Canada, an agency that recently developed its own “Research strategy for enhancing knowledge on Infrastructure” (Infrastructure Canada 2006). Andre Juneau, as deputy minister at Infrastructure Canada, was responsible for this strategy, last updated in October 2006. He was not available for an interview, having been seconded to a diplomatic mission to Europe. But his words regarding a knowledge gap flow smoothly from somewhat better-known infrastructure funding gaps. With respect to the latter -- estimates of which range widely at both aggregate and disaggregated levels in Canada,³⁸ the strategy statement says that “Pressures on existing infrastructure continue to mount due to increased movement of goods, services and people. At the same time, consistent with a general OECD [Organization for Economic Cooperation and Development] wide trend, public capital investment as a percentage of GDP has dropped steadily since the mid-1970s” (ibid.: 2).

In this statement and the research strategy of which it is a part, one can discern an enlightened, if statist, bias. In the language of Ann Dale, the verticality of a strong central state is combined with notions of horizontality, inclusive of Infrastructure Canada’s proposed seeding of the development of “a multi- (or even trans-) disciplinary community of expertise” (ibid.: 3). The latter community has “not yet emerged,” the updated 2006 report stated (ibid.). But to help it along, Infrastructure Canada funds (\$2.3 million over three years), allocated with the help of a SSHRC-managed peer-review process (with assistance from the Natural Sciences and Engineering Research Council of Canada), were going out

might soon be Toronto’s. For a “social autopsy” of a recent heat disaster in Chicago, see Klinenberg (2002).

³⁸ As of 2003 “estimates of the [overall] Canadian infrastructure funding gap ranged from as low as \$50 billion to a high of \$125 billion” (Brender, Cappe and Golden 2007: 30-31).

across the country to 15 infrastructure-related research projects. Some of the questions that guided the 41 proposals from which these projects were selected ran were:

- “What is infrastructure? What is public infrastructure? How are these terms changing?”
- If infrastructure is indeed an “instrument of government action”, how are various infrastructural “ensembles .. to be designed and implemented?”
- “What is the nature of the current stock of infrastructure in Canada? (e.g., location, condition, users, patterns of use, value, effectiveness)”
- “What impact can infrastructure investment have on overarching objectives, in particular quality of life, sustainable development and economic growth?”
- “What are the effects (e.g., economic growth, environmental) of infrastructure investment on geographical areas [e.g., ‘interconnectiveness’ inside and out], *especially metropolitan areas*?”

(All quotations from Infrastructure Canada 2006: 5-7, with emphasis added).³⁹

Our February 2007 interview with the minister in charge of Infrastructure Canada in the years when the above research strategy was being formulated --- John Godfrey, now part of the Liberal opposition --- revealed keen awareness of the potential use *and* misuse of infrastructure. While often bound up with short-term political gains in terms of employment and development, infrastructure decision making was seen to have often gone hand in hand with the longer-term rollouts of unsustainable forms of sprawling, suburban development. Looking to the present-day politics of infrastructure in Toronto, the debate is lively and rich. In response to those who support expenditures of scarce capital and operating funds on a single subway (rapid transit) extension to Toronto’s northwestern suburban frontier, the mayor of Toronto recently made a reasoned attempt to get

³⁹ For more information about the related infrastructure research projects (principal investigators etc.) go to http://www.infrastructure.gc.ca/research-recherche/fun-fin/index_e.shtml.

the public behind a plan that emphasizes networks of infrastructural connectivity, using modern light-rail systems, over and above the big-ticket subway. But this might be too little too late, with the Prime Minister of Canada having recently capitalized on the idea that all public-transit funding is by definition green.⁴⁰

This story of the politics of infrastructure brings us back to the issue of how to bring citizens in early, to build needed momentum for envisioning and enacting more environmentally sustainable and just futures. Here we come to one of Canada's more enlightened forms of infrastructure development.

The Centre for Interactive Research on Sustainability (CIRS) in Vancouver is noteworthy on a number of counts. First and foremost, it stands to be a research infrastructure that feeds into a new if not fully developed tradition in Canada: the idea of the bioregion as a basis for community development (see 6.3 below). Having to a substantial degree grown out of the thinking that went into the Georgia Basin Futures Project circa 2000-2005, its development is now quite advanced.⁴¹ The successful 2003 application to the Canadian Foundation for Innovation began as follows:

Global population is projected to increase by 2 billion people by 2030, and all of this growth is expected to occur in cities. Yet, while technological and behavioral solutions to the challenge of sustainable urban development are often well-understood, there is a gap between knowledge and performance in three areas: (a) between the predicted environmental performance of the built infrastructure and its actual performance, (b) between the claimed concern for environmental issues and actual

⁴⁰ Infrastructure Canada instituted a program of Green Infrastructure Funds in the late 1990s to help seed the development of upstream as opposed to end-of-pipe infrastructure alternatives. Administered with the help of the Federation of Canadian Municipalities, this small fund for alternatives highlights that fact that many mainstream infrastructures need to be environmentally sound.

⁴¹ Beyond the above mentioned developments, positive negotiations with further partners strongly suggest that CIRS will happen, with ground breaking on construction as early as Fall 2007, followed by a building opening ceremony in 2009. For further information updates on CIRS, go to <http://www.cirs.ubc.ca/index.php>

behavior on the part of citizens, and (c) between policy goals and actual outcomes ... The Centre for Interactive Research on Sustainability (CIRS) will be a globally unique research facility aimed at narrowing the 'performance gap' between what is technologically and behaviorally feasible and what actually happens on the ground. CIRS will provide ... understanding to reduce that gap, at multiple scales from the building to the region. A key premise is that better feedback systems between research and practice are crucial. (Sustainable Development Research Initiative 2003: 1)

CIRS promises to bring the possibility spaces of virtual infrastructures together with thinking about various green and grey infrastructures. The idea of various research infrastructures (from the CIRS building to software interfaces such as QUEST) is combined with a sophisticated understanding of the material conditions of on-the-ground infrastructures. The time-horizon for QUEST-mediated interactive research modeling exercises, for example, is in part keyed to life-cycles of various infrastructure systems, the amortization periods of which open up decision points on which popular input and social learning and transformation can be advanced.⁴²

Third, with financing from the Canada Foundation for Innovation, the CIRS building and the softer infrastructures that it will entail (further and more refined versions of the QUEST software) can hopefully become an export from British Columbia to other Canadian urban areas, and further afield. Our interview with one of Canada's more prominent urbanists, David Crombie (see section 5), a former politician who bridged both federal and municipal arenas, elicited an enthusiastic response to CIRS. He saw the project as a model for making the "bioregional idea" more real, with the help of new forms of partnership between

⁴² The scalar dimension of this infrastructural work goes beyond existing planning jurisdictions to include entities such as the Georgia Basin (which includes some five regional planning areas), the goal being to both amalgamate cross-boundary information in a Georgia Basin Digital Library and provide a virtual space within that the resident population can both take from and contribute to. The development of this work accords with new concerns with meta-data standards that go beyond the bioregional infrastructures (Bowker 2005), as well as current thinking about the need to facilitate growth of bioregional imaginaries via cross-boundary storytelling and online discussions of all sorts (see Edwards et. al. 2007).

Ottawa, Canada's urban-based universities and civil society stakeholders ranging from local citizens to civic boards of trade. Such partnership ideas are integral to CIRS's origins and, we hope, its future.

6.3 Metabolic Connectivity and the Bioregion

Within Canada and in North America more broadly, the concept of the bioregion has been a recurring theme. Early conceptualizations of bioregionalism by the likes of Sale (1985) and Berg and Dasmann (1978), with all of their limitations and problematic assumptions (see Alexander 1996), have since inspired a wide variety of movements concerning place-based ethics, politics, agriculture and community food systems. More recently, the bioregion has become a pivotal concept for new visions of urban ecological design (Hough 1984; Beatley and Manning 1997; Register 2002). This report points to a number of ways that this concept is being utilized in new research initiatives that blur the familiar boundaries between city and nature, urban and rural.

First, we can see more well-established efforts to situate the bioregion as the most important scale for sustainable planning. The Royal Commission on the Future of the Toronto Waterfront and the Remedial Action Plans described earlier (sections 2 and 5) provide two influential examples of land-use planning models grounded in an understanding of the interdependence between cities and their bioregions. Such work on bioregional planning has been supported by research that aims to measure the metabolic flows of matter and energy that sustain communities, and to engage citizens in learning how these flows can be redirected in more sustainable ways. Such bioregional modeling and sustainability simulation tools have a prominent place in Canadian research, ranging from influential conceptual models such as the ecological footprint of Rees and Wackernagel to more detailed software modeling applications such as the QUEST program and the Georgia Basin Futures digital library project. We

anticipate further advances in measuring and simulating urban metabolism at the bioregional scale, productive directions for which are suggested below.

Second, we can identify research that explores bioregions as the locus for contemporary environmental initiatives regarding the localization of food production, the conservation of green space, and the limitation of urban sprawl. This is perhaps best illustrated by the recent growth in academic research on urban agriculture and food security, as demonstrated by UBC's Centre for Sustainable Community Development, the Ryerson University Centre for Food Security and the newly created Canadian Association for Food Studies. Food security and urban agriculture were prominent themes at the World Urban Forum and World Planners' Congress meetings hosted by Vancouver in 2006, and have been cited in recent media reports as possible responses to the threats of urban vulnerability posed by infectious diseases and to the instability of global supply chains for food, water and other resources.

These themes are also prominent in new research on the bioregion as a contested scale of political mobilization. The work of Wekerle, Gilbert and Sandberg (2007) on the debates surrounding the Oak Ridges Moraine and urban development in the Greater Toronto Area is one example of emergent interdisciplinary research that sheds light on the growth of social movements and urban sustainability debates at a city-regional scale, and the conflicting ecological discourses in those debates. As bioregional visions continue to contrast and overlap with visions of "green growth," (Sandberg et al., forthcoming), "competitive city-regions" (Keil and Young forthcoming) and the rollout of "neo-liberalized ecological modernization" (Keil and Boudreau 2006) at a metropolitan scale, such research is becoming increasingly important.

Indeed, more complex and nuanced understandings of the bioregion as a central principle for urban sustainability are suggested by interdisciplinary research exploring the material flows of urban metabolism – water, air, energy, waste,

people, vehicles – *in relation* to social, political and economic changes (Heynen, Kaika, Swyngedouw 2006). Here, human knowledge of nature is seen as invariably mediated by and through cultural and linguistic lenses, and attention is given to the complex ways that social and biophysical phenomena overlap and intertwine (Castree and Braun 2001; Braun 2006).⁴³ This opens up urban sustainability research to examine how particular forms of ecological knowledge, particular models of “sustainable” urbanization and particular social actors come to be accepted over others, and encourages interdisciplinary work in which “problem identification, problem implication and problem solution are viewed as a complex social process” (Guay 1999: 597). We can see this theme of public involvement in sustainability research and planning running through many of the initiatives described in this report, with more recent projects such as the CIRS and the Montreal Biosphere framing public participation and education in explicitly bioregional contexts. Montreal’s Urban Ecology Centre provides an interesting contrast here, promoting the same goals of public engagement but with less emphasis on bioregional knowledge and more emphasis on “bottom-up” community mobilization at a grassroots, neighborhood scale.

Ann Dale has recently commented (Interview, March 25, 2007) that social capital formation (at bioregional and other scales) is a necessary but not sufficient condition for the realization of sustainability goals. A wider politics of scale inclusive of international, national and sub-national state units (e.g., the provinces of Canada) remains very significant. With respect to research funding (see section 7 below), the additional point needs to be made that the construction and re-construction of socio-natures very much presupposes notions of research that are ongoing, iterative and multiple. Here the archiving and monitoring

⁴³ Braun is especially evocative when it comes to the Deleuzian-inflected dimensions of Latour’s thinking with respect to moves “Towards a New Earth and a New Humanity: Nature, Ontology, Politics.” The latter titling (Braun 2006) is loaded insofar as the politics in play bridge from inside the academy out into the wider world. Thinking from the “structuralist” inside, Noel Castree, in a related piece (2006), suggests that many of us have a good ways to go before we catch up with Latour and the world outside, with all its threats, surprises and sublime wonder.

functions of the state, amongst others, remain as vital as ever to help establish base-lines from which communities of interdisciplinary researchers might better work (see Latour 2004). Less statist and more decentralized decision-making processes remain vital too. Thinkers such as Latour have recently proclaimed the necessity of bringing science into democracy in a multiplicity of *less* centralized, democratically diverse decision-making forums (Latour 2005).

6.4 *Planet U vs. Corporate U?*

The modern university system has given rise to disciplinary specialties and subspecialties, century-old hybrids such as bio-chemistry, and now — in what some people dub the era of postmodernity (Ford 2002) --- attempts at newer and more reflective knowledge practices in which “one discipline reflects on itself through the medium of another (e.g. the philosophy, history or sociology of this science)” (Huber 1992: 195). This is part of a so-called “jungle of phenomena” (ibid.) that Julie Thompson Klein points to as having “implications for how we think about the place where knowledge is represented — the university” (Klein 2004: 3). She continues:

Modern societies are increasingly ruled by the unwanted side effects of their differentiated sub-systems, such as the economy, politics, law, media, and science. These systems have developed their own running codes, to use Niklas Luhmann’s term, that enable them to be highly productive. However, differentiation produces imminent side effects in other fields that cannot be handled within the codes of the system. Indicative of this development, the problems of society are increasingly complex and interdependent. They are not isolated to particular sectors or disciplines, and they are not predictable. They are emergent phenomena with nonlinear dynamics. Effects have positive and negative feedback to causes, uncertainties continue to arise, and unexpected results occur. ‘Reality’ is a nexus of interrelated phenomena that are not reducible to a single dimension The need for a new [interdisciplinary] approach to complex problems is evident across fields of human interaction with natural systems ... and in fields of major technical development.” (Klein 2004: 4)

This statement reiterates trends within thinking about interdisciplinarity that are now decades old. In the same year, Marc Renaud (then president of the SSHRC) used thinking of this sort to issue his *cri de coeur* for the social sciences and humanities in Canada: change or die (Renaud 2004). He argued that the social sciences and humanities need to work harder at engaging the worlds of science and technology. We can't help but agree, especially where the urban environment, read as a Latourian socionature, is concerned.⁴⁴ But this is perhaps still too defensive, especially to the degree that the social sciences become the add-on to a knowledge economy constructed around the technological frenzy for patents, global competitiveness and economic sustainability. One of Canada's more prominent environmental systems thinkers turns the coin: "From the computers on our desks to the light weapons used by terrorists, technological change is racing ahead, leaving our social institutions and policies far behind. We are in dire need of advanced social scientific knowledge to manage our affairs in an increasingly complex and unpredictable world, and the SSHRC plays a vital role in fulfilling this need in Canada" (Thomas Homer Dixon, as quoted in SSHRC 2004: 5). As past and present beneficiaries of SSHRC funding working at Canada's oldest faculty of interdisciplinary studies (York University's Faculty of Environmental Studies), we cannot help but agree with elements of this statement too. But others might well take issue with managerially inflected

⁴⁴ Latourian notions of the socionatural and the technonatural are gaining increasing currency in the English-speaking world (e.g. Braun 2006, White 2006, White and Wilbert 2006). While not easily summarized in a few sentences, the older term *second nature* approximates something of what is at stake. Latour and company's very own "heterogeneous engineering" (1999) is perhaps more on point here, especially to the degree that it speaks to the idea of technonatural assemblages in urban environments. On the more extensive socionatural front, the big winds that knocked out those five-hundred year old trees in Vancouver last December (see section 3 above) provoke us to collapse the old categories of nature and society into a new and more realistic assemblage. Global warming from around the time of the first IPCC report in 1990 put us at the end of [first] nature – to echo a now popular if problematic phrase. Events like those recently in Vancouver and a few years back in New Orleans point to the need for new and more hopeful socionatures.

thinking such as Homer Dixon's. This includes Michael M'Gonigle, one of the Canadian cofounders of Greenpeace International.⁴⁵

M'Gonigle and Justine Starke, co-authors of *Planet U: Sustaining the World, Reinventing the University* (2006), are well acquainted with the 1970s slogan "think globally, act locally." For them the university is an ideal place and space where knowledge is not only represented, but should also be acted upon. They proclaim the duty of universities to enact the wisdom of place. Furthermore, they argue that such places, for the most part urban, provide the possibility of "UniverCities": bioregionally based and globally networked nodes of sustainability research and action that can serve as building blocks for the transformation of power relations within the university and beyond (2006: 246). We are here again reminded of CIRS, a four-institution (University of British Columbia, Simon Fraser University, the B.C. Institute of Technology, and Emily Carr College) collaboration with transformative hopes for bioregional thinking and action.

Planet U or Corporate U? We close this section by suggesting that M'Gonigle and Starke move beyond this critical question to a more sophisticated and action-oriented one. They spend a good deal of time asking what we can learn from corporations and the management schools that help enact changes within them, while recognizing that the micro-practices of corporate profit machines (relatively flattened internal hierarchies, cultures of creativity and innovation) serve highly

⁴⁵ An extended interview with M'Gonigle in February 2007 also suggests that he would react some skepticism to Homer-Dixon's recent talk of "unleashing Canada's capitalist creativity" on global warming (Homer-Dixon 2006). But some of the latter talk is indeed not without either its contradictions *or* its sophistication. For a useful consideration of some of the potential surprises – political and otherwise --- to be found in now diverse notions of capitalist ecological modernization, see White 2006. For a followup sign of the times from a more influential (neo)liberal corner, see Thomas L. Friedman's "The Greening of Geopolitics, *New York Times Magazine*, April 15, 2007, pp. 40-51.

contestable macro-outcomes.⁴⁶ This kind of thinking intersects with talk of social capital and a world of increasing rather than decreasing returns and ultimate scarcities (see Roseland 2005; Warsh 2006), even as it warns of a social capitalism that is party to wider “trajectories of global ecological and social decline” (M’Gonigle and Starke 2006: 12).

As suggested earlier, recent trends towards social capital pay little attention to the real material and ideological divisions between different social groups that can lead to intractable conflicts over sustainability and urban development. In contrast, emergent research suggests productive avenues to construct sustainable urban futures as a process of democratic contestation and decision making, involving public dialogue and debate across disciplinary lines and social divisions. Further, it suggests the need to understand urban sustainability in a larger conceptual context, examining how the problems and possibilities of urban design are shaped and constrained by social and political economic changes at multiple scales, from the bioregional to the global. Creating spaces, real and virtual, for sharing and mediating between different conceptions and visions of sustainability is highlighted here as a vital challenge for future research.

7. What Kind of Interdisciplinarity?

If interdisciplinarity has become the new name of the game along with subsidiarity and systems and research designs that might allow us to become more socio-naturally reflexive -- feedback loops and all -- what is to be done in the face of front-page headlines and stories such as this:

CITY FORECAST: NASTY WEATHER AHEAD T.O. [TORONTO] 2050

Climate change will be good for raccoons, at least. And mosquitoes, and black-legged ticks carrying Lyme disease. But for the rest of us in Toronto,

⁴⁶ For a critical look at recent trends towards corporatization of academic research in Canada, and the reflection of these trends within research funding mechanisms, see Polster 2004.

the forecast looks ominously like a news report from Bangladesh. Unrelenting heat waves stretching across whole summer months. Flash floods filling ravines, ripping up bridges and roads, tearing down electrical lines. A thick brown gauze blanketing the city most days from June to September ... Frayed nerves ... [where], ‘in terms of the number of people affected, the urban communities are the least resilient and the most vulnerable.’” (*Toronto Star*, March 25, 2007: A1)⁴⁷

If “subsidiarity” is accepted as a code word for neo-liberal shifts from government to governance, third-way social capitalism and ‘the market’ on down, we may well be living with the hangovers of a ideologically loaded and deeply problematic past. As Keil and Ali argue (forthcoming), the *new normal* challenges us to continue to think through issues of socio-nature and civil society. But civil society, rather than being free-floating, needs to be thought through in relation to new forms of metropolitan governance. Horizontal thinking needs to be combined with vertical thinking, as Ann Dale’s *At the Edge* argued back in the watershed year that was 2001. State-mediated collective capacities need to be enhanced, not diminished, and this includes state support for new research infrastructures that engage and involve citizens at the problem-formulation stage, not after the fact as passive research subjects and marketing objects.

7.1 *Between Top-Down and Bottom-Up?*

Are there tendencies towards “top-down ... overmanagement” (Polanyi 2007) of university-based research in Canada? With serious tongue in cheek, John

⁴⁷ So began a *Sunday Star* cover story by Catherine Porter – part of that big-city newspaper’s “project green, city challenge” series -- “about what we can do locally to effect environmental change globally.” The internal quote in the above extract comes from Eva Ligeti, the Province of Ontario’s former environmental commissioner and, at the time of writing, head of the City of Toronto’s Clean Air Partnership. Ligeti’s biases are in part ours too. But looking beyond the Canadian urban-environmental focus of this report, accumulations of environmental risk are highly uneven. The risks of climate change, for example, appear to be especially high for those who have the smallest ecological footprints; e.g., indigenous populations in the Canadian Arctic, and third world nations from equatorial Africa to Bangladesh. Imbroglis (see Latour 1993) in the latter ‘risk society’ (see Beck 1992) are the subject of the most recent (April 2007) IPCC report.

Polanyi deems the current academic funding regime in Canada to require “divergent antecedents (being, therefore, ‘interdisciplinary’) ... [that] span departments and institutions (be ‘collaborative’) ... receive institutional support (be ‘leveraged’) and be in receipt of encomiums or cash from government or industry (being above all ‘relevant’) while eschewing overlap (being, therefore, in the eyes of management, ‘new’)” (Polanyi 2007). In turn he is firmly on the side of older models of investigator-driven, peer-reviewed research and the related “freedom of ideas” to be found there. However, we argue that the full scope of benefits to be derived from interdisciplinarity and collaborative research are in danger of being undermined, if they are not given still more support, political and otherwise, from above. This danger is especially pronounced to the degree that government funding agencies substitute bureaucratic means for innovative experimentation, with all the flexibility and fine-tuning of research-support infrastructures that the latter entails.⁴⁸ This is not to say that we don’t already have interdisciplinary ‘results.’ But to date they have come in uneven and problematic ways. They are perhaps most entrenched in the collaborative work of scientists and engineers with an eye to knowledge transfer by way of commercial patents, life sciences being a recent leading edge in this department of the knowledge economy.

Environmental research is “unique” in terms of the degree to which “it encompasses both social and ecological dimensions” (Scott, Skea, Robinson, and Shove 1999). This was the conclusion of a joint Canada-U.K. review of environmentally oriented research programs of the early-to-mid 1990s (see below). The corollary point today is that research into socio-nature -- more than in any other research domain -- is where boundaries between the social and

⁴⁸ Cautionary concerns in this tension-ridden domain of research are developed from alternative points in the Canadian academic landscape by Polster (2004) and Nossal (2006). For a critique of where interactive research and interdisciplinarity might go if not handled with sufficient rigor by funding agencies, see the excellent work of Strathern (2005). The latter work is backed up by Strathern’s more general concern with ‘audit culture’ within changing landscapes of knowledge production.

natural sciences need to be transgressed most. Back in Canada, this point gained quasi-official support in 2002: 8).

Is Canadian society equipped to meet the immense challenge of [complex] ... environment and sustainability issues? Our frank response to this question must be no -- we have more knowledge to gain and much work to do ... Significant advances have been made in our knowledge of the biophysical underpinnings of sustainability, and innovative new technologies are emerging to reduce our environmental footprint. However, to date, no similar strategic investment has been made in building the social knowledge and capacity that is just as essential to success. (SSHRC/NRTEE 2002:

In turn we come up against a set of conundrums: if the “sustainable development ‘performance gap’” is to be eradicated with the help of further transgressions of disciplinary boundaries, what role for the state? One answer to this question is clear: the state cannot do it alone! Institutional frameworks for research, including support for interdisciplinarity, are essential. But a critical and constructive spirit of transgression (Notowony 2006) is also needed. Nigel Thrift gestures towards a related politics of knowledge:

We need a politics that can provide performative counters to the prevailing notions of what constitutes knowledge and creativity ... What I find inspiring about the current conjuncture is precisely the interdisciplinary (or perhaps transdisciplinary) push by those who recognize that to understand contemporary capitalism we need to mobilize many heritages, many viewpoints, in order to build however temporary a vantage point before the machine moves on (Thrift 2005: 10-11)

We firmly agree with Thrift, sensing that the focus on what we have dubbed social capitalism overly narrows the field of knowledge production and innovation to problematic ends. We also agree with the proposals of Bruno Latour and others for moves from more to less statist solutions (2004; 2005). This is not in any way to dismiss the state, but to strongly suggest that the state as research funder and enabler needs to accommodate a multiplicity of means to bring science into democracy, or what Latour has otherwise dubbed the project of

bringing nature into society (1999; 2004). Past and present research trends in Canada will shape the challenge of devising better means through which to collectively construct and reconstruct environmental futures --- futures that have a global face as never before.

7.2 *Urban-Environmental Eco-Research – Canadian Style*

The notion of nature as something separate and out there is exploded in the very term *urban-environmental research*. And as our global cities grow in size, their ecological significance to the wider world will continue to grow too (see, e.g., Luke 2003). How might we then summarize some of the more positive lessons of urban-environmental research in Canada?

1. Context counts. In 1998 Canada's Social Sciences and Humanities Research Council (SSHRC) helped host two workshops related to experiences with the Tri-Council Eco-Research program of the early 1990s. One of these workshops compared eco-research in Canada with the United Kingdom's Global Environmental Change Programme.⁴⁹ While having somewhat different origins, both of these environmentally oriented research programs were part of a more global zeitgeist: they were relatively early progenitors for the goal of interdisciplinarity. This said, a consensus of the 1998 Sussex workshop appears to have been that Canada succeeded in reaching this goal more effectively than did the U.K., for a variety of possible reasons. With respect to spatio-temporal context, the fact that Canada is *not* a unitary state looks like it may have actually helped: for political reasons, research monies needed to be spread around. At

⁴⁹ The latter workshop took place at the University of Sussex (March 2-4, 1998) in England, and involved both Canadian and British academics, along with program directors from the SSHRC and the U.K.'s Economic and Social Research Council (ESRC). The record of this meeting in Skea, Robinson and Shove 1999, is electronically available at <http://www.niad.susx.ac.uk/Units/gec/pubs/reps/issrep.htm>. Accessed February 10, 2007.

the same time, with the big universities concentrated in the larger cities, those monies came to be focused on urban and regionally oriented projects, at a time when bioregional thinking was being institutionalized in Canada by way of a locally directed and celebrated royal commission (see Crombie 1990 and 1992). A good deal of the success of this work, in turn, grew out of the normative commitments of academics and others to address specific place-based problems, rather than more abstracted or commercially driven knowledge production. We can by no means simply dismiss these other forms of research, but without more knowledge production directly oriented to the particular challenges of urban and regional sustainability, our road ahead will become even more troubled.

2. Research team size and management structures count. Whereas the U.K. funding that emerged out of the Global Environmental Change Programme tended to be distributed to small teams in a variety of academic departments, Eco-Research funds in Canada were concentrated in select city-regions via large teams of researchers.⁵⁰ The scale of the resulting endeavors was in turn seen to have positively shaped interdisciplinary outcomes, especially to the degree that the internal governance of project monies entailed formal reporting relationships. Local flexibility has been deemed to be an important ingredient of success, given the necessity of accommodating research surprises and emergent, iterative results. But such flexibility needs to be framed within research agendas that move researchers beyond the world of multi-disciplinarity (and edited books that fly in disparate directions), to research projects that entail various forms of interdisciplinarity and even transdisciplinarity. Beyond local commitments to

⁵⁰ Of the Canadian Green Plan funds of \$27 million (of the \$50 million allocated before cuts) for Eco-Research, Tri-Council project grants administered by the SSHRC typically ran for a minimum of four years, in sums of \$2-3 million each, for teams of up to 30 academics from diverse backgrounds. At approximately 20 million pounds, the overall U.K. outlay for the Global Environmental Change Programme was larger, but maximum grants were about 300,000 pounds, with 100,000 pounds being more typical for much smaller teams from more homogeneous backgrounds (Skea, Robinson and Shove 1999). For additional if non-comparative perspectives on the U.K. program, see Evans and Marvin (2006) and Berkhout, Leach and Scoones (2003).

these goals, and in the face of reward structures that are still biased towards disciplinarity and more abstracted forms of knowledge production, what will it take to fill the above-mentioned performance gap with more viable forms of interdisciplinary, urban-environmental knowledge?

3. Continuity in the midst of discontinuity counts, along with place-based local and global environmental commitments. An old adage of political scientists says nation-state bureaucracies help ensure continuity in liberal-democratic landscapes built around the discontinuity of short-term, electoral cycles. To be sure, promising funding programs in Canada have been cut on account of changes in the national party colors, including recent efforts to create a new interdisciplinary Eco-Research program under the banner of “Nature and Society” (SSHRC/NRTEE 2002). We are all (bureaucrats included) the subjects of political tides that we cannot collectively escape, only engage.

One element of continuity that we have highlighted in the body of this report concerns bioregional commitments of the sort seen in Vancouver and elsewhere. We highlight Vancouver and its bioregion in large part for the way the Lower Fraser Basin Eco-Research project helped seed the Georgia Basin Futures Project (GBFP – see section 3), the Major Collaborative Research Initiative funded by the SSHRC from 2000. The GBFP in turn helped set the scene for the Centre for Interactive Research on Sustainability (CIRS), financed in part by the Canadian Foundation for Innovation. CIRS is in no small way the product of local commitments with all the personal costs that such commitments often entail, yet it has most certainly gone hand in hand with more global understandings. One of these is that the “possibility spaces” of the sort that CIRS will help create need to be legitimated, not in terms of appeals to the scientific authority of “those who can see furthest,” but by way of ongoing moves towards interactive science and research (Caswill and Shove 2000). These efforts must be encouraged by national research agency funding that builds over the course of decades, not in fits and starts. And while “interactive” is the key word pointing to what Michael

Gibbons has spoken of as “science’s new contract with society” (1999), context-sensitive knowledge production may well benefit from thinking beyond both the traditional boundaries and the established terminology of the sciences (Latour 1999). The language of science comes loaded with historic baggage that is both part of the solution *and* part of the problem.

7.3 *From Interactive Science to Interactive Research*

The Centre for Interactive Research on Sustainability in Vancouver is emblematic of a new possibility space for engaging and helping to collectively shape citizen energies. Aligned spaces of hope — such as the Urban Ecology Centre in Montreal -- while often still more decentralized, are no less fragile in their needs for care and nurturing. The *Toronto Star’s* “extreme weather ... forecast to 2050” was qualified in a subheading that began: “Unless we seriously put the breaks on greenhouse gas emissions” (March 25, 2007: A8). The following Sunday, this newspaper prefigured the future, not with allusions to what we have spoken of in section 3.1 as predictive, positivist *modeling as usual*, but with a more normative positioning. A neighborhood group working to increase long-term forest cover around Jane Jacob’s old street — appropriately calling itself Grassroots Albany -- - was featured. Grassroots Albany’s urban forestry work has recently helped shape City of Toronto policies. As indicated in section 5, these policies include visions of urban connectivity by way of transit plans that the city cannot (under current federal and provincial budgets, at least) currently afford, along with proposals to double the city’s forest canopy in the next century. The latter proposals are challenge-filled, to say the least, by everything from winter road salt to the cultural politics of planting and follow-up care on private property. As part of a still wider green city vision, the success of these programs will depend on a move from forecasting to *backcasting* and political constituency building (to invoke the life-work of Canadian academics such as John Robinson), along with forms of interdisciplinarity that both build on and break from recent trends. The

nature of some of these trends are recapped and elaborated above. Where they go will in part depend on the readers of reports such as this one.

Appendix I: Interviewees

David Crombie, President and Chief Executive Officer of the Canadian Urban Institute. Interviewed February 31, 2007.

Ann Dale, Professor, School of Environment and Sustainability, Royal Roads University. Interviewed March 21, 2007

John Godfrey, Liberal Member of Parliament, Don Valley West. Interviewed January 26, 2007.

Roger Keil, Professor, Environmental Studies, York University and Director, City Institute at York University. Interviewed March 19, 2007.

Rob McDonald, Professor, Environmental Studies, York University. Interviewed March 26, 2007.

Michael M'Gonigle, Professor, Environmental Studies, University of Victoria. Interviewed February 10, 2007.

Ron Pearlman, Associate Dean, Faculty of Graduate Studies, York University. Interviewed January 29, 2007.

John Robinson, Professor, Geography, University of British Columbia. Interviewed January 26, 2007.

Mark Roseland, Professor, Geography, Simon Fraser University. Interviewed January 24, 2007.

Dimitri Roussopoulos, Director, Urban Ecology Centre, Montreal. Interviewed April 7, 2007.

Peter Victor, Professor, Environmental Studies, York University. Interviewed February 8, 2007.

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