

BIODIVERSITY CONSERVATION AND BROWNFIELD SITES:
A SCALAR POLITICAL ECOLOGY?

By

James Philip Martin Evans

A thesis submitted to
The University of Birmingham
for the degree of
DOCTOR OF PHILOSOPHY

School of Geography, Earth and Environmental Sciences
The University of Birmingham
December 2002

UNIVERSITY OF
BIRMINGHAM

University of Birmingham Research Archive

e-theses repository

This unpublished thesis/dissertation is copyright of the author and/or third parties. The intellectual property rights of the author or third parties in respect of this work are as defined by The Copyright Designs and Patents Act 1988 or as modified by any successor legislation.

Any use made of information contained in this thesis/dissertation must be in accordance with that legislation and must be properly acknowledged. Further distribution or reproduction in any format is prohibited without the permission of the copyright holder.

Biodiversity Conservation and Brownfield Sites: a Scalar Political Ecology?

James Evans

Abstract

This thesis develops a multi-scalar political ecology of biodiversity conservation on brownfield sites in Birmingham, U.K. While urban brownfield biodiversity is increasingly recognised as a valuable resource, political pressure to develop such spaces is also growing. Forty-five interviews were conducted with practitioners and policy makers, supported by genealogical and discursive analyses of a range of texts, to interrogate this tension. Common discourses structuring ecological, conservation and planning activities are traced across national and international levels, to contextualise the formulation and implementation of biodiversity action plans at the local level. Because urban landscapes are characterised by disequilibrium, planning policies and ecological models under-represent the worth of these spaces. The mediation of these discourses through local networks of actors engaged in the biodiversity action plan process is explored socially and geographically. A scalar political ecology of urban planning is developed through the consideration of wildlife corridors, and a case study of a specific brownfield site. The thesis offers an integrative analysis of socio-ecological transformation, and urban ecological governance. It is argued that while the BAP process has the potential to reconfigure urban geographies, it is currently sterile because such forms of sustainable governance contradict the dominant ‘scalar fix’ of capitalism.

Acknowledgements

Thank you to all the people who gave up their time to talk to me. The enthusiasm and unfaltering generosity with which I have been given knowledge by people from all walks of life has made the past three years a personally enriching experience.

The research was made possible by an ESRC and NERC Postgraduate Training Award (R00429934133), and my supervisors, for creating an environment in which it was possible to talk expansively about a diversity of topics, and for offering nuggets of wisdom to keep me on track and regulate occasional excesses.

The many friends in the department, who have supplied words of advice, good conversation, inspiration, amusement, sporting camaraderie and the occasional riff, have helped make the research process enjoyable. Thank you to my family and friends for their support and understanding in everything over the last few years, and finally, thank you to my girl, who has been lovely throughout.

Abbreviated Contents

Chapter 1 Introduction	1
Chapter 2 Theorising the Environment.....	14
Chapter 3 Method.....	51
Chapter 4 BioDiversity	78
Chapter 5 Nature and the City	112
Chapter 6 The Local Biodiversity Action Plan Process .	147
Chapter 7 New Scales of Conservation	186
Chapter 8 The Political Ecology of Brownfields	208
Chapter 9 Conclusions	259
Appendices.....	272
References.....	304

Contents

<i>Figures</i>	<i>i</i>
<i>Tables</i>	<i>iii</i>
<i>Plates</i>	<i>iii</i>
<i>Abbreviations and Acronyms</i>	<i>iv</i>

Chapter 1 Introduction 1

<i>1.1 Placing the Study</i>	<i>1</i>
1.1.1 The Socio-Ecological Agenda and Political Ecology	1
1.1.2 Biodiversity and Brownfields	4
<i>1.2 Aims and Approach</i>	<i>9</i>
1.2.1 From the Global to the Local: Thesis Overview	9

Chapter 2 Theorising the Environment..... 14

<i>2.1 Introduction</i>	<i>14</i>
<i>2.2 Conceptualising Socio-Environmental Phenomena</i>	<i>16</i>
2.2.1 Beyond Realism	16
2.2.2 Discourse	21
2.2.3 Actor Network Theory	26
2.2.4 Reconciliation: Material Discourse	29
<i>2.3 Ecological Governance</i>	<i>34</i>
2.3.1 Science and Policy	34
2.3.2 Locales and Organisations	37
<i>2.4 Urban Political Ecology and Scale</i>	<i>41</i>
2.4.1 The Matter of Nature (and the City)	41
2.4.2 Political Ecology	43
2.4.3 The Politics of Scale	45

<i>2.5 Conclusions</i>	<i>50</i>
------------------------------	-----------

Chapter 3 Method.....51

<i>3.1 Introduction</i>	<i>51</i>
<i>3.2 Research Design.....</i>	<i>54</i>
3.2.1 Genealogy and Policy	54
3.2.2 Selection of Case Studies	57
3.2.3 Case Study Methodology	63
3.2.4 Practical Reflections	67
<i>3.3 Interpretation.....</i>	<i>72</i>
3.3.1 Organising Output	72
3.3.2 Analysis	74
3.3.3 Reflexivity	75
<i>3.4 Conclusions</i>	<i>77</i>

Chapter 4 BioDiversity.....78

<i>4.1 Introduction</i>	<i>78</i>
<i>4.2 Situating BioDiversity.....</i>	<i>80</i>
4.2.1 The Origins of Biodiversity	80
4.2.2 Systems, Mechanism, and the Limits-to-Growth	83
4.2.3 From Equilibrium to Diversity	87
4.2.4 The Convention on BioDiversity.....	92
<i>4.3 Implementing the Convention on BioDiversity in the U.K.</i>	<i>97</i>
4.3.1 Nature Conservation in the U.K.	97
4.3.2 The U.K. Biodiversity Action Plan	102
4.3.3 Biodiversity and Nature Conservation Compared.....	105
<i>4.4 Conclusions</i>	<i>110</i>

Chapter 5 Nature and the City 112

<i>5.1 Introduction</i>	<i>112</i>
<i>5.2 Losing Nature</i>	<i>115</i>
5.2.1 The U.K. Planning System	115
5.2.2 The Browning of the City	119
5.2.3 The Sustainable City	123
<i>5.3 Recovering Nature</i>	<i>128</i>
5.3.1 The Unruly Space of Brownfield Sites	128
5.3.2 The Unofficial Countryside	131
5.3.3 Non-Equilibrium Ecology	136
<i>5.4 Conclusions</i>	<i>145</i>

Chapter 6 The Local Biodiversity Action Plan Process . 147

<i>6.1 Introduction</i>	<i>147</i>
<i>6.2 A Social Process</i>	<i>150</i>
6.2.1 The Framework	150
6.2.2 Establishing the Network	156
6.2.3 Formulation	163
<i>6.3 New Networks, New Knowledges?</i>	<i>169</i>
6.3.1 Contrasting Urban and Ecological Knowledges	169
6.3.2 Contestation	172
6.3.3 Embedded Geographies	178
<i>6.4 Conclusions</i>	<i>184</i>

Chapter 7 New Scales of Conservation 186

<i>7.1 Introduction</i>	186
<i>7.2 Urban Conservation Planning and Brownfields</i>	188
7.2.1 The Corridor Debate and Biodiversity	188
7.2.2 The Biodiversity in Urban Habitat Patches Project.....	192
<i>7.3 The Political Ecology of Urban Planning</i>	197
7.3.1 Corridors: Exploding the Myth	197
7.3.2 Planners and Scientists	200
7.3.3 Barriers to Urban Biodiversity Conservation	203
<i>7.4 Conclusions</i>	206

Chapter 8 The Political Ecology of Brownfields 208

<i>8.1 Introduction</i>	208
<i>8.2 Nature and Planning in Birmingham</i>	211
8.2.1 Strategic Planning.....	211
8.2.2 Development Control and the Environmental Impact Assessment Process.....	215
<i>8.3 The Political Ecology of Vincent Drive</i>	221
8.3.1 Planning Context	221
8.3.2 Current Planning Proposals	230
8.3.3 Surveying.....	238
8.3.4 Mitigation (or the Politics of Mapping Revisited)	243
<i>8.4 Towards a Scalar Political Ecology of Brownfield Planning</i>	251
8.4.1 Scale and the Representation of Vincent Drive.....	251
8.4.2 Scale, Power and Socio-Ecological Transformation	255
<i>8.5 Conclusions</i>	257

Chapter 9 Conclusions 259

<i>9.1 Aims</i>	259
9.1.1 A Multi-Scalar Political Ecology?.....	259
9.1.2 The International and National Frameworks for Biodiversity Conservation	261
9.1.3 The Local Biodiversity Action Plan Process.....	264
9.1.4 Biodiversity and Urban Brownfield Planning	266
<i>9.2 Final Reflections</i>	267
9.2.1 Biodiversity and Brownfields- the Bigger Picture	267
9.2.2 Power, Scale and Socio-Ecological Transformation	269

Appendices..... 272

<i>Appendix 1 Interviewing Schedule</i>	272
<i>Appendix 2 Linguistic Analysis Tools</i>	275
<i>Appendix 3 Edward Wilson: Biodiversity and the Limits-to-Growth Revisited</i>	276
<i>Appendix 4 Sections of the CBD Classified by Principle Concern</i>	282
<i>Appendix 5 The Birmingham and Black Country BAP Deadwood HAP</i>	284
<i>Appendix 6 The Birmingham and Black Country BAP Urban Wasteland HAP</i>	294
<i>Appendix 7 Birmingham and Black Country LBAP HAPs and SAPs Categorised by National / Local Priority</i>	303

References..... 304

Figures

Figure 1.1: Dimensions of the LBAP process in an urban context	6
Figure 1.3: Structure of the thesis.....	13
Figure 2.1: Theoretical structure	14
Figure 2.2: Symmetry in dualistic models of explanation.....	25
Figure 2.3: A model of material discourse	32
Figure 3.1: Relations between stakeholder organisations and levels of policy making in the LBAP process	56
Figure 3.2: Potential case study topics	58
Figure 3.3: The case study settings at the conurbation, authority and district levels	61
Figure 3.4: Temporal implementation of research elements	71
Figure 4.1: The rise of biodiversity and sustainable development.....	80
Figure 4.2: Politico-economic and conservation concerns in the CBD.....	95
Figure 5.1: Relationships between urbanisation and biodiversity	136
Figure 5.2: Succession on brownfields.....	139
Figure 5.3: Recovery pathways of disturbed communities	140
Figure 5.4: Effect of disturbance and stress on species.....	141
Figure 6.1: Functional components of the LBAP process.....	153
Figure 6.2: National and local priorities in the Birmingham and Black Country LBAP	154
Figure 6.3: The LBAP division of labour as knowledge funnel.....	167
Figure 6.4: The geographically embedded LBAP process in Birmingham and the Black Country	182
Figure 7.1: Relationship between species richness and habitat patch area	193
Figure 7.2: Relationship between species richness and habitat patch isolation (log scale)....	194
Figure 8.1: Environmental Impact Assessment and the development control process	215
Figure 8.2: The Environmental Impact Assessment process.....	217
Figure 8.3: Aerial view of Vincent Drive and surrounding area.....	225
Figure 8.4: Plan of Vincent Drive showing locations and aspects of Plates 8.1-8.4.....	226
Figure 8.5: Bourn Brook Valley and Vincent Drive as nexus of corridors in the Birmingham NCS	229
Figure 8.6: UDP designation of Vincent Drive	233

Figure 8.7: Context map of the Selly Oak area appended to the Selly Oak development study public consultation document.....	234
Figure 8.8: Proposals map appended to Selly Oak local action plan	235
Figure 8.9: Plan showing proposed development of Vincent Drive.....	236
Figure 8.10: Vincent Drive phase two botanical survey- map of botanical interest	246

Tables

Table 3.1: Research techniques	53
Table 3.2: Stakeholder groups interviewed by case study.....	62
Table 3.3: Sample and response rates by sector	68
Table 4.1: Relationships between ecosystem processes and species numbers.....	89
Table 4.2: Scaled elements of biodiversity.....	108
Table 5.1: Post-industrial ecological variables.....	142
Table 6.1: Division of Birmingham and Black Country LBAP HAPs into rural habitat types and urban land use types.....	149
Table 6.2: Habitat / land use action plans in the Birmingham and Black Country LBAP listed by classification system.....	155
Table 6.3: Evaluation criteria for habitats and species.....	165
Table 6.4: Equivalences for urban land use HAPs from U.K. habitat classification systems	176
Table 6.5: Constraints and opportunities in the LBAP process.....	180
Table 8.1: The scalar politics of urban planning	254

Plates

Plate 8.1: Woodland and grassland to North of Bourn Brook.....	227
Plate 8.2: Woodlands and wetlands along the Bourn Brook.....	227
Plate 8.3: Grassed floodplain to South of Bourn Brook.....	228
Plate 8.4: Derelict factory and sealed surfaces at Southern end of Battery Site.....	228
Plate 8.5: Section of Bourn Brook proposed for conservation	247
Plate 8.6: Section of Bourn Brook proposed for enhancement	247

Abbreviations and Acronyms

ANT	Actor Network Theory
BAP	Biodiversity Action Plan
BTCV	British Trust for Conservation Volunteers
BUHP	Biodiversity in Urban Habitat Patches
CBD	Convention on BioDiversity
CPRE	Council for the Protection of Rural England
DETR	Department of the Environment, Transport and the Regions
DHAP	Deadwood Habitat Action Plan
DoE	Department of the Environment
EIA	Environmental Impact Assessment
EA	Environment Agency
EN	English Nature
ER	EcoRecord
ESRC	Economic and Social Research Council
FC	Forestry Commission
GIS	Geographical Information System
HAP	Habitat Action Plan
IBP	International Biological Programme
IGBP	International Geosphere-Biosphere Programme
JNCC	Joint Nature Conservation Council
LA	Local Authority
LA 21	Local Agenda 21
LBAP	Local Biodiversity Action Plan
LCG	Local Conservation Group
LNR	Local Nature Reserve
LO	Land Owner
LPA	Local Planning Authority
MORI	Market Opinion Research International
NCC	Nature Conservancy Council

NCP	Nature Curriculum Project
NCS	Nature Conservation Strategy
NERC	Natural Environment Research Council
NGO	Non-Governmental Organisation
NNP	Neighbourhood Nature Project
NNR	National Nature Reserve
NT	National Trust
NVC	National Vegetation Classification
POST	Parliamentary Office for Science and Technology
PPG	Planning Policy Guidance
RDB	Red Data Book
SAP	Species Action Plan
SINC	Site of Interest for Nature Conservation
SLINC	Site of Local Interest for Nature Conservation
SoCC	Species of Conservation Concern
SPG	Supplementary Planning Guidance
SSK	Sociology of Scientific Knowledge
SSSI	Site of Special Scientific Interest
UDP	Unitary Development Plan
UHAP	Urban Wasteland Habitat Action Plan
UKRTSD	United Kingdom Round Table on Sustainable Development
UKLIAG	United Kingdom Local Issues Advisory Group
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Organisation for Education, Science, Culture and Communications
URGENT	Urban Regeneration and Environment Research Programme
UWT	Urban Wildlife Trust
WT	Wildlife Trust

Chapter 1 Introduction

1.1 Placing the Study

1.1.1 The Socio-Ecological Agenda and Political Ecology

Society's relationship to the environment continues to transform rapidly, from the proliferation of global environmental threats (Strong 2001), to the increasing urbanisation of human existence (Swyngedouw and Kaika 1999). Biodiversity conservation represents a major international response to these changes, potentially reformulating our relations to the environment at all levels, from the global and national to the local and situated. While critiques of scientific objectivity and environmental realism have emphasised the need to recognise reciprocity between social and physical aspects of environmental change, the relationship between these dimensions at different levels is increasingly complex (Macnaghten and Urry 1998; Luke 1999).

In distinction to the clamour created by geographers attempting to 'claim' the newly created territory of environmental studies in the 1980s (Stoddart 1987), and the blunt interdisciplinarity advocated subsequently, this thesis reacts to calls for more nuanced social approaches to environmental issues in geography (Massey 1999a; Thrift 2002). As the vista of environmental theorising in the social sciences has extended (Lubchenko 1998), so questions concerning the environment have re-emerged as one of geography's more pressing concerns. In the aftermath of the 'linguistic turn', this period represents a unique opportunity for the social and philosophical insights of postmodern geographical work that have characterised the discipline over the last ten years to inform more socially astute environmental theorising (Whatmore 1999).

Indeed, rather than disingenuously portraying a break with postmodernism, it is possible to identify an incipient ecological turn within the geographical milieu, manifested in musings and editorials upon ecologies of place (Thrift 1999), biogeographies (Spencer and Whatmore 2001) and post-natural / post-human geographies (Murdoch 1997). But perhaps even more so, such a turn is apparent in mounting efforts to capture what Castree (2002a, p.357) has

termed the ‘ontological promiscuity’ of environmental issues: the recognition that environmental concerns bleed inescapably through dualistic modes of analysis that segregate society from nature, and across geography’s corresponding categories of economic, cultural, social and physical concern.

It is within this context that political ecology has emerged in the geographical literature. The Marxist origins of political ecology in development theory form the basis for engagement (Bebbington 2000), enhancing critiques of capitalism that focus on the dynamic interaction between the material transformations of nature, and the social transformation of humans (Lipietz 2000). Resultantly, it is relatively familiar as a style of analysis in geography (Castree 1995; Swyngedouw 1996), being used most extensively to enhance the ‘excavation of the historical geography of socio-natural environments that have marked the capitalist mode of production’ (Boyle 2002, p.1). However, moving political ecology beyond this remit remains at an embryonic stage within geography. This thesis develops political ecology in two ways: by applying it to urban environmental issues, and by exploring its potential to articulate multi-scalar socio-ecological transformations.

Political ecology represents an ideal tool with which to study areas that are characterised by human influence, such as urban environments. The urban sphere has been traditionally neglected by realist approaches to environmental issues (Cronon 1992), and environmentalism (Light 2001), that are typified by the study and valuing of environments that display little evidence of human disturbance. Despite this, urban environmental considerations have come to the fore under the aegis of sustainable development, with the result that,

Ecology is now central to the institutional and symbolic modernisation of capital. So, too, are discourses of urban sustainability and ecological planning, which seek to reorder and rationalise capitalist urbanisation in the future. The politics and discursive strategies not only of politically dominant forces but also of a range of reformist efforts are connecting the ‘city’ with ‘ecology’ and both to the production of urban space (Kipfer *et al.* 1996, p.5, quoted in Keil and Graham 1998, p.108).

A political ecology of the urban is thus concerned with how different forms of urban governance produce qualitatively different relations between humans, non-humans and their urban environments (Huston 1997). Such an understanding is developed through this thesis in

order to interrogate whether the implementation of the Convention on Biodiversity (CBD) (UNCED 1992) in urban areas is reformulating the city's connection with ecology, to produce different, and perhaps more ecologically and socially sustainable, urban spaces. While resonating with the traditional concerns of Marxist geographers, concerning social justice (Harvey 1973), and the dynamics of capitalist accumulation (Smith 1984), political ecology emphasises the need to conceive of the ecological dimension as part of the cause, rather than merely an outcome of capitalist processes.

In her recent review of the sustainability research literature in and beyond geography, Eden (2000) states that 'the practical focus at the local scale runs the risk of losing sight of the big picture' (p.115-116). Socio-ecological transformation exhibits a 'continuous transformation of global flows and local embedding' (Yeung 1998, p.2), revealing the physical consequences local actions have nationally and internationally more than any other dimension of globalisation (Mason 2001). Most of all,

In an epoch in which new, highly disempowering and increasingly authoritarian scalar arrangements are being forged and aggressively entrenched by the agents of transnational capital [the politics of scale]...would appear to be one of the more urgently important political contributions that could be made by progressive theorists (Brenner 2001, p.608).

The scale imperative is particularly germane to the ongoing socio-ecological transformations associated with capitalist development, and the study of potentially reformative initiatives such as biodiversity conservation and sustainable development. Building upon this theme, areas of synergy with the themes of political economy are drawn upon to incorporate ecology into a powerful and coherent analysis of global, national and urban capital processes (Harvey 1996).

A number of comparative research programmes are underway that address the geographically heterogeneous nature of the urban biodiversity process in the U.K. (the 'Habitable Cities' project at the Open University, and 'Conserving Biodiversity that Matters: the Value of Brownfield Sites' at University College London), leaving a 'research gap' for an in-depth 'vertical' study that addresses its articulation from the global to the local levels (Bishop *et al.* 2000). Mindful of Eden's warning, this thesis explores the relations between these levels and

develops conceptual tools that allow meaningful engagement with political and ecological models, knowledges and practices at a range of levels to explain processes unfolding in the city of Birmingham, U.K. The key contribution of this study is to interrogate the material and discursive co-constitution of ecological and political scales, rather than articulate two interacting but discrete spheres.

This thesis mines the potentially fecund vein of theoretical engagement between political ecology and geography, by examining urban biodiversity conservation. Bringing two areas of research into relation with one another gives the study unique relevance to areas of activity that are traditionally studied discretely, and the potential to contribute to wider scientific and social debates surrounding socio-ecological transformation. Brownfields represent an ideal vehicle with which to explore these issues, as they disrupt dominant discourses of nature (as untouched by human activity), ecology (as the conservation of stability), and urban space (as economically productive).

1.1.2 Biodiversity and Brownfields

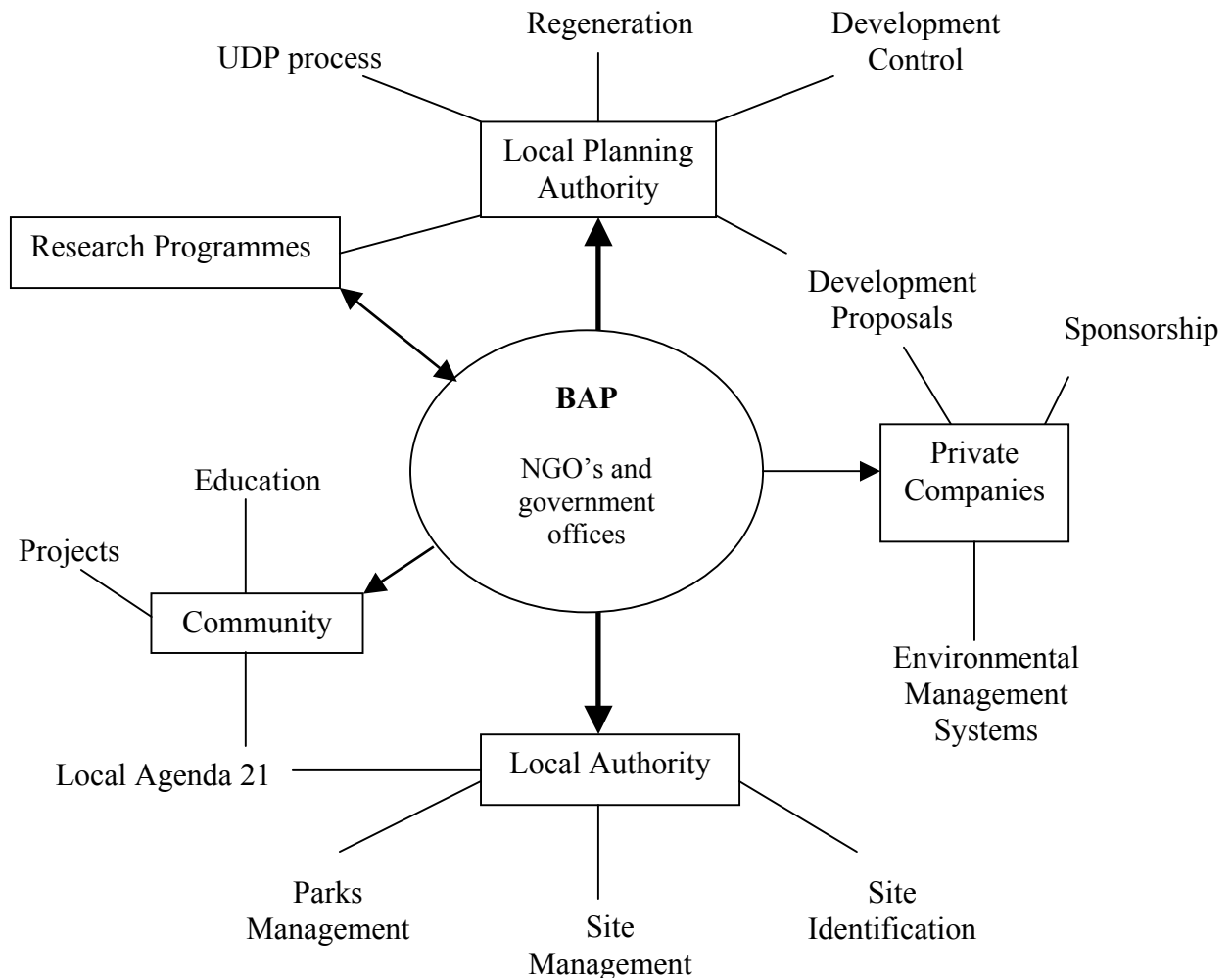
Although not articulated as such, global biodiversity conservation represents a major contemporary endeavour to mitigate the negative physical and social externalities associated with capitalist transformation. Subscribing to the ideology of sustainable development, it seeks to forge new social and political relations to the environment at international, national and local scales in a more coherent fashion than has hitherto been known, and is characterised by a complex mixture of cultural, physical and social factors:

Although “biodiversity” has concrete biophysical referents, it must be seen as a discursive invention of recent origin. This discourse fosters a complex network of actors, from international organisations to...local communities and social movements. This network is composed of sites with diverging biocultural perspectives and political stakes (Escobar 1998, p.53).

This quote summarises the fundamental tenets of biodiversity that must be articulated. As a hybrid biophysical and discursive concept, it has the potential to transform cultural and

physical landscapes. However, it is simultaneously a politically loaded term that can be contested through locally embedded networks of people and organisations. While Escobar is talking about the Columbian rainforest, this study applies such an understanding to the highly regulated arena of biodiversity conservation in the Western urban context. While the global framework remains the same, articulating a political ecology at the practical level in the city of Birmingham, U.K., means engaging with very different ideas, legacies, actors and institutions.

In line with the CBD, signed at the Rio Earth Conference in 1992, biodiversity is to be conserved through a nested hierarchy of Biodiversity Action Plans (BAPs), ranging from the international, national and regional to the local level (Selman and Wragg 1999). The BAP process is intended to influence a diverse range of pre-existing activities, from national policy to local practices, rather than operate discretely as a freestanding initiative. In contrast to rural areas, urban space is highly regulated, and while administered mainly through wildlife NGOs and government offices, the LBAP process impacts upon a range of activities, from Local Authority (LA) site management to the various functions of planning development. Areas of influence spread across planning (including strategic and development control planning), private companies (for example, the formulation of development proposals and site management schemes), research programmes, LA functions (site management and identification and parks management), and community involvement (through Local Agenda 21 (LA 21), education initiatives and so forth). Overlap exists between these areas of concern, and the different concerns impact upon the BAP in stronger or weaker ways, but the management and planning functions of the LA represent a key arena that the Local Biodiversity Action Plan (LBAP) process must influence (Figure 1.1). Of these functions planning is crucial, as it not only prescribes the uses to which space can be put, but frames the contestation between potential uses of space (Whatmore and Boucher 1993). But while the process of planning ecology (Browne and Keil forthcoming) is increasingly recognised as discursive and ‘power-ridden’, it has been little studied.

Figure 1.1: Dimensions of the LBAP process in an urban context

At the local level, BAPs are driven by collaborative processes of knowledge formulation (Healey 1997) between planners, conservationists, ecologists, consultants, academics, residents and environmental managers. Debates over urban sustainability, environmental planning, and how to achieve more sustainable cities, coalesce around the formulation, mediation, and contestation of knowledges through such networks (O’Riordan 1995a). The success of these networks in altering planning policy and practices is fundamental to the success of the BAP initiative, and the socio-ecological transformation of the urban landscape. However, in utilising such networks, these semi-voluntary forms of governance impart a major source of path dependency and geographical variation to the process.

The international framework for biodiversity conservation is new, but the U.K. BAP is being superimposed upon pre-existing policies and institutions. While Harvey (1993) is right to claim that cities are not ‘unnatural’, a plethora of powerful and deeply rooted discourses operate to de-naturalise and de-ecologise their space. Negative cultural assumptions about the ‘natural’ worth of cities are closely entwined with positive valuing of the countryside (Nicholson-Lord 1987), and this cultural geography spawns a number of dichotomies between, for example, urban and rural or brownfield and greenfield in the U.K. An anti-urban discourse of nature pervades planning, ecology, conservation (Barker 2000), and even our national aesthetic sensibilities.

The idea that urban space can be ecologically valuable sharply contrasts with the dominant spatial logic of capitalism, which requires urban space to be financially productive. Urban biodiversity conservation thus represents a fascinating microcosm of the conflicting approaches to planning that characterise debates over environmental reform in the U.K., and indeed the world. The historical relationship between ecology and national and global environmental governance exerts a structuring influence over practical attempts to articulate nature in the city, raising serious challenges to the conservation of biodiversity and transition to more sustainable modes of governance in the urban context.

This disjuncture is manifested acutely in the case of urban brownfield sites: areas that have been abandoned and are derelict or contaminated. While the contributions of unmanaged spaces such as brownfield sites to urban biodiversity is increasingly recognised by ecological research (Gibson 1998) and media coverage (McIlvena 2001), their image as wasted and dirty space inheres (Shirley and Box 1998). Thus over the same time-period that action plans were drawn up to conserve brownfield biodiversity, such spaces became increasingly pivotal to urban regeneration and development policies, with the Department for the Environment Transport and Regions (DETR) setting a target for 60% of new homes to be built on brownfield land by 2008 (DETR 1998). The approach of the planning system, and privileging of shorter or longer time-scales vitally determines the balance that is struck between these positions.

Located in the centre of the U.K. and currently home to more than one million people, Birmingham provides an ideal case study of the urban BAP process on brownfield sites. As a product of the Industrial Revolution, Birmingham has been severely affected by the negative social and economic factors associated with post-industrial decline and urban exodus that have taken place over the latter half of the Twentieth Century. Resultantly, the city currently has 1500 Ha of brownfield land on its registers, which is scattered over its area of approximately one hundred square miles. However, Birmingham is also home to the largest Post-War urban reconstruction programme undertaken in Europe, and hence offers the opportunity to explore the contemporary re-ordering of nature in the city, and how these tensions are ordered through planning and governance processes at city, landscape and site scales.

The brownfield-biodiversity debate lies at the centre of contemporary urban debates concerning the deficit of housing, loss of open space and the associated degradation of social and ecological standards of living for those inhabiting urban landscapes (Harvey 1996). It underpins national debates concerning post-industrialisation, the shift to a post-productivist paradigm of national agriculture, and how best to manage the rise of a recreational society. Investigating biodiversity conservation in the urban brownfield context offers a window upon some of the U.K.'s most pressing contemporary political, economic, social and ecological issues, and their changing countenance within the shifting context of global and local levels of governance.

1.2 Aims and Approach

1.2.1 From the Global to the Local: Thesis Overview

Transplanting the global diktats of biodiversity conservation to the urban context of the U.K. involves capturing its essential features, and investigating how they are mediated through pre-existing ideas and institutions at different levels. Studying this process means exploring the global discourses of environmentalism and conservation biology from which biodiversity emerged. It requires an understanding of the political ecology of the U.K. upon which biodiversity conservation has been superimposed, in terms of the historical legacies of managing the national environment through practices such as nature conservation and planning, and the cultural bases that underpin this national framework. It demands an understanding of how this terrain frames the articulation of urban nature at the local level, in order to understand how biodiversity conservation is being put into practice, and its successes and failures. This thesis develops a political ecology approach in order to elucidate the role of key ideas and values that traverse traditionally discrete levels of analysis, and explore how the articulation of nature is changing in the post-Fordist, post-Rio, city (Keil and Graham 1998).

The key departure of this study is to conceive of biodiversity as a nested phenomenon, which operates from the international to the local levels. The overall theoretical aim of the study was to construct a multi-scalar political ecology approach that integrates analysis between these levels. Three substantive aims were identified to interrogate this over-arching aim: to assess the fit between international and national frameworks for biodiversity conservation; to investigate how these frameworks are mediated through the LBAP process; and to explore the intersection of biodiversity with current urban brownfield planning.

The relation between society and nature, the material reproduction of this relation through practices and approaches, and the role of scale in organising this process between levels are used as key analytic themes. The relationship between these themes is clarified in Chapter Two, by outlining an understanding of material discourse that can accommodate the discursive, socially embedded and biophysical components of biodiversity. Actor Network Theory (ANT) is used as an epistemological tool to explore how things are made to matter

practically, while discourse is used to reveal the relationship between nature and society that inheres in practices, traditions and disciplines (Glacken 1967; Worster 1977). This is an important step: rather than viewing discourses as deterministic of everyday action, it emphasises how discourses can be conceptualised consistently between levels of analysis.

Chapter Three translates this theoretical framework into a research methodology capable of articulating biodiversity at a number of different levels. A multi-scalar understanding of biodiversity as material discourse allows the ‘big picture’ of global discourses to be connected to empirical case studies in a meaningful way. Genealogical analysis is used to show the existence of coherent ideologies structuring global and national discourses (Bishop *et al.* 2000), while the analysis of actors and networks is used to explore how such ideologies are renegotiated through socially embedded practices of ecological governance (Eden *et al.* 2000), such as the LBAP process.

Chapter Four explores the global discourse of biodiversity within its historical and conceptual context, establishing the importance of the idea of natural equilibrium to ecological and environmental understandings of the world. This genealogy informs analysis of the Convention on BioDiversity (CBD) and its counterpart, the U.K. BAP, and their potential fit and disjuncture is considered with the British traditions and institutions of nature conservation. Chapter Five addresses the political ecology of urban and brownfield planning in Britain. It is argued that the discourse of natural equilibrium spawns a number of binaries, between urban and rural, greenfield and brownfield and so forth. This has serious implications for urban landscapes that are characterised by disequilibrium, as the dominant policy and practices of urban governance adhere to an anti-nature, developmental logic of urban space. However, urban ecology and urban conservation initiatives disrupt this hegemonic logic, and represent a major resource for the local biodiversity process.

The re-working of these knowledges and discourses of ecology and urban space are occurring at the local level, and Chapter Six provides a case study of the formulation process of the LBAP for Birmingham and the Black Country. The network of people and institutions that produced the LBAP is traced, and detailed sociological evidence is used to highlight the mediation, contestation and subsequent hegemonisation of certain ecological knowledges over

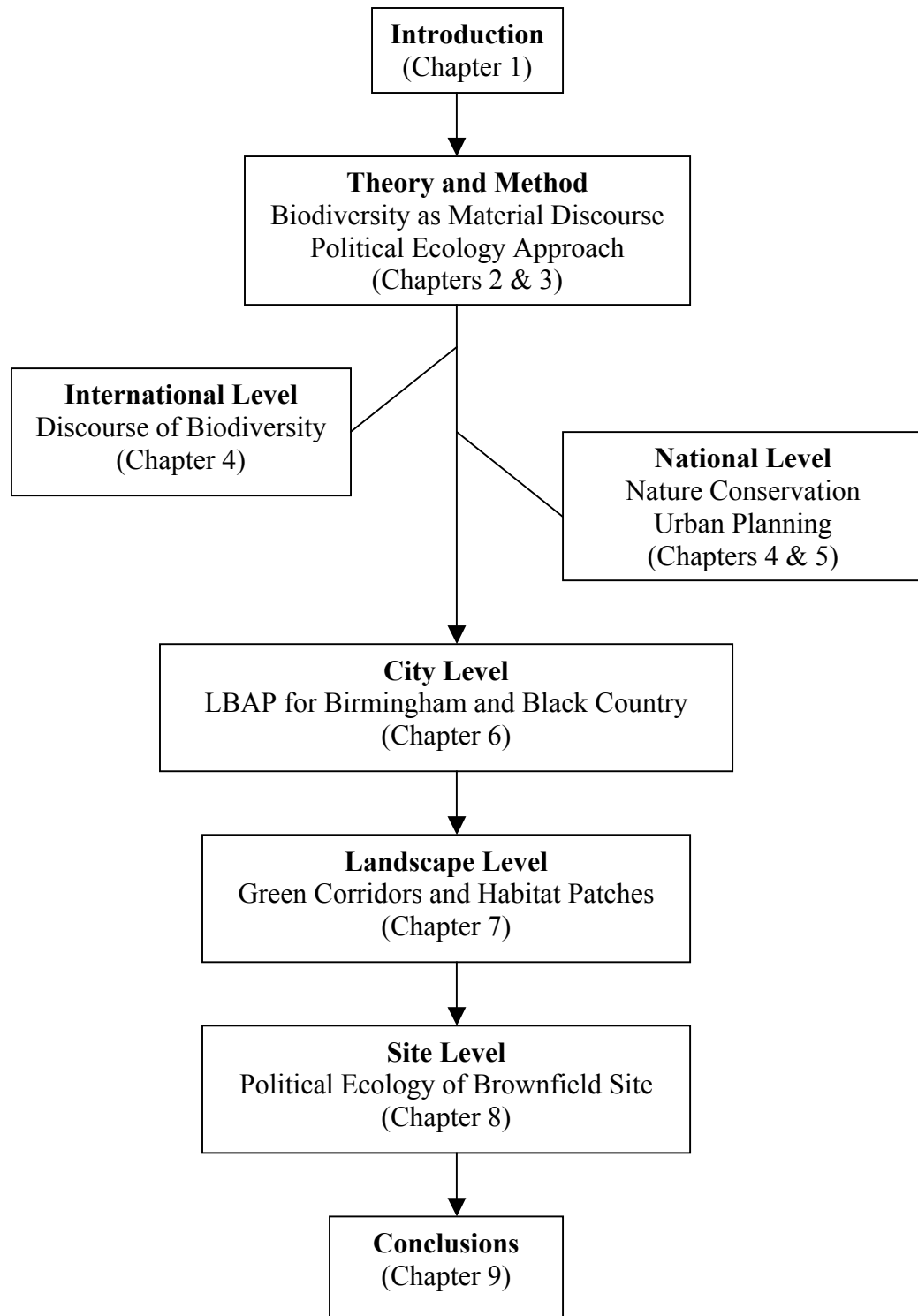
others between diverse stakeholders. The urban wastelands action plan directly covers brownfield ecology, and is compared to the deadwood action plan, in order to highlight disjunctures between new forms of urban ecological knowledge and traditionally discrete ecological knowledges. At the practical level, the mediation of the LBAP process through pre-existing networks and institutions makes the process of formulation, and resultant product, highly geographical, in this case varying between conurbations.

Chapter Seven extends the analysis of formulation, to consider academic and end-user collaboration as a key part of the local biodiversity process. The ‘Biodiversity in Urban Habitat Patches’ (BUHP) Natural Environment Research Council (NERC) funded Urban Regeneration and Environment (URGENT) project aims to deliver a brownfield-biodiversity decision support system to Birmingham Local Planning Authority (LPA). This project evaluates the ecological planning tools of habitat patches and green corridors as spatial models of conservation that operate at the landscape level. Problems of creating and consuming professional knowledge at the local level, and a number of structural barriers to ‘sustainable’ planning are considered. Arguments concerning the dominance of a specifically capitalist urban mode of ecological governance are developed through a consideration of the manipulation and ordering of scale in ecological and planning practice.

Chapter Eight focuses analysis upon an individual site, investigating how the Birmingham LPA articulates brownfields in current ecological planning practices and policy. The designation of sites in strategic planning, and use of ecological assessment in the development control process, are explored in detail. An ecologically sensitive urban wasteland in Birmingham known as Vincent Drive is used to show how urban ecological issues are represented and mediated against development pressures through the Environmental Impact Assessment (EIA) process. A form of scalar politics emerges from the analysis of surveying, mapping and planning practices, and is developed to show how the dominant capitalist drivers of urban planning conflict with the transformative elements implied by more sustainable forms of ecological governance such as biodiversity.

Chapter Nine revisits the theoretical and substantive aims of the thesis, considering the prospects for sustainability and biodiversity conservation, and the major contributions of the

study to the understanding of socio-environmental issues. The thesis is organised as a progression from the global ecological discourse of biodiversity, to the national political ecology of conservation and urban planning in the U.K., through to case studies of the conservation of biodiversity at the city level, and finally to the brownfield site itself (Figure 1.2). However, this progression (from the abstract to the concrete) should also be read as a set of nested arguments. The articulation of socio-natural environments, through concepts such as biodiversity, sublimates around these scales, and exploring how these scales fit together allows the development of a more nuanced understanding of the relationship between physical and political dimensions of socio-environmental phenomena.

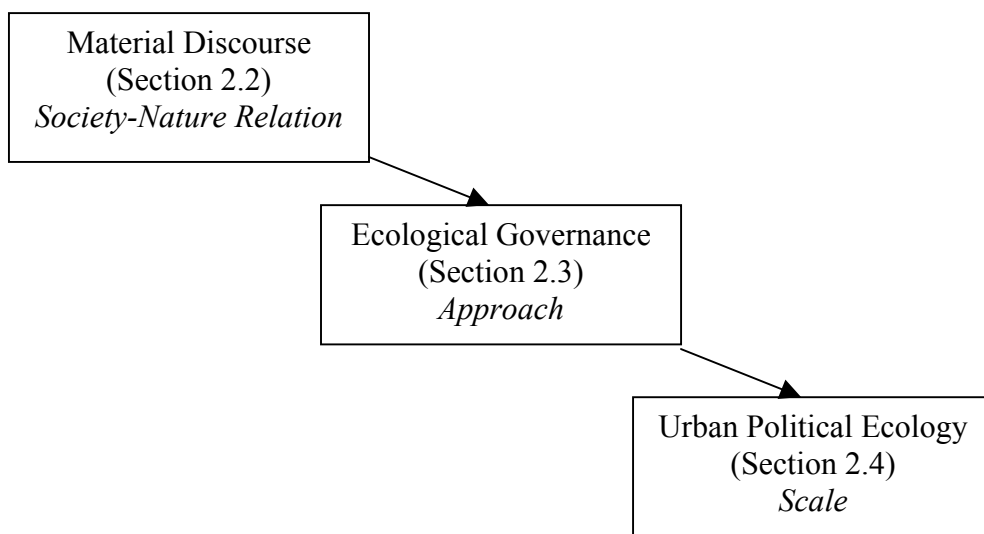
Figure 1.2: Structure of the thesis

Chapter 2 Theorising the Environment

2.1 Introduction

This chapter draws upon a range of ideas and theories in order to construct the basis for a multi-scalar political ecology approach, that investigates and interprets biodiversity at a number of levels. A general understanding of socio-environmental processes as material discourse is offered by reconciling discourse and ANT. This foundation is used to delimit the practices that constitute ecological governance, and to outline urban political ecology as an analytic framework with which to articulate the multi-dimensional character of ecological governance. The theoretical progression from general to specific understanding (Figure 2.1) establishes coherence between each element of the research by focusing and refining the study, in terms of both the object of study and terms of analysis. The themes of society-nature relations, approach and scale are grounded in these three theoretical stages respectively.

Figure 2.1: Theoretical structure



Section 2.2 outlines the increasing importance of post-realist understandings of our relation to the environment in the social sciences over the last twenty years. It is argued that theory must resist adopting overly realist or constructionist positions in order to capture the physical and political status of socio-environmental phenomena at different levels. Discourse and ANT are presented as prominent post-realist approaches to the environment in geography. Drawing upon the concepts of immanence and context, the constructionist pit-falls of discourse are tempered using ANT. The resulting framework, termed material discourse, has both theoretical and methodological benefits for investigating socio-environmental phenomena, allowing discourses to be traced across levels, and from abstraction into practice.

Section 2.3 uses the understanding of material discourse to identify the key aspects of ecological governance that influence the ecological transformation of the city; from resident action and local conservation activities, to ecological surveying and economic planning. The status and relationship between science and policy is explored, and the practices of classification and mapping are explored as areas in which these two domains meet. The concepts of the ‘organisation’ and the ‘locale’ are explored as sociological and geographical tools with which to conceptualise the spaces of ecological governance.

Section 2.4 introduces urban political ecology as a specific analytic approach to the study of ecological governance. Within the context of ongoing efforts by geographers to incorporate ‘nature’ into urban theoretical frameworks, and increasing calls for interdisciplinary research and analysis from funding agencies and politicians alike in the arena of sustainable urban development, it is argued that the ‘political ecology’ approach has much to offer practically, politically and philosophically. The synthesis between political economy and ecology incorporates ecology into a powerful and coherent analysis of global, national and urban capital processes. The concept of scale is discussed in terms of its capacity to integrate analysis of the varied activities that make up ecological governance at different levels, and its potential to articulate urban environmental transformation as a contested politics of scale.

Section 2.5 summarises the theoretical tenets that structure the subsequent thesis, outlining their implications for methodology.

2.2 Conceptualising Socio-Environmental Phenomena

2.2.1 *Beyond Realism*

The ‘environment’ emerged as a distinct object of concern in the 1960s, with the first wave environmental crises of pesticide use (Carson 1962), desertification, and population explosion (Ehrlich 1968) casting the mould into which ozone depletion, global warming and biodiversity loss fit today. Characterised by high media coverage, these events represent the maturation of the modern environmental movement, and the emergence of a specifically global environmental consciousness in the West. The meaning of the environment was transformed from,

...the surroundings, or context, within which humans, animals or objects exist or act...to the natural world system, which is currently seen as fragile and threatened by the human technology developed since the Industrial Revolution (Jary and Jary 1999, p.199).

This cultural reaction served to externalise the environment, and was mirrored by resultant scientific studies of the environment, which treated environmental problems as purely physical phenomena, separate from society, objectively measurable and rectifiable by scientific means (Macnaghten and Urry 1998; Haila 1999). Compounding Enlightenment tendencies towards determinism and reductionism in scientific study, this environmental realist approach embodied an epistemological and ontological separation between nature and humans. With the continued dominance of science within the academy, environmental realism remains the prevailing approach to the study of the environment.

However, the limitations of the realist approach are increasingly apparent in the face of global environmental problems, such as global warming, which explicitly demonstrate a co-constitution of the human and physical domains (Gore 1992). Indeed, it has been argued that because every corner of the globe now bears evidence of human interference, the category of nature has itself become technically obsolete (McKibben 1989). As the analytical distinction between nature and humans becomes ever harder to achieve, the distortions inherent in approaches that remain wedded to this distinction become more apparent.

The epistemological divide between the physical and social sciences, which structures academic institutions and knowledges, is unhelpful in the environmental domain, as,

It is dangerous to have two cultures which can't or don't communicate... Scientists can give bad advice and decision-makers can't know whether it is good or bad (Snow 1964a, p.98).

The argument has been made that negative environmental externalities generated by capitalist accumulation over the Twentieth Century cannot be articulated adequately by an over-specialised academic system (Snow 1964b; Horkheimer and Adorno 1972; Nissani 1996), and that disciplinary fragmentation must be undone before these issues be adequately conceptualised. Following numerous critiques of scientific rationality from a variety of academic quarters (Popper 1963; Kuhn 1970; Foucault 1973; Buttimer 1982; Harvey 1984; Latour 1987), critiques of disciplinary fragmentation have gained ground in policy circles,

...a range of human, social and institutional factors exert decisive determining influences on the shape and character of the prior underlying definitions and categories which govern formal knowledge...Methodologies and policy approaches resting on the tacit assumption that 'environmental' issues and problems lend themselves to definition in exclusively physical 'natural' terms are misleading analytically, and are likely to prove increasingly ineffective in the circumstances of 'real world' policy initiatives (Centre for the Study of Environmental Change 1994, p.1).

Biodiversity conservation on urban brownfield sites typifies one such 'real world' policy initiative, and the imperative to integrate environmental factors with modes of governance would seem to demand a more nuanced articulation of the environment than that offered by environmental realism.

One pragmatic answer has been to call for interdisciplinary studies to inform environmental policy and practice (Nissani 1997; Beck 1999; Eden 2000). Although losing the battle in the early 1990s over the substantive field of environmental science, it is hard to resist the view that geography is well placed to respond to calls for environmental interdisciplinarity. Not only do physical and human understandings coexist within geography (Cooke 1992), but the discipline can trace its roots back to a rich polymath tradition (Kates 2002). Most recently,

biogeography has been touted as a potentially fecund meeting ground for physical and human geography (Spencer and Whatmore 2001): and indeed, this research was itself funded by an interdisciplinary award from the Economic and Social Research Council (ESRC) and NERC, specifically to conduct a social study of urban ecological processes.

However, the challenges of conducting interdisciplinary research are considerable, perhaps due to the fact that the word interdisciplinary itself seems to defy definition (Klein 1990), invoked variously to mean trans-disciplinary, multi-disciplinary and cross-disciplinary (Nissani 1995). It has also been argued that academic boundaries reflect wider cultural boundaries between for example, urban and rural (Becher 1989), providing further barriers to interdisciplinarity. In relation to the environment,

...it is clear that we do not know what the parameters of interdisciplinary environmental work are, nor what defines it (ESRC / NERC / Environment Agency (EA) 2000).

Turning to the social sciences in search of such an approach, traditionally the,

...role of the social scientist in the analysis of global environmental change has been largely seen as that of a social engineer, as someone who manipulates and 'fixes' society so as to facilitate the implementation of a sustainable society (Macnaughton and Urry 1998, p.6).

As Macnaughton and Urry note, post-realist approaches to the environment have emerged across a range of disciplines that problematise the Enlightenment dualism between society and nature: mentioning only an indicative set of disciplines and authors that they cite, anthropology (Douglas 1992), cultural history (Schama 1995), philosophy (O'Neill 1993), politics (McCormick 1991), sociology (Beck 1992a), Science Studies (Yearley 1996) and Womens' Studies (Shiva 1994). This diversity is reflected in the diverse approaches adopted by contemporary geographers (Castree 2002b). In order to situate this thesis with reference to these bodies of work, it is worth briefly considering the lineage of environmental studies that informs the current raft of post-realist endeavours.

Worster (1988) identifies environmental history, which emerged in the 1960s as a sub-field of history (Williams 1994), as one of the first ethical injunctions against the blunt interpretations (and prescriptions) of environmental realism. In its classic works, supposedly ‘real’ environments, such as the wilderness landscapes of the USA, are shown to be the product of socio-cultural factors and human habitation and modification, rather than inherently ‘natural’ products of evolution (Worster 1984). Despite often Sauerian subtlety in treading the line between natural and cultural explanation on the part of its main proponents, it has been accused of falling back on the foundational claims of realism in the ‘final analysis’ (Demeritt 1994a).

Harnessing the style and topics of environmental historians, and prompted by the recognition of urban bias in their own work (Fitzsimmons 1989), Marxist geographers built upon this body of work to proffer explicatory accounts of how specific constructions of nature operate to support specific material power relations, in specific places, at specific times (Eder 1996a; Swyngedouw 1997a; Castree and Braun 1998). Through an engagement with Foucauldian theory, the concept of discourse was employed to reveal implicit values and assumptions about society’s relation to nature underpinning the knowledge produced by environmental realist science, from global scientific debates to local environmental politics (Myerson and Rydin 1996; Darier 1999).

However, the progressive development of the so-called constructionist positions associated with discourse analysis opened an ever-expanding gulf with the realist approaches of mainstream science. Nourished by the largely interminable wider philosophical debate between idealism and realism, this led to something of a Mexican standoff. A fundamental task of contemporary theory building in geography is thus to avoid the ‘impasse’ between social constructionism and environmental realism (Macnaghten and Urry 1998). This project employs discourse and ANT to avoid such an impasse, by furnishing a material discourse approach that can capture the social, cultural and biophysical status of biodiversity (Escobar 1998) that a multi-scalar analysis demands.

From the mid-1990s, geographical work on the environment embraced a range of other post-modern trends in the academy, from ideas of embodiment and sensory technologies of nature

(Urry 1995), to cyborg ontologies (Haraway 1991) and post-Fordist conceptions of governance (Held 1995). Amongst these, it is the rapid adoption of ANT that has mounted the stiffest challenge to the dominance of discourse in human geography approaches to the environment (Castree 2002b). This infusion of diversity has occurred against the ever-changing backdrop of developments in disciplinary sociology, such as structuration theory (Giddens 1985), and the enduring Marxist sensibility that form the bedrock of social theorising in geography (Cloke *et al.* 1991; Harvey 1996). A further challenge to theory building is therefore to negotiate the numerous schools of thought, bodies of work and strains of theory that are deployed in contemporary human geography against the broader undercurrents of social theory. Before leaping into an extended discussion of discourse and ANT, it is worth situating discourse and ANT within this terrain.

The brief lineage of post-realist thought given above notes the extensive use of discourse made by Marxist geographers in the 1990s. Agreeing fully with the recent arguments of Castree (2002b) that the use of discourse to frame environmental studies in geography is essentially a manifestation of 'green' Marxism, his concomitant attempt to build bridges between Marxist and ANT approaches to the environment is to a degree implicit in the reconciliation of discourse and ANT offered here. Like Castree's, this reconciliation is driven by a suite of concerns. In the face of supposed hostility between the two approaches (Whatmore 1999), and a reluctance to relinquish critical analysis (offered in this case by discourse), it is necessary to face up to the realisation that ANT cannot be ignored, both as 'paradigmatic flavour of the month' (Castree 2002b, p.4) and in terms of its potential to offset the constructionist tendencies of discourse.

The resolution offered mirrors Castree in suggesting that weak forms of the two approaches are compatible, but goes further in claiming that they are necessary to accommodate the full range of social and environmental phenomena, both in terms of conceptual and methodological approach. Articulating a critical approach to the material transformation of nature by capitalist relations, through a complementary understanding of ANT and discourse, is essential to the coherent formulation of a multi-scalar political ecology approach.

2.2.2 Discourse

Discourse literally means ‘connected utterances’. Foucauldian notions of discourse explore how consistent associations of and connections between communicative acts normalise certain meanings to form discourses. Discourses are unavoidably political, in that normalising some meanings and actions simultaneously abnormalises others (Fairclough 1992; Burr 1995). Discourse is the abstract representation of a series of connected texts, that arise materially through concrete sociological processes of meaning-making such as speech, writing, modes of action, performance and so forth (Derrida 1974). It is this that led Derrida (famously) to claim that there is ‘nothing outside the text’ (*ibid*, p.158), and text is used here in this all-encompassing Derridean sense. It is important not to conflate discourses with real processes: the discursive is not a distinct arena of reality, but an analytical lens through which to view it.

The political dimension of discourse is based upon the neo-Kantian rejection of correspondence between knowledge and reality. If meaning was derived un-problematically from an external reality, it would have little to do with social power; or as Foucault once put it,

...when I read- and I know it has been attributed to me- the thesis, "knowledge is power", or "power is knowledge", I begin to laugh, since studying their relation is precisely my problem. If they were identical I would not have to study them (Raulet 1983, p.210)

The power of the term as an analytic concept is related to its versatility within this brief. While it can be applied to everyday texts and communicative practices, it can also be used to explore how certain views of the world become established historically (Foucault 1980). Foucault used discourse in this way to ground ‘genealogies’ of sexuality, madness, punishment, knowledge, things and so forth, and the idea of genealogy is drawn upon to guide the background analysis of the ideas that structure biodiversity, ecology and planning in Chapters Four and Five. While not wanting to delve into the philosophical or biographical intricacies of Foucault’s use of genealogical analysis, given the general popularisation and,

sometimes, uncritical use of the term, it is worth briefly expanding upon the meaning and use of the term herein.

Foucault describes genealogical analysis as the historical study of ontology, or existence. He claims that genealogy can be put to three discernible projects: uncovering our perceived relation to truth through which we constitute ourselves as knowing agents; revealing the structures of power through which we act upon others, and showing how ethics pre-suppose humans as moral agents (Dreyfuss and Rabinow 1982). Ethical structures, conceptions of truth and structures of power are obviously, although (as Foucault was at pains to state) not necessarily, interrelated. Although the genealogy of the relations between humans and nature (most pertinently here biodiversity) draws upon all three, the genealogical analysis undertaken in this thesis concentrates upon the structures of power through which humans act upon nature.

The impossibility of language and knowledge being more than an approximation to reality means that discourses are only ever partial fixations of meaning, masquerading as foundational or ‘real’ centres, creating an infinite ‘play of meaning’ around a centre-less structure (Derrida 1974). As a result, numerous discourses can arise concerning the same issue. These can be analysed in relation to one another, in terms of resistance and normalisation processes of the claims-making process itself (who makes them, and what are they based upon) that propagates a specific set of political values (Burr 1995; Eden 1999). The idea that meaning is always centre-less articulates the potential for new meanings to arise that escape the logic of a given discourse (Laclau 1994; Torfing 1999). The study of discourse thus ‘unpacks’ the relationship between meaning and power (Foucault 1977, 1984; Fairclough 1995).

In articulating a number of concerns and revealing implicit value systems, discourse is suited to the study of environmental governance and politics. Thompson and Rayner (1998) describe how scientific framings of global climate change reflect cultural values, while Thomas and Middleton (1994) have shown that the ‘advancing deserts’ of big-science desertification research in the Sahel in the 1980s owed more to Live-Aid style cultural assumptions than to empirical scientific measurement. Examples abound for ecological

issues: from acid rain (Shackley and Wynne 1995) to habitat protection (Hajer 1995), and deforestation (Waterton *et al.* 1995). Harrison and Burgess (1994) have analysed the use of different discourses by developers and conservationists to contest the worth of Rainham Marshes at the local level, while Bridge and McManus (2000) have highlighted the strategic deployment of environmental narratives by national mining and forestry interests in the US. These studies show how the meanings and values of plants, animals and landscapes form an integral part of social and mass-mediatised (Burgess 1990) struggles over environmental issues.

Discourse has been used to reveal diverse models of society and nature implicitly employed by planners to balance ecological issues against other planning imperatives (Whatmore and Boucher 1993; Healey and Shaw 1994), and constructions of nature in the political arena more generally (Grove-White 1993; Hajer 1995; Anderson 1997; Darier 1999). Similarly, the discursive practices of cartography have been explored (Harley 1992). It is precisely because 'the map is not the territory' (Korszybski 1948, p.59 quoted in Crampton 2001, p.239) that the practice of cartography is inherently an exercise of power. Maps appear to be objective by plotting the position of objects in space, but are always a partial representation. A highly discursive process of social production determines what is represented and what is not.

The discourse approach is flexible in terms of how 'closely' and technically sources are analysed, allowing a diversity of topics to be explored, from verbal or visual communicative practices and to histories (Potter and Weatherall 1987). This trans-disciplinary aspect (Martin 1992; Fairclough and Wodak 1997) concentrates on,

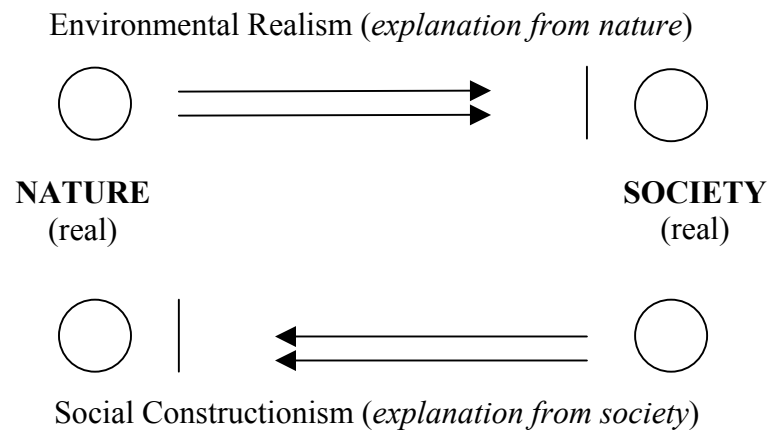
...fine-tuning linguistic discursive and semiotic perspectives to the specialised social and organisational sites of enquiry, and integrating these perspectives with ecological, organisational, theoretical and sociological concerns (Iedema and Wodak 1999, p.6).

Discourse analysis is suited to the multi-dimensional and multi-level aims of this project, as it reveals common assumptions across a variety of disciplines and practices concerning society and nature.

However, taking values as the fundamental unit of analysis raises the spectre of relativism, in which no one value system can be shown to possess a more valid claim to correspondence with reality than any other. This 'descent into discourse' is deferred if analysis is tied to an external politic (Fairclough 1992), as many in geography have done by marrying the discourse analytic to a Marxist sensibility, but external aims are also values susceptible to analysis. Studying value systems replaces the analysis of content for the analysis of form (Szerszynski 1996); or, putting it another way, pseudo-objectivity is sought in the abstract discussion of the form communication between values takes. In failing to engage with content, these meta-evaluation models reproduce the instrumentalisation and formalisation (of values rather than theories) for which it critiques science.

This is an inconsistency that 'has done much to generate an air of irritable suspicion amongst many outside and some within the movement [of constructionism]' (Velody and Williams 1998, p.3). The problem has manifested itself in explanation as a form of determinism, whereby discourses assume a transcendent existence as 'top-down' causal factors, a trend linked by some to a lingering Saussurian structuralism in the Foucauldian articulation of discourse. While constructionists rightly argue that they (and indeed most social scientists) implicitly employ a 'weak constructionism', or 'methodological relativism' (Collins and Yearley 1992), which rejects blunt notions of ontological and epistemological constructionism, it still begs the question of how to ground critical research.

This failure is amplified in studies of the environment where non-human elements (i.e. 'nature') are treated as discursive constructs, often absent from analysis (see Gross and Levitt 1994, for a telling analysis of rain). The failure of social constructionism mirrors that of environmental realism, in that by adhering to a similar dualistic understanding of society and nature they offer symmetrical explanatory frameworks (Figure 2.2). Constructionist explanation analyses society to explain nature, while realist explanation analyses nature to explain society. In deriving one from the other, the dualistic poles of nature and society constrain both positions symmetrically.

Figure 2.2: Symmetry in dualistic models of explanation

Source: Latour 1993, p.95

As sustainable development and modern planning increasingly adopt Habermasian approaches to decision-making, that are chiefly concerned with facilitating communication (Habermas 1993; Healey 1997), such a silencing of the environment runs the danger of becoming counter-productive. Discourse falls short of telling us how the values articulated across biodiversity policy, or a development conflict, actually arise. What role do birds and habitats themselves play in the linkages between scientists and policy-makers, planners and conservationists, developers and economists, dog-walkers and ecologists? What is the relation between the world ‘out there’ and discourse ‘in here’? The next section uses ANT to explore the immanent material basis of the linkages that produce discourse, in order to clarify the concept of material discourse.

2.2.3 Actor Network Theory

Discourse is an abstraction of historical and cultural meaning (Smith 2001) from material micro-scale processes (Haraway 1991), from sites of performance and technologies of the body (Butler 1993), to the inscription of social relations into built form (Sennett 1992). ANT is a powerful tool with which to conceptualise the fine-grain detail of these material linkages, and a number of uses can be gleaned from a discussion of its uses in geography (Whatmore 1999).

ANT grew out of the detailed empirical studies conducted by the Sociology of Scientific Knowledge (SSK) School (Knorr 1981; Latour and Woolgar 1986; Mol and Law 1994), exploring how scientific practices create and propagate new meanings and discoveries. The structuring and creation of meaning is explained by tracing the minute manipulations and transformations of things, from microbes to lab equipment, and from politicians to journals. As a mode of analysis, it rejects rigid categorical divisions, such as nature/culture and subject/object, that structure traditional explanatory accounts of knowledge. In exchange for what Latour calls the 'modernist settlement', ANT replaces these categories with assemblages of 'actors', understood as objects, people, belief systems, machines or whatever, that are tied into relations with one another, or 'networks'. The enrolment of actors, such as institutions, books, practices, animals and so on into networks gives them a social power that is directly related to the durability of these networks through space and time (Latour 1988; 1990; Law and Hassard 1998).

ANT distributes agency throughout a network (for example, it is not airplanes that fly, but airlines). Translation between actors is critical in a relational model such as this, whereby 'translation refers to the processes of negotiation, representation, and displacement which establish relations between actions, entities and places' (Murdoch 1998, p.362). It is the process of establishing circulating references, meanings that are both supported by, and dispersed throughout, a network of humans and non-humans, that gives networks their ability to produce power relations. Echoing ethno-methodology (Law 1994), ANT studies the practices of translation in which work has to be done at every point to maintain the

connections (and hence reference) within a network. Translation occurs continually in all networks, varying from loose arrangements, in which translation is informal, to the highly prescribed processes of translation in institutional settings (Callon and Latour 1992). Such a typology has been mapped in geographical terms as spaces of emergence and prescription (Murdoch 1998), but equally it has been suggested that such a rigid dichotomy is unhelpful (Hetherington 1997).

As a derivative of SSK (Latour 1987; 1999), ANT is suited to the study of the formulation and flow of knowledges and meanings in organisational and institutional contexts. It was employed in geography to re-think the role of economic actors and spaces, underpinning the 'New Economic Geography' (Murdoch 1995; Thrift and Olds 1996), being applied to a range of processes, from knowledge production and spatial models of high-tech industry (Henry and Pinch 2000) and regional development (Legendijk and Cornford 1997), to agricultural geography (Goodman 1999), geopolitics (Davies 2000), and planning processes (Hillier 1999).

ANT has stimulated more philosophical work, coalescing around the development of non-Euclidean understandings of space (Thrift 1996; Murdoch 1998). ANT suggests that space and scale are effects of networks rather than pre-given conditions, and that space is topographical and flexible, rather than Euclidean in character. This is demonstrated famously by the example of a railway line, that simultaneously stretches across the globe, but which is inherently local at each point. A direct parallel is possible with biodiversity, which is simultaneously a global phenomenon, but only ever manifested locally. This aspect of ANT allows scales to be viewed as relative and contingent, but rather than jettison the concept of scale entirely in favour of a topological approach (Latham 2002), this thesis explores how scalar relations between levels are established. The manipulation of scale is a very real source of power in socio-ecological transformation, and this thesis uses material discourse to explore how meaning is articulated through scale.

ANT has been used in environmental studies to show how environmental phenomena are established in the public (Murdoch and Marsden 1995) and professional (Burgess *et al.* 2000) spheres. Perhaps most fruitfully, ANT inspired studies of socio-environmental phenomena

have highlighted the reproduction of contingent nature-culture dualisms, within environmental ethical debates (Whatmore 1997), wildlife sanctuaries (Whatmore 1999), zoos (Davies 1999) and indeed across human and physical geography itself (Massey 1999a). ANT shows how an inherently hybrid reality is organised into seemingly separate categories, through the process of ‘purification’.

However, such insights can be arrived at from a rigorous understanding of discourse, and it is the material aspect of ANT that this section focuses upon. In opening up an explanatory space for non-humans, ANT has the potential to bring the environment back in to sociological analysis, rather than forcing it outside (Demeritt 1994b). Biodiversity conservation is a network of human and non-human actors, sustained by the translation of relations, meanings and knowledge between them. Work seeking to incorporate non-humans is also appearing in radical geography, from the agency of rivers in policy formulation (Eden *et al.* 2000), to the role of animals in shaping time-spaces (Whatmore and Thorne 1998), and their rights in disrupting classic class-based narratives of historical change (Wolch and Emel 1998).

However, decentring agency throughout a network flattens difference (Castree 2002b) in two major ways. Firstly, internal processes become black-boxed, as human actors are conceived of in the same terms as any other actor (which can be anything from an antelope to a paperclip). In removing features like reflexive thought, humans are reduced to matrix elements, with political action underplayed in the network (Berg 1996). The same problem underpins the ambivalence of objects in networks (Joerges 1999; Woolgar and Cooper 1999), and the more practical difficulties of deriving political prescriptions from ANT analyses (Eden *et al.* 2000). Latour has suggested that ANT is,

...simply a way for the social scientists to access sites, a method and not a theory, a way to travel from one spot to the next, from one field site to the next, not an interpretation of what actors actually do (Latour 1998, p.20).

Similarly, O'Neill and Whatmore (2000, p.124) claim that ANT is less an ‘off-the-peg theoretical template’ than a disposition and set of means of doing research. This applied understanding reveals the saliency of ANT as a theory of practice and circulation, an aspect that forms the basis for its reconciliation with discourse.

2.2.4 Reconciliation: Material Discourse

The idea of material discourse is a pragmatic attempt to avoid the purely descriptive accounts of network-based analysis (Eden *et al.* 2000), and the overly structural accounts of discourse (Latour 1991), in order to provide a theory of socio-environmental process that can accommodate action and meaning coherently at a number of levels of analysis. As Lefebvre muses,

...knowledge can be neither defined nor located without an understanding of language and discourse. Contemporary thought has tackled this question upside down. It has made discourse subordinate to knowledge, constituting linguistics (and its dependants, semantics and semiology) as absolute knowledge...Only Nietzsche posed the problem of language correctly, because he set out from real discourse and not from a model, and because from the beginning he linked meanings with values, and knowledge with power (Lefebvre 1976, p.76-77).

The reconciliation offered here is based upon a conception of meaning that refutes a structural, or deterministic, understanding of discourse, in order to avoid the reduction of explanation to either society (constructionist accounts) or nature (realist accounts). As Woolgar (1986) has suggested, much antagonism towards discourse is derived from the confusion of Anglo-American analytic understandings of the concept and Continental usage of the term,

Anglo-Saxon empiricism uses 'discourse' as a label for a narrow set of empirically observable linguistic activities...[Whereas in the continental school]...Reality is constituted in and through discourse...Hence entities such as objects, machines and circumstances can all be treated as texts in that they too manifest a discourse (p.312).

Seen in this light, ANT offers an intriguing method of access to the material relations underpinning discourse. While it is important to avoid a 'mix and match' approach that damages both theory and the purpose to which it is put (DeMan 1986), an exploration of the concepts of text and context (discourse) and circulating reference (ANT), reveals a compatibility between both schemas as relational theories of meaning that merely operate at different levels of theoretical and methodological abstraction.

The relational basis of discursive meaning is derived from Bakhtinian dialogics. Bakhtin argued that because a body inescapably occupies a specific place in time and space (the law of placement), its identity can only be formed in relation to others, as the only categories to perceive oneself as a self are pre-given by the other (Holquist 1990). The self is always partial as it is defined in relation to others that are perceived externally as 'whole'. Because it is impossible not to inhabit a specific space-time, it is impossible not to construct a self. The equation of existence with the activity of making meaning (*ibid*) mirrors the all-encompassing Derridean conceptualisation of 'text'. Replacing identity for discourse, it becomes apparent that discourses are interleaving webs of relations, defined through external reference to other discourses, rather than internal essences (Brown *et al.* 1993). Discourses,

...are systematically related to one another in ways which correspond to the macro-social and political relations among the groups which speak to them (Lemke 1999, p.27).

This thesis interrogates the underlying oppositions between society and nature, urban and rural, brownfield and greenfield, as dialogically defined binaries (Lemke 1990; 1999; Martin 1995). Such a definition 'from outside' makes text and context (of production / consumption / mediation) functionally equivalent. In contrast to Saussurean concepts of fixed or abstract linguistic systems, 'meanings cannot be separated from the actual contexts in which they emerge' (Lahteenmaki 1999, p.77). No line exists between individual thought processes (inner speech) and outer communication with others, as the categories of the self are simultaneously the categories of the other: words and meanings are a 'shared territory' (Voloshinov 1986).

The concept of 'circulating reference', which accounts for how meanings arise and propagate in networks, has much in common with the 'shared territory',

...there is neither correspondence (between language and nature), nor gaps, nor even two distinct ontological domains, but an entirely different phenomena: circulating reference (Latour 1999, p.24).

A circulating reference is a meaning that is both supported by, and dispersed throughout, a network of humans and non-humans, in which work has to be done at every point to maintain the reference. 'Biodiversity' circulates through a wide range of actors, from animals to ecologists to policy-makers to buildings, at each stage dependent upon what are often routine connections being maintained (from scientific surveying to processes of written and verbal dialogue).

For Latour, meaning resides neither 'in here' (society), nor 'out there' (nature), but in a circulating reference, echoing the reduction of text to context through the shared categories of the other. The inclusion of any entity within the term 'actor' mirrors the insistence of discourse upon the all-inclusiveness of 'text'. Within Latour's derivation of 'reference' from the 'internal referent' of semiotics, reference depends not upon an external referent, but on 'the quality of the chain of transformation, the viability of its circulation' (Latour 1999, p.310). Because meaning and actors are determined by a circulating reference, they are never social or natural, but mixtures, or quasi-objects. This reconciliation buttresses neo-Kantian tendencies tempting discourse towards constructionism by rooting meaning to material processes.

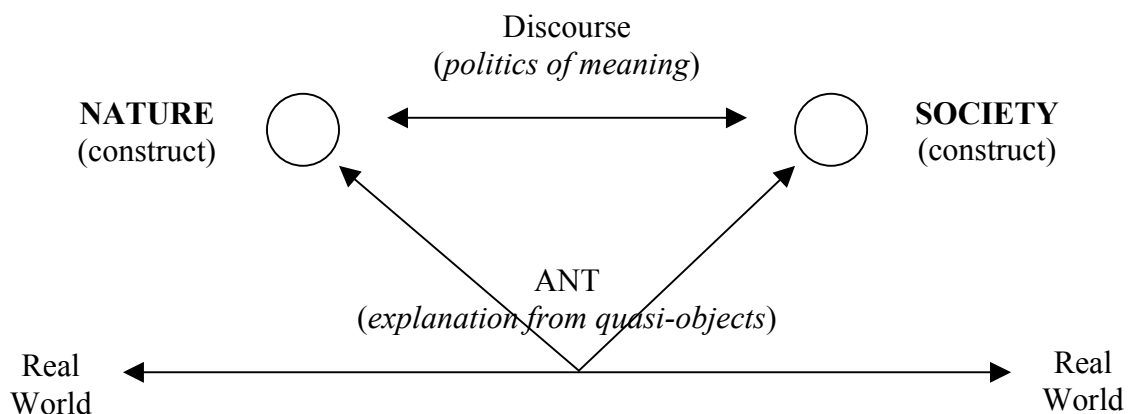
Circulating reference on this reading is conceptually congruous with the shared territory of Bakhtin, and the intertextuality of continental discourse. While critics may claim that the neo-Kantian basis of discourse is irresolvable, Bakhtin gives a way out, emphasising not the unknowability of reality, but the multiple (or dialogic) nature of reality (Holquist 1990; Shotter and Billig 1998). This again strikes a chord with Latour, who argues for relative existence, based upon the 'emergence of networks' in opposition to an 'always-everywhere' / 'never-nowhere' dichotomy of existence.

The ontology of ANT provides a brief but necessary caveat to this synthesis. As part of his rejection of the modernist settlement, Latour argues that network transformations are not epistemological, but ontological. Thus, when 'hybrids' (Haraway 1991) are described as 'simultaneously real, like nature, narrated, like discourse, and collective, like society' (Latour 1993, p.6), or space is described in non-Euclidean terms (Massey 1999b) as an 'effect' of networks, it is the nature of their actual existence that is being described (although how many

uses of ANT in geography actually make this ontological aspect of ANT ‘count’ is another matter). The complexities of this argument are considerable (Latour 1999), and it is precisely because the philosophical problems of claiming identity between epistemology and ontology are discounted that the version of ANT offered here is methodological.

The circulating reference refutes the separation of things and processes into the categories of social or natural, as meaning is based upon the mixing of actors. Latour echoes the work of environmental historians, emphasising that nature is never ‘pure’, but always a mixture of the social and the natural. The baseline of Figure 2.3 represents this real world situation, in which entities are quasi-objects residing in socio-natural networks, as opposed to separate social and natural domains. Human practices and traditions abstract from the baseline of reality to construct the separate domains of nature and society, into which ‘things’ are then separated. Discourse analysis reveals how this separation, or in Latourian terms, purification, is achieved, and what the resultant social and political effects of this separation are. Figure 2.3 thus shows discourse as a theoretically consistent abstraction from the processes of actor-networks, rather than a qualitatively incompatible mode of understanding.

Figure 2.3: A model of material discourse



Source: Latour 1993, p.95

As non-dualistic relational understandings of the world, discourse ‘abstracts’, while ANT grounds in material process:

...networks are not just constructed *around* power relations, they are practiced (in a Foucauldian sense) in and through them....translation can be seen as the process through which pre-existing discourses of change are contested and new discourses constructed (O’Neill and Whatmore 2000, p.125, emphasis original).

ANT is used as an epistemological tool to explore how things are made to matter practically, while discourse is interpreted as a conceptual abstraction from these concrete network processes. Discourse reveals the nature-society relations that inhere in practices, traditions and disciplines, while ANT grounds them in an understanding of material context. This is necessary to facilitate coherent analysis at a number of levels. Methodologically, discourse can be used to explore a greater amount of material, while ANT can be used as a tool of access to ground this understanding in an empirical investigation of the material processes of translation.

This reconciliation allows discourses such as the implicit relations between society and nature to be coherently traced across levels, from global discourses of biodiversity to locally embedded practices of ecologists, in a theoretically consistent manner. The construction of binary geographies around the nature - society dualism structures urban environmental transformation, and the material discourse approach is able to show how these circulating references are underpinned by myriad material practices of purification. We have arrived at a point where it is necessary to see what conception of the environment material discourse furnishes. The next section uses this understanding to consider the range of practices and ideas that underpin ecological governance.

2.3 Ecological Governance

2.3.1 *Science and Policy*

Urban areas are highly regulated environments in terms of both degree and coverage. The conservation of biodiversity in the urban context is largely dependent upon the integration of ecology into the planning system, from the determination of planning proposals on ecologically sensitive sites, to the formulation, implementation and enforcement of environmental policies. This section provides a framework within which to consider the multifarious modes and practices by which nature is represented and articulated through this system, conceptualised as ‘ecological governance’. Ecological governance is an inclusive term that focuses analysis upon the interface of ecology and politics, encompassing a wide range of activities, from national and local policy-making to local ecological surveying.

Ecological governance represents the networks and discourses through which power is circulated, and reproduced, contested and transformed. The term governance intentionally hints at regulationist understandings of political systems for two reasons: firstly, to reflect the shift from direct ‘government’ to indirect ‘governance’ (of which LBAP initiatives are a part); and secondly, to highlight how these practices are part of dominant and contested scales of regulation (Towers 2000). Science and policy perform crucial roles within the complex of ecological governance, and the following discussion problematises the two categories in order to ground a sociological approach to their relationship.

Critical social theory has sought to re-establish the complex relationship between policy and science (Shackley and Wynne 1995). In opposition to classic linear models of science ‘driving’ policy (and more recently policy ‘driving’ science), discourse tells us that all knowledges and practices, including those of science, are political. Indeed, Ezrahi (1990) has argued that the modern state requires the instrumental use of science and scientific communities to secure governmental authority, and that the two spheres are intimately bound together (this historical element must wait for consideration here until Chapter Four, which explores the origins of ecological science within the modern nation state apparatus). The epistemological blurring of science and policy is nourished by the material mixing of actors

within networks that sustain, and literally embody, ‘biodiversity conservation’, through the establishment of circulating references. The domains of policy and science are implicated in the same network practices, meanings, performances, and actors. Separating the domains of policy and science must be recognised as an abstraction, which, in ignoring the myriad processes of translation across networks, serves to simplify, but also to obfuscate. Meaning exists only in terms of its circulation throughout a network, emerging simultaneously at all points in the network,

It’s not a question of ‘someone’ or ‘something’ producing an effect of transformation or articulation, as if its identity was somehow previous to this effect...the production of an effect constructs the identity of the agent generating it (Laclau 1990, p.210-211, quoted in Torfing 1999, p.151).

Given these complexities, it has been suggested that more sensitive studies of the relations between environmental policy and science are required (Select Committee on Environment, Transport and Regional Affairs 1999; Lekakis 2000).

It is important to avoid reifying ‘Science’ as a monolithic structure (Gibson-Graham 1996). Equally, it is important not to simply slot ‘science’ into an analytical framework as ‘just another discourse’. Rather, it is necessary to recognise the aspects of science that distinguish it from other practices. SSK practitioners have shown that it is the reciprocity between the social context of science and the activities of non-human actors in experimental practices that allow new actors to ‘appear’, and argue that it is this that distinguishes science from other practices (Haraway 1991; Latour and Woolgar 1996). Science brings us into new relations with the world by allowing new entities to emerge and ‘act’ in the highly staged context of experimental practice (Latour 1999).

Science is thus a highly distinctive but widely adopted set of practices and beliefs that creates new actors, such as molecules, microbes or global warming, through new network associations. Although the practices of scientists, planners and surveyors are not studied here in the detail of SSK studies, it is important to clarify that this understanding is being subscribed to. The articulation of science as a material practice resists collapsing into constructionism, grounding environmental policies within an understanding of material scientific legitimacy (Jasanoff 1996). As a network performance, it also shows how science

never merely ‘reflects’ reality, but is to a degree staged and contingent: an important source of uncertainty in the policy and media domains (Hinchliffe 2001).

Like science, policy formulation and dissemination is a continual process of translation, but differs in that it concentrates upon consistent reproduction between levels and across other areas of concern. If networks of ecological governance represent meaning translation systems, then the more efficient enrolment of non-humans (such as contaminants) occurs at the places usually designated ‘science’, and the more efficient enrolment of humans occupies the places designated ‘policy’.

A key aspect of the way in which policy and science mutually order the world is categorisation (Jasanoff and Wynne 1998). Categorisation greatly affects future action (Bowker and Star 1999), and common orderings of nature across science and policy (for example, through ecological categorisations) are vital to informing decision-making processes, such as planning decisions. Equally so, differing categorisations between science and policy domains will lead to incompatibility, and very little effectual interchange of legitimacy. An important area of categorisation is the map. Maps enable decisions to be based upon ‘multiple, contingent and exploratory perspectives of data’ (Crampton 2001, p.235), by compressing extensive time-spaces at certain places so that,

...that which is large in the Euclidean sense, spread out over time and space, gets reduced. To a report. To a map...Everything- or representatives of everything- are being brought to one place. All at one time. That which was big is thereby being rendered small. And, as it is rendered small, it generates the capacity to see far. For the privileged centre. And, crucially, it also generates a capacity to see what would not otherwise have been visible (Law and Hetherington 1999, p.7-8).

For example, when planning and designing urban space, scientific representations of multiple natural elements are mapped in order to show areas of greater and lesser value, and provide the basis for policy decisions. This power of cartography has been well established by post-colonial geographers, who have explored the importance of maps and cartographical practices in establishing imperial and ideological dominance over places and people (Gregory 1994). As Chapter Eight shows, maps provide a key arena in which ecological and political models of the world are brought together and manipulated.

Categorisation, whether through maps or ecological typologies, represents a vital point of confluence between the apparently separate domains of science and policy. The discursive power of categorisation, maps and map-making in mediating between planning policy and ecological science in the exo-somatic production (Harley 1988; Iedema and Wodak 1999) of urban space, is a key conduit through which political ecological knowledge becomes spatialised.

2.3.2 Locales and Organisations

The communicative turn in planning has prompted more inclusive participatory decision-making processes, which aim to facilitate contestation and diverse knowledges (Healey 1997). For example the LBAP process involves formulation by local actors in a local setting, while planning processes, such as development control, increasingly incorporate (and sometimes comes into conflict with) locally situated knowledges and interests. Individuals, companies, local authorities, newspapers and Non-Governmental Organisations (NGO) can interject with their own knowledges of a space, which range from the situated knowledges of local populations to the disputation of ecological practice and judgements by conservation NGOs and their ecologists.

The ascendancy of the local within post-modern geography reflects these trends in governance, with local cultural politics (Soja and Hooper 1993), local institutions (Soja, 1989; Bryson *et al.* 1999), and local (or lay) ecological knowledges (Haraway 1991; Wynne 1996) being seen as highly relevant to environmental issues. National and international environmental policy is enacted through these geographically unique social formations and arrangements, often the result of highly specific histories, and locales represent a loose form of institutional capacity that exerts path dependency (Grabher and Stark 1997) over the processes of ecological governance.

The concept of the locale offers a useful tool with which to understand the sociological and

geographical context in which these processes are played out. Derived from structuration theory, locales show how social networks reproduce themselves, without reducing power either to over-bearing social structures, or individual agency (Giddens 1981). Locales are social groupings within which the day-to-day work of individuals reproduces the particular meanings of the social grouping itself, within the context of that system (Moos and Dear 1986). The locale conceptualises the path dependent social reproduction of individuals in a time and place specific network that operates to constrain and enable different activities and knowledges. It resonates with attempts,

...to rethink space as integrally space-time and to conceptualise space-time as relative (defined in terms of the entities 'within' it), relational (as constituted through the operation of social relations, through which the 'entities' are also constituted) and integral to the constitution of the entities themselves (the entities are local time-spaces) (Massey 1999a, p 262).

In providing a non-structuralist account of power in social networks it echoes ANT, although, importantly, is not identical to it. The structure-agency debate addressed by structuration theory only resembles the realism-constructionism debate informed by the ANT-discourse resolution in terms of its dualistic character, and its proposed non-reductionistic solution. It is used here as a conceptual stepping-stone between the abstract understanding of discourse and ANT, and the practical analysis of the social networks of ecological governance. The concept of the locale must not be conflated with the local level, or with the assumption that the local level is inherently more legitimate or democratic (Myers 2002).

Organisations represent a specific form of locale, in which the creation and maintenance of meaning is formalised, and constantly recreated as actors change and move within and between organisations (Boden 1994). Understanding how organisations are bound together to sustain meaning is important to the sociology of environmental knowledge, and the study of how these organisations function and interact has received much attention (Davidoff 1965; Drew and Heritage 1992). A key question to ask of organisations is 'how "objectivity" is construed, achieved and contested, how its transmission is ensured or prevented, and what the consequences of this are for interaction' (Iedema and Wodak 1999 p.13-14).

Following the arguments above, objectivity arises through a variety of network connections being made between actors, from policy documents and mission-statements, to technology and built form (*ibid*; Latour 1992). The institutionalisation of biodiversity is well exemplified by the former Institute of Terrestrial Ecology (now the Centre for Ecology and Hydrology (CEH)), which translates organisms through surveying practices, and objectifies them in an electronic national database of species, housing them and their human backup in a built complex. These data are then used to assess species status, and inform further surveying. The translation of vast amounts of survey data, obtained through ecological procedures designed to facilitate the emergence of a range of species and habitats, into a particular material form in this particular respected scientific establishment creates a circulating reference that underpins biodiversity conservation in the U.K.

Organisations must continuously control internal and external dialogue so as to reproduce its meanings (Gunnarsson *et al.* 1997), and maintain the boundaries of the organisation. This type of formality,

...is a limiting or closing off of possibilities with regard towhat is said and done, how it is said and done, who says it or does it, and the choices members have regarding their (mode of) attention and attendance. In short, formality is about interactive closure (Iedema 1999, p.50).

The organisation (its employees, literature, buildings and so forth) literally is the material practices that facilitate the increasing codification of translations within the network, to give them consistency in the form of circulating references. The social power of actors within an organisation is essential to achieving interactive closure,

By translating interests efficiently and effectively, actors are able to appeal to other actors, to enrol them, to mobilise them, and to align and fix interest relationships in order to stabilise organisational configurations (Lagendijk and Cornford 2000, p.211).

This approach is particularly useful for interrogating specific instances of policy formulation, revealing the influential role a few individuals can play within an organisation in establishing new knowledges (Callon 1991; Clegg 1997), and showing at a practical level how certain groups are more implicated in circuits of power.

Similar processes relate organisations to one another. For example, texts concerning biodiversity conservation function due to the codified intertextuality between organisations, a codification that represents a circulating reference. Classification is a fundamental codification of meaning, which is critical to co-constitution of scientific and political representations of the world (Running *et al.* 1994). The establishment of certain classifications through surveying procedures and policy frameworks in the sphere of ecological planning has major political consequences within and across organisations (Bowker and Starr 1999). The organisation and the locale represent key tools with which to interrogate the mediation and contestation of established knowledges and practices that the institutionalisation of new environmental governance initiatives, such as the CBD, has prompted (Eder 1996b).

The Foucauldian concept of genealogy recognises that discourses have a material history (Foucault 1984), and that the institutionalisation of these accreted histories exerts a major influence over the contemporary world (Foucault 1977). In the case of biodiversity conservation in the U.K., many codifications have been inherited from early conservation movements, and the superimposition of the global discourse of biodiversity conservation upon these national nature conservation organisations has caused some degree of epistemic divergence (Jamison *et al.* 1990). The accretion of these processes over time into built forms, cultural consciousness, policy legacy, statutory laws and so forth gives rise to powerful discourses, which structure contemporary urban planning and conservation debates. Chapters Four and Five address these processes within the context of this study.

Applying the argument of this section that policy and science arise in highly social situations that are infused with power, the focus of a refined study of ecological governance shifts to the socially embedded and political processes by which certain positions become established over others. Given the context-driven understanding that material discourse and locales imply, decisions become a function of the network, and emphasis shifts to the enrolment of actors. An understanding of biodiversity as material discourse, and ecological governance as a sociological terrain, grounds the multi-scalar approach of the thesis.

Further, it indicates how political ecology can articulate a critical geography of biodiversity in the city. With this in mind, the next section considers the relationship between 'political' and 'ecology', and that between 'nature' and the 'city'.

2.4 Urban Political Ecology and Scale

2.4.1 The Matter of Nature (and the City)

Possibly excepting studies of 'place' that intermittently emanate from North America (Tuan, 1974; Relph 1976), environmental and natural aspects of urbanisation went largely unrecognised by human geographers until recently. Fitzsimmons (1989) attributed this in part to the urban bias of continental social theory that informed the majority of qualitative research conducted on the city, and an implicit cultural dissociation of nature from the city. Up until the 1990s, environmental studies and ecology displayed an equal but opposite tendency in their studied neglect of city environments. Fewer than 6% of the last 217 papers published in the leading journal *Conservation Biology* included work conducted in urban, suburban or exurban areas (Miller and Hobbs 2002).

Williams (1973) situates an urban/rural divide in the very fabric of British national culture, as the spatialisation of the ideological dualism between society and nature, which gives rise to a nature-city antithesis, manifested through psychosocial imaginaries of immoral/impure cities and moral/pure nature (Nicholson-Lord 1987). This dualism exerts a structuring influence across the fields of ecology (Worster 1977) and urban studies (Bennett 1997), to the degree that a subject such as urban ecology 'reads more like an oxymoron than an authentic theoretical subject' (Kipfer 1996, p.5). The basis of this schism is explored in Chapters Four and Five, but is intended to be indicative here of the academic barriers to considering urban nature.

The environmental historian Hays (1998) argues that the city is an ideal conceptual vehicle to examine environmental issues, because it is the focal point of human congestion and the source of new ideas, values and organisations to cope with these issues. With the emergence

of sustainable development as a major political philosophy, funding priorities have begun to recognise the need to study the urban environment (DoE 1994a; 1994b). Urbanisation is the condition under which an increasing majority of western populations live (Swyngedouw and Kaika 1999); nowhere else are social, economic and environmental factors so closely entwined.

In response to these prompts, a limited number of ecological and environmental projects are generating specifically urban models and theories (Barker, 2000; URGENT, 2001a). Similarly, Marxist (Jahn 1996; Bennett and Teague 1999; Massey *et al.* 1999; Swyngedouw and Kaika 1999), and regulationist theorists (Tickell and Peck 1992; Bridge 1998; Keil 1998) are building environmental and ecological concerns into their work on cities. A radical stream of work has recently emerged in human geography, using ANT to explore urban geographies of wildlife (Wolch *et al.* 1995; Hinchliffe 1999). However, these bodies of work have generally avoided conceptualising the urban arena as one of many levels at which socio-environmental phenomena operate.

Literatures that are more specific give only partial consideration to the tensions of urban nature. Debates concerning urban green-space form part of the tradition of town-planning theory (Howard 1902; Hardey 1991), but the concrete processes through which these spaces are planned for and struggled over have received little attention, with studies being largely confined either to historical traditions or local protests (Nicholson-Lord 1987). Similarly, literatures dealing with brownfield sites have been narrowly concerned with specific policy related issues and practical problems (Cameron *et al.* 1988; Alker *et al.* 2000). Work upon urban environments as sites of intersection between ecology and people exists in disciplines such as landscape and planning studies (Collinge 1996; Healey 1997), but comprise a limited theoretical dimension and rarely consider multi-level processes.

In straddling carefully policed dichotomies between urban and rural, social and natural, the topic of urban nature risks falling victim to these powerful binaries:

...although new concepts like sustainability have become fashionable, the deep anti-urban sentiment combined with an idealised and romanticised

invocation of a 'superior' natural order has rarely been so loud (Swyngedouw and Kaika 1999, p.570).

Chapters Four and Five explore the historical and conceptual basis of these binaries, in order to contextualise the challenges associated with both the content and approach of this thesis. The conceptual dualism between social and natural understandings of the world spawns the cultural segregation of the world into material binaries, between for example urban and rural. The theoretical component of this thesis can thus be viewed as complementary and continuous with the genealogical and empirical content. While material discourse indicates the contingent character of the society-nature dualism, political ecology adds a critical edge that brings the ensuing binaries between urban and rural, nature and city and so forth into analysis.

2.4.2 Political Ecology

The impetus to politicise ecology came from large-scale failures to understand and control environments in the Third World (Pimm 1991; Escobar 1995), and the increasing influence of non-deterministic theories in ecology (Gleick 1988; Botkin 1990). In simple terms, the *raison-d'être* of political ecology is to reinstate people in ecology (Stott 1998), in order to improve the ecological management of human inhabited environments (Peet and Watts 1996; Zimmerer 2000a):

It is a field concerned with the relationship between the *oikos*, the ecological household or community, and the *polis*, the human community...It is about the *logos* of that relationship, its underlying meaning, structure, dynamics, rationality and our understanding of that relationship in the most critically incisive, empirically grounded and rationally coherent way possible (Clark 2001, p.29).

The perceived need to re-conceptualise society's relation to nature has stimulated the propagation of political ecology from its roots as a developmental critique (Peet and Watts 1996) into geography (Zimmerer 1994). The emphasis of political ecology upon natural resources reflects the analysis of material conditions that forms the basis of Marxian political economy (Swyngedouw 1999). Indeed, by seeking to transcend the placelessness of

ecological science and the localism of cultural ecology (Brown and Purcell 2002), political ecology aims to engage with the wider processes of political economy (Escobar 1995; Filer 1997), leading Lipietz (2000) to posit political ecology as the 'Heir to Marxism'.

In its radical form, political ecology explores how capitalist logics of resource use underpin ecological knowledges, disembedding nature from its cultural context (Escobar 1998). Such an analysis has the power to ground interventions across a range of debates concerning sustainability, ecological justice, planning and conservation. However, it is important that the similarities to Marxist analysis do not edge the 'ecology' out of political ecology (Zimmerer 2000b), and that it remains conceptually distinct from political economy. Similarly, it is important that the adoption of vocabulary and concepts derived from biogeography or ecology does not preclude the critical potency of political ecology. While the achievement of this balance is a task that is undertaken throughout the thesis, it is worth qualifying the spirit of political ecology further at the outset.

Speaking over five years ago, McGuire states the project of political ecology simply as needing to conceptualise,

...scale and context in the social and the physical...to link the 'horizontal' analysis of ecosystem behaviour- shorn of its systematic assumptions- to the 'vertical' analysis of capital, class and power (1996, p.4-5).

An implicit dualism resides in the term 'political' 'ecology' (amply demonstrated in Clark's definition above), and in resisting abstract theoretical positions, political ecologists have been criticised for remaining overly realist (Hinchliffe pers. comm.). These drawbacks are offset in two ways. Firstly, by the provision of a theoretical framework that addresses these problems (material discourse and ecological governance), to support the critical analysis of political ecology, and secondly by the powerful and possibly unique commitment to pragmatic engagement with scientific theory and practice that political ecology offers. Such an engagement allows direct analysis of the ecological models and practices, such as surveying and mapping, which underpin ecological governance. Analysis at this level is undertaken using a post-structuralist reading of ecology as, 'the articulation of knowledge and power, of statements and visibilities, of the visible and the expressible' (Escobar 1996, p.46).

It is this representational sensibility that is drawn upon to ground a critical urban political ecology that is concerned with the,

...intersection of urban political economy and ecology, i.e. with the ways in which different forms of urban governance produce qualitatively different relations between ...humans and their city environments (Huston 1997, p.132).

This quote reveals the potential of urban political ecology to bring ecology into direct analytic relation with economic and social aspects of governance, not only revealing conceptual continuities across networks of urban ecological governance (in their widest sense), but also showing how different complexes of ecological governance give rise to very different urban realities. By explicating the formulation and use of ecological knowledges in governance, urban political ecology is simultaneously a political ecology of the state, revealing how scientific knowledge is formulated within and legitimises structures of governance. These dynamics are critical to the success of initiatives such as biodiversity action plans. However, the transplant of political ecology from third world rural to first world urban contexts is at present only an embryonic project, and the next section develops the concept of scale to refine a political ecology of urban ecological governance.

2.4.3 The Politics of Scale

The interweaving of international environmental narratives, local networks, planning practices and ecological science in the complex of urban ecological governance places issues of scale at the centre of urban political ecology. Scalar struggles have been posited by urban and economic geographers in various guises before, from Lefebvre's conception of scale as the 'spatial units' of capitalism (Brenner 2000) to Massey's (1999b) 'power geometries'. Recent work in political ecology (Schroeder 1999; Myers 2002) has used the concept of scale to interrogate how certain representations and material transformations of the world are established over others (Swyngedouw 2000), and how local processes and outcomes are embedded in social processes operating at far larger scales (HersHKovitz 1993; Swyngedouw

1997b). For example, local processes of ecological governance occur within the context of economic property cycles (Bryson 1997), which are driven at wider national and global scales. The dynamics of property development cycles leave their imprint upon ecological resources of the city- in the face of large development pressures ecological and socially valuable sites will be lost, while relatively unimportant sites will remain where little development pressure exists.

The interpretation of urban political ecology given here draws upon three aspects of what can now be reasonably described as the 'scale' debate, emanating primarily from urban theorists and economic geographers (Jessop 2000; Smith 2000; Brenner 2001). This literature is used firstly to understand how physical and political systems co-constitute scalar hierarchies that transform urban nature, secondly to understand how different scalar hierarchies give rise to very different geographies, and thirdly to refine the sociological understanding of networks of ecological governance, by replacing the local with a situated politics of actors.

Scale is an outcome of social processes, and the struggle to command spatial scales of social processes is crucial to socio-ecological politics (Swyngedouw 2002). The critical insight offered by the scale literature is that scales are not pre-given, from the home to the nation (Marston 2000), but constructed and reproduced continually through daily practices, that establish them over other potential scales. The politics of action and representation are always scalar, prioritising certain scales over others, and shifts in power result in a concomitant reshuffling of scales. It is worth being vigilant in order to clarify this point,

...our theoretical grasp of geographical scale could be significantly advanced if scaling processes are distinguished more precisely from other major dimensions of sociospatial structuration under capitalism (Brenner 2001, p.593).

He suggests that slippage has occurred between geographical scale and other concepts such as place, territory and space, and that to prevent scale becoming a materially empty term a more rigorous politics of scale is needed that applies only to the relative struggles between scales. With this in mind, it becomes possible to outline what an urban political ecology of scale may look like, and how it can be used to conceptualise the diverse practices and discourses associated with urban ecological governance.

Because political and ecological practices and discourses operate within certain spatio-temporal scales, diverse activities such as ecological surveying and national urban regeneration policy can be reconciled within a scalar analytic framework. To reproduce a popular quote,

...the question of scale inserts itself at the outset- at the foundation, as it were- of the analysis of texts and the interpretation of events. The results depend on the scale chosen as primary or essential (Lefebvre 1976, cited in Brenner 1997, p.137 and Swyngedouw 2000, p.68)

Scale thus links political ecology to the political economy of urban capitalist processes, and the associated dynamic transformation of space. Scale underpins the representational dynamics of political ecology. In determining what becomes visible, and what remains invisible (Escobar 1996), scale articulates knowledge and power, constraining the types of decisions that can be made (Treweek 1999). As Swyngedouw and Kaika (1999) state,

...the process of separating things natural from things social...permits a discursive reading of what nature is *to serve specific social ends*, while ignoring the inevitable mediations between nature and society (p.574, emphasis added).

Scale is crucial to the separation of natural and social things that forms the basis of the politics of ecology. Scale underpins broader discourses, such as the urban / rural dichotomy, revealing how activities at different levels are related to one another. However, as Purcell and Brown (2002) point out, scale is itself socially constructed, and is used and contested politically. Because the disparate practices of ecological governance operate at a number of levels, competing scales of representation emerge, attached to different world-views. Within this representational sensibility, scalar hierarchies facilitate discursive coherence between levels. The term level is employed for want of a better word to express the relatively static and discrete dominant stratified organisation of reality. This opens up a politics of scale in the Brennerian sense in which scales are continually being fixed and re-fixed in relation to one another (Collinge 1999):

The meaning, function, history and dynamics of any one geographical scale can only be grasped relationally, in terms of its upwards, downwards and sideways links to other geographical scales (Brenner 2001, p 606).

This is an important step towards the over-arching aim of the thesis to articulate biodiversity conservation as a nested phenomenon, from global to local levels. Such a politics is versatile enough to explore how social struggles are positioned within the scalar politics of urban ecological governance (Smith 1992), and inform debates concerning the success of certain environmental policies and ecological models (such as those associated with sustainable development) over others. Contradicting recent criticisms of the scale concept, rather than giving rise to a dualistic understanding of global and local processes, in which one or the other is privileged (Cox 2002), a relational scalar understanding reveals how practice and ideology are connected and coherently reproduced at different levels. Place-specific processes can be articulated as the space-time dimension of embedded social processes (Massey 1999b). Rather than flatten rich historical legacies and patently different material realities into a topological ANT analysis, a relational scalar approach uncovers the co-constitution of the material and discursive realms. In opposition to the intentionally dry meaning of ‘level’, scale is an unavoidably critical and discursively charged term. Indeed, this thesis develops its axiomatic and material dimensions through the interrogation of multi-scalar socio-ecological transformation.

Finally, an understanding of nested scalar hierarchies refines the sociological understanding of networks of ecological governance. Within a hierarchical scalar framework, so-called ‘local actors’ are rarely just local actors, but function at a number of scales (Jepson 2002), and are thus situated (in Donna Haraway’s sense of the word) as a node within multiple scaled networks. Brennerian scale tempers the theoretical and political bias towards local action described above with the insight that no level is in itself any more democratic or responsive than another (Bebbington 1995). A scalar political ecology brings all levels of ecological governance into analysis (Brown and Purcell 2002).

Because this thesis deals with physical science representations of the world, a final point demanding consideration concerning scale is its conflicting status as a social construct and a physical reality. To avoid repeating the post-realist environmental debate with which this

discussion began, the reconciliation offered here is practical rather than philosophical. Human geography understandings of scale treat it as a construct, network effect or abstraction, while physical geography treats it as a methodological variable (Phillips 1999), with debate revolving around the choice of scale at which to study a phenomenon (Gregory *et al.* 2002). In physical geography, its methodological import is derived from the ontological argument that ‘there is an ‘incommensurable irreducibility’ to nature when viewed and described at different levels’ (Bauer, Veblen and Winkler 1999, p.3).

In other words, real processes operating at different scales are seen as independent of each other (Phillips 1999), in contrast to social notions of structuration that see scales as nested hierarchies which co-constitute one another. Social understandings view scale as an effect of social process, and hence a reflexive construction, while physical understandings of scale view it as a pre-given reality. The approach of urban political ecology advanced here explicitly analyses ecological articulations and socio-political systems together, in order to explore the transformative dimensions of ecological governance. A methodological reading of scale forms the basis for the investigation of ecological science in this thesis, thus side-stepping the conflicting ontological implications of physical scales.

However, the problem of integrating physical and social scalar approaches raises interesting questions concerning attempts to build more sustainable forms of ecological governance. Concepts such as ‘panarchies’, which articulate the idea of matching political scales of management to ecological scales to allow adaptive environmental management (Mason 2001), are not used in this thesis. Although it is hard to disagree that ecological scales, such as watersheds, have a different basis to political scales, recent work has explored their mutual constitution (Swyngedouw 1999), emphasising notions of ‘process, evolution, dynamism and socio-political contestation’ (Brenner 2001, p.592) in recent geographical articulations of scale. It is this spirit of scale that is drawn upon to develop an integrative analysis.

2.5 Conclusions

The major aim of this thesis was identified as the development of a multi-scalar political ecology, capable of articulating the relations between physical and social understandings of the world at a variety of levels, from abstract global environmental discourse to situated local practices. The approach put forward has addressed this aim by progressing from a philosophy of socio-environmental process, to an object of study, and finally to a critical analytic framework.

Discourse and ANT have been developed to articulate social processes at differing levels of abstraction, and are deployed to explore different things. Discourse is used to analyse processes in which meaning is relatively fixed, such as national policy documents, while ANT is used to explore processes in which meaning is being constructed or actively mediated, such as the formulation of the LBAP. As such, the reconciliation offered in this chapter is a justification for using discourse and ANT within the same thesis, rather than a foundation upon which to attempt to use them simultaneously. It allows the coherent analysis of the phenomenon of biodiversity at a number of levels. In order to study a relatively unfamiliar intersection of politics and ecology, ecological governance was presented as the object of study, and a specific suite of sociological and geographical ideas were introduced. Finally, a scalar urban political ecology was developed to inform the critical analysis of the study.

By structuring the theoretical understanding in this way, society-nature relations, approach and scale have been established as integrative themes that flow through the subsequent discussion of the thesis. Chapter Three translates this multi-scalar approach into a research methodology, and describes the resultant research process itself.

Chapter 3 Method

3.1 Introduction

As with theoretical approach, environmental studies in geography employ a diversity of methodological approaches (Macnaghten and Urry 1998), and, in an interdisciplinary field, the formulation of research design and methodology demands attention (Petrie 1986). Particularly, this section addresses the challenges of overcoming the institutional and conceptual separation between the concerns of urban planning and biodiversity conservation, and collecting and integrating material from a variety of sources.

The idea of material discourse outlined in Chapter Two provided the foundation for a methodological approach that operated at a number of levels. ANT was used to articulate material representations of the world, while discourse was employed to explore the political effects of these representations. ANT was deployed as a method for access rather than a theory in its own right (Latour 1998), situating documents and policies within networks made up of people, institutions and things (Callon 1986). Enquiry traced discourses across these networks, with emphasis being placed upon the points of intersection between concerns (a form of dimensional sampling).

Flexibility was required to capture the various combinations of texts, people, institutions and things at different levels. An eclectic methodology was adopted to make these varied points of intersection amenable to a common analysis (Yin 1989), and allow the triangulation of key findings and results (Lincoln and Guba 1985). Documentary and interview techniques of investigation were supplemented at various points using complementary methods (Robson 1993) such as group meetings, the long interview, participant observation, and photography.

The research design was implemented over the course of about fifteen months, and although areas of research were known in advance, the exact actors, institutions and case studies this would entail researching were not. Hence, an exploratory phase was built into the research design, with numerous avenues of enquiry being probed through snowball sampling.

Accordingly, a suite of exploratory techniques were also used, including e-mail, telephone interviewing, formal letter writing, and the use of academic and non-academic contacts. These techniques gave the flexibility to trace emergent themes (Glaser and Strauss 1967) across networks of actors, and in terms of the research design lent a certain air of unpredictability to its implementation that could not be planned for in advance.

Building upon the concept of ecological governance, Section 3.2 describes how key topics were identified for investigation and incorporated into a research design and methodology. Research was split into two components, background (genealogy / policy), and case studies. These components are outlined in relation to methodology (sampling regime), operationalisation (including barriers to the research process) and output. Problems of response rates, terminology, and positionality are addressed in relation to the research methodology. Section 3.3 describes the process of organising and analysing data that was used to translate the theoretical approach of Chapter Two into concrete actions (Rose 1982), and considers issues of reflexivity between the study and its content. The concluding section assesses the merits and drawbacks of the research design with reference to achieving the overall aims of the study, the efficacy of the methods used, and the ways in which the study could be extended.

Table 3.1 lists the techniques used during the research period, describing their defining features and function, and should be referred to when required as each element of the methodology is discussed. Appendix 1 lists the research interviews in the temporal order in which they were conducted, and can be referred to for details of interviewees, and interview procedure as the research process is described.

Table 3.1: Research techniques

<i>Technique</i>	<i>Description</i>	<i>Use</i>
Unstructured interview	Variable length, wide-ranging discussion.	Garner opinions, less formal situations.
Structured interview	10-30 minutes, specific questions.	Provide comparable data.
Semi-structured interview	30- 90 minutes, combines unstructured and structured.	Combines unstructured and structured.
Long interview	90-240 minutes, interviewee narrative.	Obtain biographical or historical details.
Group interview	30-90 mins, more than one interviewee.	Allows development of opinion and debate amongst group.
Observation	Passive, unannounced.	Gives information about real-world practices without researcher prompts.
Photography	Visual illustration.	Track changes over time. Explore politics of representation.
Archival	Library / records – based research.	Access unpublished documents.
Electronic	Internet searches, email contacts.	Quick way to garner background information and documents.
Phone	Exploratory interviews < 20 minutes.	Access respondents quickly for preliminary interview / supplementary information.

Source: Brenner *et al.* 1985; Cassel and Symon 1994; Robson 1993; McCracken 1995; Gillham 2000

3.2 Research Design

3.2.1 Genealogy and Policy

The theoretical approach outlined in Chapter Two emphasised that current attempts to integrate environmental priorities with wider concerns do not occur on a blank sheet of paper. Although their juxtaposition in the concept of sustainability may be recent, they are unfolding upon a tapestry of pre-existing ideas, institutions and practices. To contextualise this process, the Foucauldian understanding of discourse outlined in Chapter Two was used to investigate the genealogy of the key terms of debate. This mode of exposition interrogates critical moments and confluences in the development of ideas, and is common as an academic strategy in critical geographical and social science approaches to environmental issues (Healey and Shaw 1994; Darier 1999). Rather than offering an encyclopaedic catalogue of events (Livingstone 1995a), continuities and discontinuities of meaning were traced for nature conservation and biodiversity conservation (Chapter Four), and the planning of the urban environment and brownfield sites (Chapter Five), in order to historically situate the global discourse of biodiversity conservation in the urban context of the U.K.

A wide range of contemporary and historical literatures were drawn upon to address these areas (Scott 1990), including academic literatures, newspaper archives, government reports, non-governmental reports, electronic (web-based) sources, biographical searches, and policy archives. Initially, this phase of research was conducted using archival, literature and electronic search procedures. Subsequently, common themes were traced across literatures through reference work. The critical focus of this work was to explore how common ideas about nature and society structure a range of scientific and political discourses. This added an historical dimension to the study of ecological governance, providing a platform upon which to understand the interrelation of policy and science in the institutional frameworks of biodiversity conservation and brownfield development.

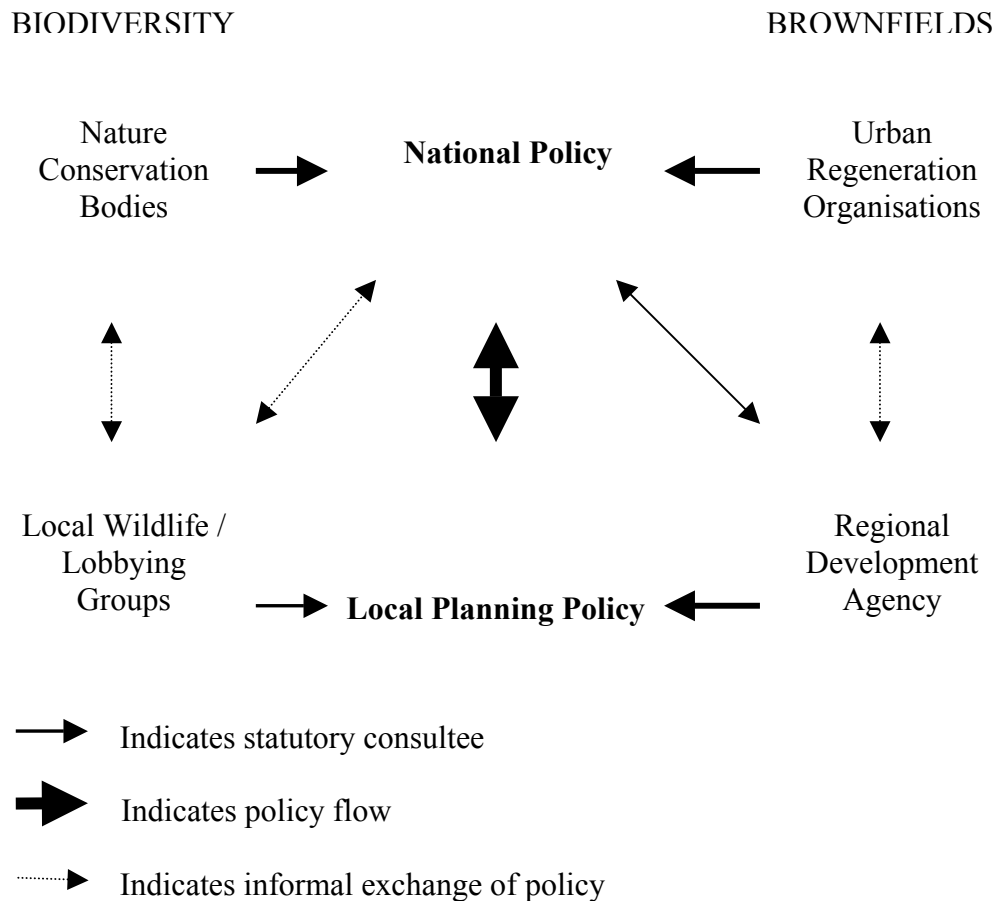
Due partly to its recent emergence, the BAP process is driven by top-down policy (DoE 1994a), and cannot be understood without a consideration of policy frameworks at different levels. The CBD has been translated into a national BAP, and then a local BAP, and an

important part of the multi-scalar analysis was achieved by tracing the translation of policy priorities between levels. At the national level, translation occurred within the planning policy framework of Planning Policy Guidance (PPG). At the local level translation occurred within the remit of the local Unitary Development Plan (UDP) and the Supplementary Planning Guidance (SPG) that informed it. The translation of policy discourses was traced vertically between levels, and horizontally across the concerns of nature conservation and urban planning through these policy documents.

Secondary analysis addressed a wide range of policies and reports that were collected from key institutions, and identified documents that addressed the intersection of conservation and planning concerns. The starting point for this schema was a form of stakeholder analysis (Cassel and Symon 1994) of the BAP policy process, based upon preliminary web-searches, formal literatures and informal contacts. A preliminary list was created, to capture the organisations involved with biodiversity conservation and brownfield development at national and local policy making levels.

The four most important types of organisation involved with these two policy streams are national nature conservation bodies such as English Nature (EN) and the Joint Nature Conservation Council (JNCC), local wildlife lobbying groups such as the Wildlife Trust (WT) and voluntary pressure groups, national urban regeneration organisations such as Groundwork and local regeneration organisations such as the Regional Development Agency. The most important link between national and local levels is that of policy-making. However, the relations of conservation bodies to local government tend to be less formal than those of brownfield development interests, reflecting the existing imbalance between conservation and development concerns in urban governance structures. Figure 3.1 shows the strength (weight of arrow) and flow of information and policy (direction of arrow) between organisations and levels of policy-making.

Figure 3.1: Relations between stakeholder organisations and levels of policy making in the LBAP process



A dimensional sampling regime was devised, based upon this schema, to represent each concern in its own right, and in terms of the intersection between concerns. It did not aim to be representative of the balance between biodiversity policy and brownfield development policy in terms of sheer quantity of policy, but rather to represent the range of policy positions (Potter and Wetherall 1987). The analysis of policy allows meaningful contribution to policy debates (Jasanoff and Wynne 1998), both as a geographical study (Peck 1999; Martin 2001), and as a piece of interdisciplinary environmental research (Nissani 1997).

Due to the ongoing nature of the BAP process, much policy is being actively formulated, distributed and interpreted. In addition to the discursive understanding outlined above, policy was thus approached as a process, being read hermeneutically as a form of meaning that

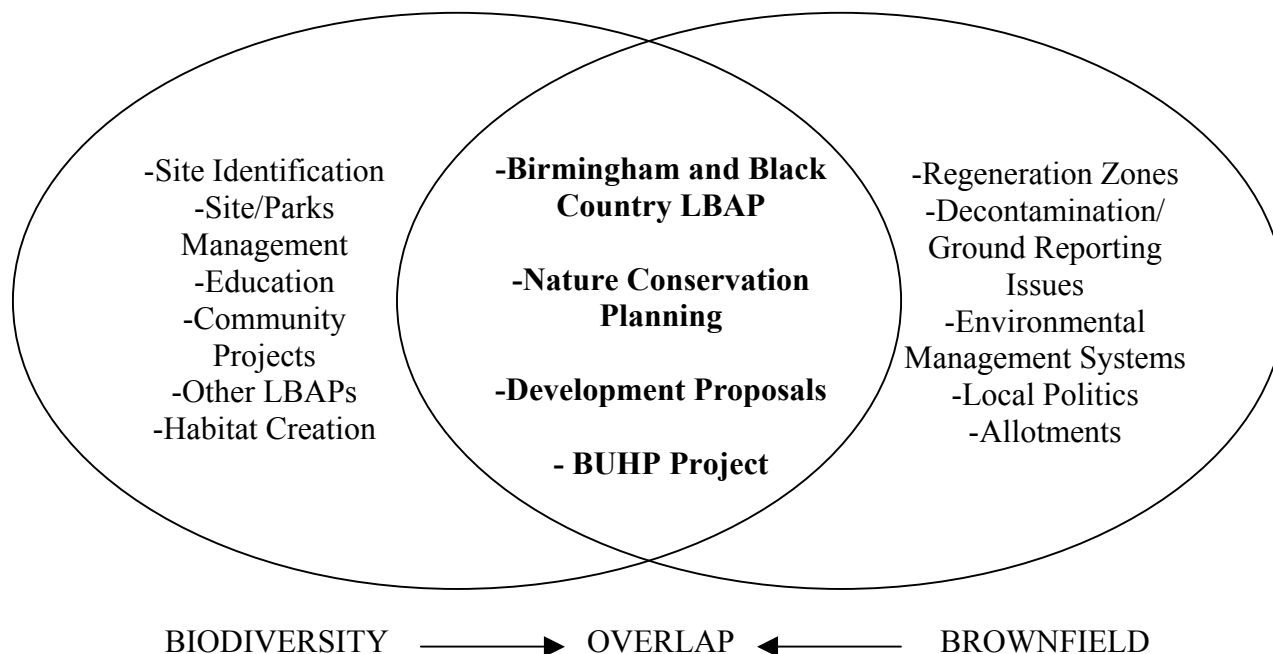
cannot be interpreted outside of its context of production and reception (Giddens 1976; Wynne 1984; Hajer 1995). This process was explored by conducting semi-structured interviews with policy-makers in key organisations about the process of policy formulation, the intended impacts, and the process of policy translation between organisations.

Individuals were identified within these organisations from formal job descriptions, a process of being referred by personnel within an organisation, or by snowballing contacts in other organisations from interviewees. The unstructured interview style was used for public policy-makers, as the more formal recruitment procedures and need for less focused information demanded more sustained engagement with the interviewee. In total, eight interviews were conducted with national policy-makers, yielding ten hours of material, and nine interviews were conducted with policy contributors (think-tank members, academics etc.) and practitioners. Policy documents were accessed electronically via the web, through institutions, and through interviewees.

3.2.2 Selection of Case Studies

Case studies are widely acknowledged as a fecund and legitimate approach to understanding spatio-temporally specific processes (Yin 1981; Stake 1994; Lane 2001), and are well suited to place-specific research. While Figure 1.1 showed the range of activities that LBAPs influence in the realm of urban governance, Figure 3.2 illustrates the potential range of case study topics concerning biodiversity on brownfield sites that came to light over the course of the research period.

Figure 3.2: Potential case study topics



Many topics represented only one dimension of the research agenda, and so were not developed into case studies. For example, habitat creation is increasingly important to biodiversity conservation, but tends to occur after the fate of a site has been decided. Similarly, while decontamination is vital to the uses to which a site can be put, it is a highly technical process that rarely considers nature conservation. The relevance and importance of certain issues within the city became apparent as the research progressed. For example, while site maintenance and environmental management systems are key delivery mechanisms for BAP targets, it became clear during the initial period of interviewing and background research that, as yet, these systems are very rarely designed for, or implemented on, brownfield sites.

In a different way, it became apparent that disputes concerning the status of allotments as brownfields or greenfields that infringe upon urban biodiversity and brownfield debate were both highly topical and highly politicised in the city, but were dominated by tangential issues of ownership, parliamentary re-definition and so forth. The regional tier of governance was

similarly investigated as a key arena in which new forms of environmental governance are being formulated, but it became apparent early in the research process that these levels of governance exert very little influence over ecological governance as yet. These topics were not selected for detailed case study, but where relevant, are drawn upon to provide insights into peripheral debates and background context. In some cases (such as the regeneration zones planning initiative), it is instructive that biodiversity has not been considered in any meaningful way.

A number of topics were raised repeatedly, by interviewees and contacts from a range of organisations, to highlight issues surrounding urban biodiversity concerns and brownfield development. At the centre of these concerns was the LBAP formulation process itself in Birmingham and the Black Country, which was central to the BAP process, both as a new form of governance, and as the core driver of wider biodiversity conservation initiatives at the level of the conurbation. It was through this process that discourses of urban nature, and the national and international frameworks of biodiversity conservation, were re-negotiated. The format of the LBAP was intended to make it instrumental in extending and changing the role ecological knowledges play in urban planning.

The first case study chosen was thus an in depth exploration of the LBAP formulation process for Birmingham and the Black Country, both in terms of the socially and geographically embedded context of its production, and its success in formulating new knowledges and practices of urban natures that transcend traditional divisions. Within the LBAP, the ‘Urban Wasteland’ Habitat Action Plan (UHAP) was explored in depth, as it pertains directly to brownfield sites, and compared and contrasted to a more ecologically oriented Deadwood Habitat Action Plan (DHAP), in order to tease out the re-negotiation of the categories through which urban nature is articulated.

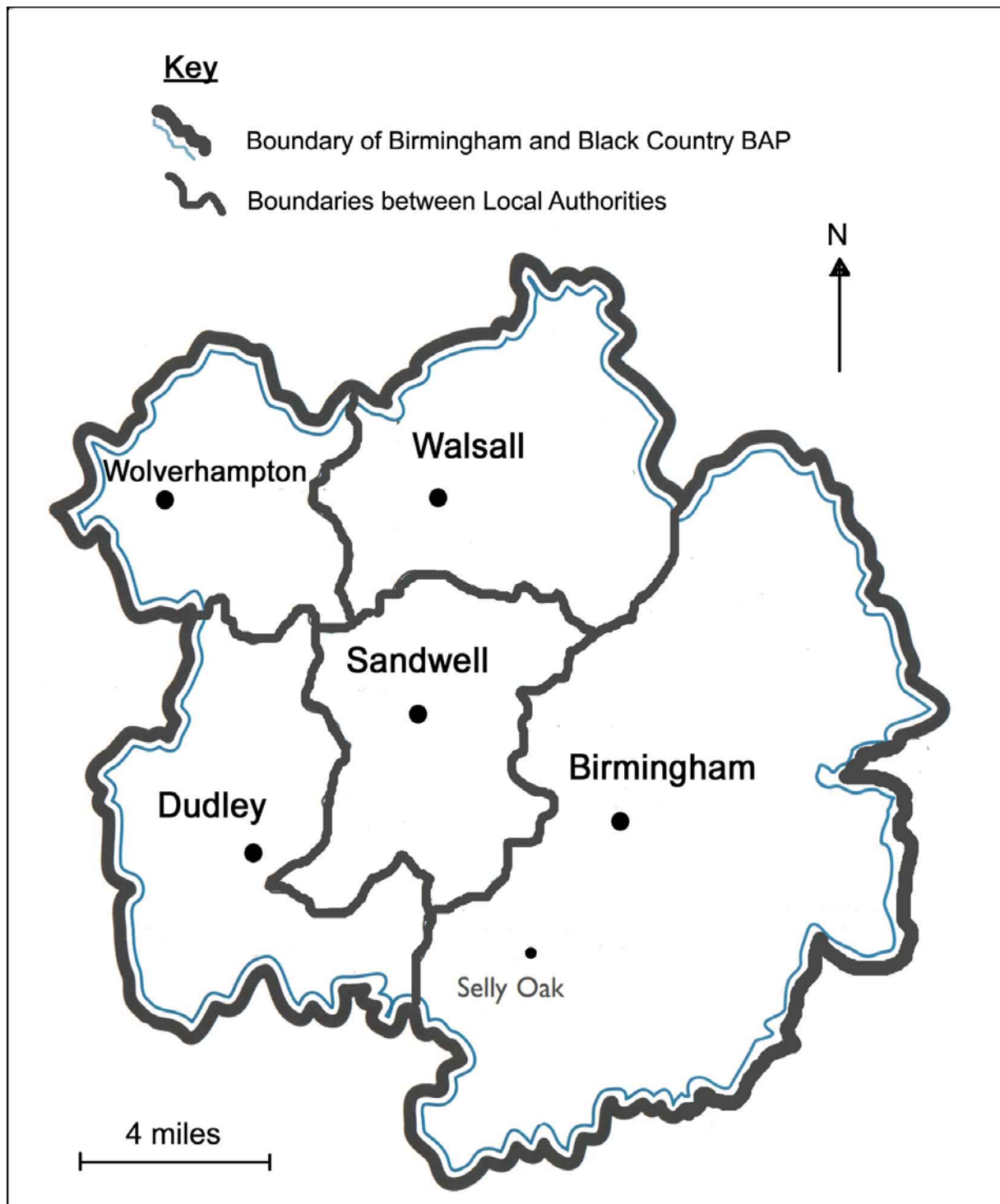
The second case study was chosen to extend the analysis of the social and conceptual formulation of new knowledges and actions, by exploring the Biodiversity in Urban Habitat Patches (BUHP) project. This academic-end-user project aimed to provide Birmingham LPA with new models and tools to represent and conserve brownfield biodiversity against development pressures. In addition to developing the analysis of the LBAP formulation

process itself, and the UHAP, this case study reflects increasing government emphasis upon academic-end-user collaboration in environmental governance. As a relatively new initiative, the BUHP was of considerable professional and local interest to many of the interviewees, and represents a process that has received relatively little academic attention.

The third case study was chosen to explore the actual and potential implementation of the BAP through planning practices in Birmingham. Issues of nature conservation planning and development proposals were combined into one case study, because both the strategic and reactive planning systems are informed by the same planning framework. During the period in which the study was conducted, the fate of one particular ecologically sensitive brownfield site in Birmingham became highly controversial. The Vincent Drive site was thus selected for detailed investigation early in the research period, as almost every local actor identified it as a site of considerable interest. This site was used to provide a detailed case study of the actual practices through which urban brownfield biodiversity is represented and mediated against development pressures in the planning system.

The final selection of three case studies was thus arrived at to highlight both the actual and potential transformations associated with the LBAP, in Birmingham, and at this specific time. Furthermore, they were selected to show how the discourses surrounding urban nature are translated and mediated between levels. The LBAP case study operates at the level of the conurbation of Birmingham and the Black Country, while the BUHP case study examines ecological knowledge produced at the city level in the Birmingham LA area, and the case study of Vincent Drive (in the district of Selly Oak) examines how these knowledges are applied at the local district and site level of development control planning (Figure 3.3). Each case study represents a mutually complementary element in the overall multi-scalar analysis, showing how the discourses are translated into material practice.

Figure 3.3: The case study settings at the conurbation, authority and district levels



Source: Birmingham and Black Country BAP Steering Group 2000

There was substantial overlap between the groups interviewed for the three case studies (Table 3.2). This is in accordance with the idea of ecological governance outlined in the Chapter Two, whereby actors are situated within multiple networks that operate across spheres of concern, and added coherence to the themes that run through the three case studies.

Table 3.2: Stakeholder groups interviewed by case study

<i>Stakeholder Groups Interviewed</i>	<i>Case Studies</i>		
	<i>LBAP</i>	<i>BUHP</i>	<i>Planning</i>
LPA Personnel	▲	▲	▲
Conservation NGOs	▲	▲	▲
Academics	▲	▲	
Conservationists	▲		▲
Local Residents	▲		▲
LA Personnel	▲		
Brownfield NGOs			▲
Private Consultants			▲
Councillors / MPs			▲
Research Councils		▲	

Actors interviewed concerning more than one element of the research are listed as one interview, and the total hours of interviewing listed for each case study below includes only the proportion of the interview that was spent addressing that element.

3.2.3 Case Study Methodology

The first case study explored the formulation of the Birmingham and Black Country Biodiversity Action Plan. Local BAPs represent the driving force behind biodiversity conservation as formulated in the CBD, and are the bedrock upon which the wider process is built. The UHAP is directly concerned with conserving biodiversity on brownfield sites, aiming to combine planning and ecological knowledges from a wide network of stakeholders. It sits within the overarching Birmingham and Black Country Biodiversity Action Plan, and is linked to various other habitat and species action plans. The UHAP was explored as a form of ecological knowledge by detailing the social dynamics of the actors involved with formulation, and compared and contrasted to the DHAP.

The LBAP officer for Birmingham and the Black Country was at the centre of the LBAP process, both as coordinator of the process and supplier of further contacts. A semi-structured interview was conducted with the BAP officer early in the research period, followed by a series of unstructured interviews based around information exchange, via dropping in or 'phoning, and a second semi-structured interview at the end of the research period. Following the establishment of this relationship, a number of semi-structured interviews were arranged and conducted with other contributors, snowballing contacts. These concentrated upon the authors of and contributors to the UHAP, and the DHAP. Questions focused upon the knowledge they brought to the process, the mediation of this knowledge within the BAP framework, and the ways in which they attempted to incorporate BAP priorities back into their main work. Unstructured interviews were used to gain an insight into the history of the local conservation networks that formed the locale in which the BAP process unfolded, and give an insight into the local politics of urban biodiversity conservation.

A stratified sample of twelve contributors to the HAPs and Species Action Plans (SAPs) was interviewed, to represent the diversity of interests and knowledges that were brought to the table. The actors involved with formulation were easily identified from the documents and the LBAP Officer, and, it was possible to interview almost all actors involved with specific action plans. These interviews yielded approximately eighteen hours of material. Three other BAP officers were interviewed over the course of the research to highlight the particular approach to formulation that was adopted in Birmingham and the Black Country, its relative

status as an urban BAP, and the wider reception of top-down guidance from regional and national bodies.

The second case study examined the process by which new knowledges feed into the biodiversity conservation process. The wider U.K. approach to biodiversity conservation recognises the need to connect academic research concerning biodiversity to end-users (DoE 1994a), a topic of increasing interest to academics working on environmental issues (Ziman *et al.* 1994; Lekakis 2000). The NERC funded URGENT program is intended to do just this (URGENT 2000), and was identified by numerous actors in the field of urban nature conservation and planning as an innovative initiative warranting attention. The BUHP project aims to translate its research findings concerning the biogeography of brownfield sites into a decision support system for strategic planners in Birmingham City Council.

The work of this project was accessed through contacts within the School of Geography, Earth and Environmental Sciences at the University of Birmingham, and the annual URGENT conference. A series of semi-structured and unstructured interviews were conducted with the three members of the research team, and the end-user sitting on the steering committee. Easier access to interviewees and the highly focused subject material meant that a shorter interview method was adopted, and extensive use was made of the annual conference. Three formal interviews were conducted with ecologists and planners working on the specific project, and six informal discussions were conducted, lasting from one to thirty minutes, with higher-level personnel from NERC, the DETR, scientists, planners, and NGO representatives involved with the URGENT programme. These occurred in a networking context, and were noted in detail as soon as possible after taking place. These data served as a counter-point to the official presentations that took place largely along institutional lines, with interviewing designed to uncover the social dynamics of the research programme, rather than proffer detailed personal opinions or comprehensive data.

The third case study focused on the actual and potential interface between the UHAP and the planning practices and policies of brownfields. Two arenas were explored: the articulation of brownfield sites within the hierarchical site-based system of nature conservation, and the potential for the UHAP to influence the development control process, specifically focusing on

an environmental impact assessment and ecological assessment attached to a planning proposal. Both these issues were considered at the city-level, and in the context of a particular brownfield site known as Vincent Drive in South Birmingham. This particular site encapsulates the intersection of biodiversity conservation and brownfield development, having recognised nature conservation status and biodiversity value while being subject to two major development proposals. The Vincent Drive site illustrates how ecological knowledges are formulated within and influence practical urban regeneration, environmental consultancy, sustainable development, and community use.

This element of research required the most diverse methodology in order to capture as many aspects of these negotiations as possible. The colourful planning history of the site was initially investigated through archival work, conducted in the city archives and those of the Birmingham and Black Country WT, and through two long interviews conducted with local residents involved with the conservation of the site. The site was investigated first-hand through a series of visits throughout the research period, beginning as simple strolls familiarising the features of the site, and being used later to follow up contentious issues that arose from other avenues of research. This included taking photographic evidence of features of interest, and observing use of the site by other humans and non-humans.

The planning control process was approached through key documentary sources, such as the current planning applications and comments, environmental statements and comments, and supporting documentary sources, including the local action plan for regeneration of the area and consultation documents. Detailed reference is made to the ecological assessment surveys (including a number of maps and pictures taken or copied from these documents), and their incorporation within the environmental statement itself, in order to place them in relation to the wider concerns pertaining to the proposed development. Extensive use is made of correspondences between the Birmingham and Black Country WT, acting in their formal position as consultees in the local planning process, and the LPA. This is supplemented by evidence from local residents and conservation groups that was formally presented to the development control committee.

Semi-structured face-to-face and phone interviews were undertaken with key actors in the development control process, including in-house and independent town-planning and ecological consultants, planning officers, statutory consultees, and members of the development control committee. Group interviews were conducted with environmental consultants, urban wildlife activists and environmental business consultants, and a number of key development control processes were observed, including a LPA Development Control Committee site visit, a public meeting and development control committee meetings pertaining to the Vincent Drive site. This case study impinged upon a potentially huge and dispersed group of people, and as a result interviewing was designed to capture the diversity of interests involved. In total, fourteen specific interviews were conducted for this stage of the research, yielding over twenty hours of material, with ten other interviews yielding relevant material.

Interviews with policy-makers, strategic planners and planning officers are used to investigate the concepts used to plan brownfield sites within the UDP. Structured interviews were conducted with four Birmingham and Black Country strategic conservation planners involved in the UDP process, and the ecological consultants who undertook the most recent site surveys for these authorities. The criteria, guidelines and grey literature surrounding the site designation process were accessed through these people.

3.2.4 Practical Reflections

Problems of representativeness of sample, access to interviewees, time constraints and researcher positionality, are common challenges to any social science research project. However, the interdisciplinary focus of this research made the parameters of the study less familiar, both from the point of view of the researcher and the researched.

With the exception of the BAP formulation process, the range of actors involved with each research element meant that selective sampling had to be undertaken, targeting key points in the process to achieve a representative sample. A list of stakeholders itself was derived from the process under consideration, and the sample aimed to interview a representative sample of the stakeholders involved with each element. Within this group of people, key contacts were identified and contacted through snowballing. So, while the stakeholders for the LBAP formulation case study were identified from the list of contributors listed in the UHAP itself, the selection of interviewees and access to them was achieved as the process of interviewing unfolded.

Where possible, more than one actor was interviewed in each capacity, in order to contextualise the comments of individual interviewees. This worked well for the ecological consultants interviewed for the planning case study, who qualified each other's comments. This approach was also used for the LBAP formulation case study, in which other BAP officers who were not directly relevant to the research were interviewed, in order to situate the comments of the Birmingham and Black Country LBAP officer. In other instances, interview data have had to be interpreted in isolation.

In two cases, key actors made themselves unavailable for comment over the entire research period. In one case, a key actor in Birmingham LA had to be represented by proxy through interviewing subordinates, actors in equivalent positions in different organisations, and by comments made by others working in closely related positions. This material was supplemented by interview data that became available from a separate urban planning research project being undertaken at the University of Birmingham, which overlapped

partially with the concerns of this project. In another case, a potential interviewee working for the EA had intimated that although the agency was a major national environmental NGO, their involvement with the BAP process was minimal.

The amount of interviewing conducted followed the saturation principle whereby as the same story begins to emerge from interviewees, the law of diminishing returns sets in and it becomes unnecessary to continue. The success of snowballing interviewees varied between the research elements, reflecting my own positionality, and the response rates for interview requests from different sectors varied accordingly. The response rate for interviews from the group who formulated the LBAP was largely unproblematic, as many were sympathetic to academic research, or were keen to publicise their work in any way possible. The response rate of interviewees in the upper echelons of policy-making was lower, due to more stringent constraints upon their time, and in some cases because actors were generally suspicious of agreeing to be interviewed about the biodiversity and urban development strands of the research at once. This undoubtedly reflected the abstract problems of mediating between two normally discrete concerns, and overcoming the accompanying institutional separation. Response rates for interviews from the LA and the private sector varied between specific companies and departments, with some offering total compliance, and others almost none (Table 3.3).

Table 3.3: Sample and response rates by sector

	<i>National and Regional Government</i>	<i>Private Sector</i>	<i>LA</i>	<i>Conservation and Academic</i>
Sample	13	10	17	15
Interviews	9	7	14	15
Response Rate	69%	70%	82%	100%

Related to this were problems of differing terminologies (Deetz 1982; Ruscio 1986) employed by urban development and biodiversity conservation practitioners. This added an extra

challenge to the task of interviewing, both in having to be familiar with two different sets of practices and jargon, and of not repelling or intimidating interviewees by using unfamiliar jargon. Interviewees from formal government institutions were often concerned with one aspect to the point of excluding the other; a problem that was exacerbated by the necessity of conducting interviews in their office environments.

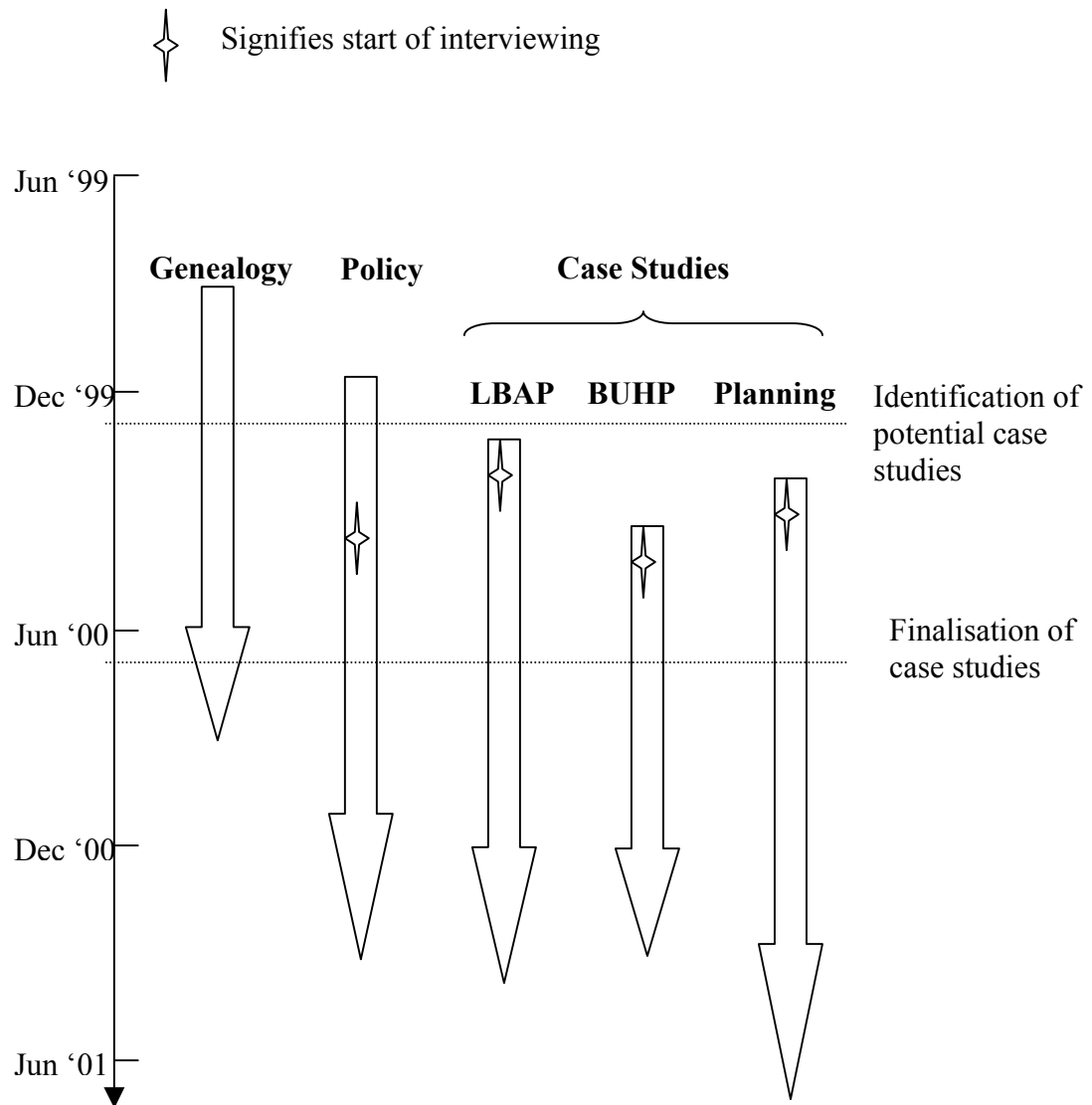
These problems were addressed in two ways. Firstly, through the use of very formal approaches for assistance with the research that emphasised the credentials of the research, but avoided details about what would be asked, and secondly, by emphasising the side of the research that a respondent was more comfortable with in the approach strategy, and then using the semi-structured interview format to lead into other issues. By tailoring the initial focus of the interview to the position of the interviewee, and only subsequently bringing in wider concerns, it was possible to gain an insight into their own position with respect to the intersection, allowing for the discovery of meaning (Anderson *et al.* 1990).

I tried to reflect the position of the specific respondent, both in my appearance, line of questioning, and sympathies. Interviewees who could or would only address one aspect of the research unintentionally revealed the real remit of their position. This approach tied in with the wider focus of this study upon contextual meaning making, rather than what people ‘really think’ (Cassel and Symon 1994). Taking a relational approach to the two topics of concern highlights the contrasts between them. Instead of inhabiting one position or the other, their mutual co-constitution is revealed, enhancing the value of the data (May 1993).

Access to documents from certain private sector companies was also problematic in the case of Vincent Drive. Politically sensitive documents, such as preliminary surveying reports, diagrams, pictures and maps, remained under the copyright of the company that produced them, and, in the case of Vincent Drive, the copying or reproducing of maps and pictures were specifically forbidden by both the LPA and the company itself. Furthermore, certain preliminary ecological surveying reports became unavailable for second viewing over the course of the research period. Whether this was due to their increasingly problematic political status in the conflict over development proposals for Vincent Drive, or their genuine ‘loss’ is not of concern here. These problems were overcome by substituting photographs and maps

for analogous ones, drawn up independently to reflect the main textual features of the originals.

A second associated research dynamic existed between the need to explore potential avenues of enquiry while at the same time working to a timetable. It is impossible to avoid collecting material that turns out to be peripheral to the final format of the study. A more specific problem was that initial plans to conduct a range of interviews with high-level policy-makers before undertaking other research elements delayed the collection of other interview data (Hodgson and Rollnick 1989). This lost time was recovered by instigating all elements of case study research simultaneously. Figure 3.4 shows the implementation of research elements over time.

Figure 3.4: Temporal implementation of research elements

3.3 Interpretation

3.3.1 *Organising Output*

Qualitative research tends to generate un-standardised data that are not immediately amenable to systematic analysis and valid interpretation. Issues of data management, consistency of evaluation, and variation in source reliability (Sadler 1981) were addressed in the post-collection phase.

Tape-recorded interviews were transcribed verbatim, in accordance with the usual conventions of correcting / omitting informal syntax and exchanges, immediately after the interview took place. Interviews are contrived social situations that create an internal reality (Silverman 1985), and detailed notes were made covering off-the-record conversations and non-verbal information to record basic inter-subjective observations. Non-tape-recorded verbal material was written up in a research notebook, covering key facts and points of interest.

Rather than complicate the research process with differing levels of anonymity granted to various interviewees, with some sections of interviews attributable and some not, semi-anonymity was agreed with all respondents. Interview data were thus tagged according to organisation and position, with multiple tags being used for material from an actor being used in more than one capacity. Where a person is quoted, the first tag designates their position, the second tag indicates the organisation with which they are involved (and in which capacity they are being interviewed), and the third, the date on which the interview took place. For example,

There's always a recognition that you've got an element in a wildlife corridor, which is so important in the urban situation, and in this case you've got a node, and that in my mind...is absolutely vital (Principal Ecologist, Landscape Science Consultancy 9/3/01).

Subsequent tags are included occasionally where the actor is involved in another capacity that has specific relevance to their comments. Although more confusing than using singular

representations for each actor, this system is consistent with the arguments of Chapter Two that actors are often situated in multiple networks, and that these tangled webs are an important component of ecological governance. When names occur in quoted interview material, the surnames have been left blank.

Preliminary analysis occurred during this process with standardised data being coded and cross-referenced, and more open-ended data distilled into memos that were then ordered in themes (Glaser and Strauss 1967). This was crucial not only to facilitate the exploratory aspect of the research framework, but also to the initial task of indexing data. The transcription and the use of interim summaries produced data that was comparable in terms of themes, and these themes were used to guide the synthesis of material entailed in writing each section of the research. Studying brownfield planning and biodiversity conservation created the potential for acronym-overload, on account of the sheer number of organisations, projects and groups that were relevant to the study. In response to this problem, acronyms occurring more than twice in the thesis are explained when they initially appear, and included in the abbreviations and acronyms section for future reference.

Interviews were only part of a variety of texts that were collected at each stage of the research, including photos, memos, policy documents, newspaper articles and so forth. Because it was impossible to analyse everything to the same degree of detail, two corpuses were created: a general one that was subject to broad-brush analysis, and a specific one that was subject to a detailed analysis. A two-stage selection criterion was used. The first stage involved selecting which documentary sources warranted detailed analysis. This decision was based on a similar logic to the selection of interviews outlined in the previous section, and aimed to represent key instances of articulation of both concerns. Within these documents, sections were selected for detailed analysis and cross-analysis. A corpus was thus put together that followed the logic of the overall sampling regime, while also being sympathetic to constraints on time and space. Photographic and observational data were recorded in a research diary, with dates and detailed observations appended. The various formats of data were finally indexed together according to subject. For example, interviews with policy-makers from the U.K. Biodiversity Group were indexed to the UKBAP, and LBAP guidance notes.

3.3.2 Analysis

The significant amount of documentary data posed the problem of how to devise and present systematic procedures of analysis and interpretation (Platt 1981). Both quantitative and qualitative techniques can be utilised to analyse the discursive structure of a textual corpus. Indeed, while theoretical approaches to qualitative research differ hugely, the procedures of qualitative data analysis are very similar (Tesch 1990). Although theoretically consistent with the ideas of material discourse outlined in Chapter Two, the techniques of discourse analysis used here are common to a variety of hermeneutic traditions.

Analysis focused upon the formulation, circulation and interaction of meanings through the various networks being analysed. Content analysis furnishes the tools to make replicable and valid inferences from data to their context (Krippendorff 1980) through showing objective regularities in content (Ericson *et al.* 1991). Qualitative methods based on semiotic analysis allowed the material to be analysed in the context of its production and reception. Discourse analysis was deployed in its wider sense comprising techniques for the analysis of narrative, content and semiotic elements of texts, images and other data (Manning and Cullum-Swan 1994). Finally, detailed linguistic analysis was employed at specific points to support descriptive quantitative and qualitative analyses (Appendix 2).

These tools were used to analyse the orientation of large documents or bodies of work, from searching for the occurrence of certain keywords, to excavating genealogies. Content analysis was used to assess the power relations bound up with each research element at a number of levels: from the discourses of nature conservation and planning policy (Bruff and Wood 1995; Counsell 1998), to their manifestation at the local level. Drawing upon the work of cultural geographers on landscape and cartography (Barnes and Duncan 1992; Harley 1992), semiotic analysis of various media, such as photographs and maps, was used to contextualise documentary and verbal texts, and emergent themes were triangulated between texts to increase the verifiability of conclusions. The case studies analyse the production and reception of these discourses as socially embedded processes of knowledge formulation and mediation (Scott 1990).

3.3.3 Reflexivity

It is widely accepted that the study of social systems entails a degree of reflexivity between the study and the object of study (Giddens 1976; Sayer 1992). In a study such as this, that seeks to bring the key terms and categories of debate into analysis, some qualification should be offered for the terms to which the study itself subscribes. The terminology of brownfields is a classic case. Not only are there a plethora of terms that describe these spaces in particular discursive ways, but their use within policy and literatures itself varies over time.

This study itself explicates the various problems associated with the usage and discursive baggage of key terms, highlighting the politics attached to provocative terms such as brownfield, or the invention of new lexical items such as ‘urban commons’, or ‘previously developed land’. However, it also emphasises that discourse is socially embedded in networks of people and things, and so where possible the terms of debate used within the networks being studied at that point are used. This demonstrates both the contested nature of terms, the work that is done within networks to maintain them, and how discourses coexist and are defined against one another.

Although the strategy of using the terminology of the groups under study tries to avoid a biased political vocabulary, it inevitably fails to escape the politics of discourse, reflecting the politics and discourses of the groups that crop up most often in analysis. For example, amongst a morass of terminological cul-de-sacs and fads over the last fifty years it is the term brownfield that has become most widely used in current policy circles and academic literature. Resultantly, the term brownfield is used most throughout this thesis. Although using the term’s political connotations to highlight the problematic status of the category and spaces it denotes throughout, this study unavoidably vindicates it as a term of debate merely through use. Similar discursive problems were raised in places by the masculinised language of some scientific literature and environmental speak. Where it crops up, gendered language has been indicated but left, as it forms an integral part of some of the discourses under analysis. The price of avoiding an overtly political bias to analysis is constant reflexivity on the part of both the writer and the reader towards the terms of debate.

A degree of theoretical reflexivity is also discernible. The concepts and models used by organisations, both governmental and non-governmental, are based upon those of the academic communities studying them. This may be a result of the increasing use of academics by government think tanks, New Labour's associated shift to research-led policy, and the proliferation of Third-Way theorising (Haylett 2001) across the academy and government. Organisations utilise concepts such as branding and vision-based stakeholder dialogue (Selman and Wragg 1999), which are derived from the same communicative turn in thinking that spawned the academic concepts of discourse and networks. A DETR consultancy document states the need,

...to speed up the evolution of a better language for sustainable development...[which] should in turn stimulate the cultural and behavioural changes that will make our lives more sustainable (DETR 2000a, p.1).

Every organisation today has mission statements designed to increase codification within and extend codification and discourse beyond themselves, many of which may be viewed online for the organisations discussed in this study. The new managerialism that pervaded organisations in the late 1980s is reflected in academic literatures that stress the analysis of auditing processes within organisations. Given the reflexive nature of social research, it is useful to have concepts that are well adapted to the phenomena being studied, but also necessary to be wary of implicitly falling back on those same models, further legitimising and reifying them at the cost of critical insight.

3.4 Conclusions

The research design translated the theoretical approach into a methodology that was capable of addressing the topic at a number of levels and across a range of concerns, within the practical constraints of time and resources. The use of diverse case studies to assess the BAP process reflects the wide remit of biodiversity itself, and the over-arching aims of the thesis. Studying concrete instances of knowledge formulation and implementation through the planning process grounds these issues in the material processes through which the urban environment is made and re-made.

As Massey (2001) argues, spatio-temporally specific studies are popular in geography because they are representative of more general issues being played out across other areas and in other places. While there is ‘no such thing as the way Local Authorities do things, they’re vastly different in terms of structure, people, procedures’ (LA Representative, DETR, 6th April 2001), situating these case studies within the genealogical context of the broader discursive currents from which biodiversity and urban brownfields emerge enhances their transferability, by giving the study wider relevance in terms of spatial and temporal relevance. Governance is highly place specific and new policies and initiatives come and go, but the underlying concepts and legacies through which they are mediated remain essentially the same. The challenge of addressing a diversity of factors and phenomena operating at a range of levels, while simultaneously rendering a coherent analytic thread between them has inevitably made studying the BAP experience for one particular urban area the most efficient and revealing enterprise within the PhD. time-frame.

Chapter 4 BioDiversity

4.1 Introduction

Over one hundred nations signed the CBD at the United Nations Conference on Environment and Development (UNCED) Earth Conference in 1992. As Macnaghten and Urry (1998) argue, it was a potentially historic moment, as ecological relations were given a global footing, and interleaved into the wider activities of governance on an unprecedented magnitude through the concept of sustainable development, establishing on paper at least a new relation between society and environment.

Biological diversity means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (UNCED 1992, Article 2).

Biodiversity forms the cornerstone of the study, and, in order to contextualise its resolution in the urban scenario, this chapter explores the origins of the term, its relation to the broader discourse of sustainable development, and its institutionalisation within Britain. The political ecology of biodiversity is explored genealogically as a material discourse of ideas and institutions.

Exploring the political ecology of biodiversity as a hybrid of culture-society-politics-science (Haraway 1991) better explains how it is mediated against other interests, from its inscription upon the traditions and institutions of U.K. nature conservation examined at the end of this chapter, to its penetration into wider spheres of governance through the LBAP process. The history of relations between society and nature from which biodiversity emerged constitute a vast field (Glacken 1967), and the genealogy offered explores key discursive moments and relations that structure the web of biodiversity.

Section 4.2 explores the origins of the term biodiversity, beginning with the work of the conservation biologists who organised the first forum on biodiversity in 1986. The

establishment of international systems ecology research programmes are explored as institutional and conceptual precursors for the globalisation of ecological discourse. This discussion highlights how the inherent mechanism in systems ecology led to the establishment of an equilibrium paradigm in ecology, which equated stability with diversity. Considering the early origins of modern ecology as a function of governance reveals the limits-to-growth discourse that characterises the popular environmental movement, illustrating the co-constitution of scientific and social models of the relationship between society and nature. It is argued through a developmental critique that this elision underpins the articulation of biodiversity in the CBD, both in the context of the United Nations Environment Program (UNEP), and in its incorporation into the wider Rio agenda for sustainable development.

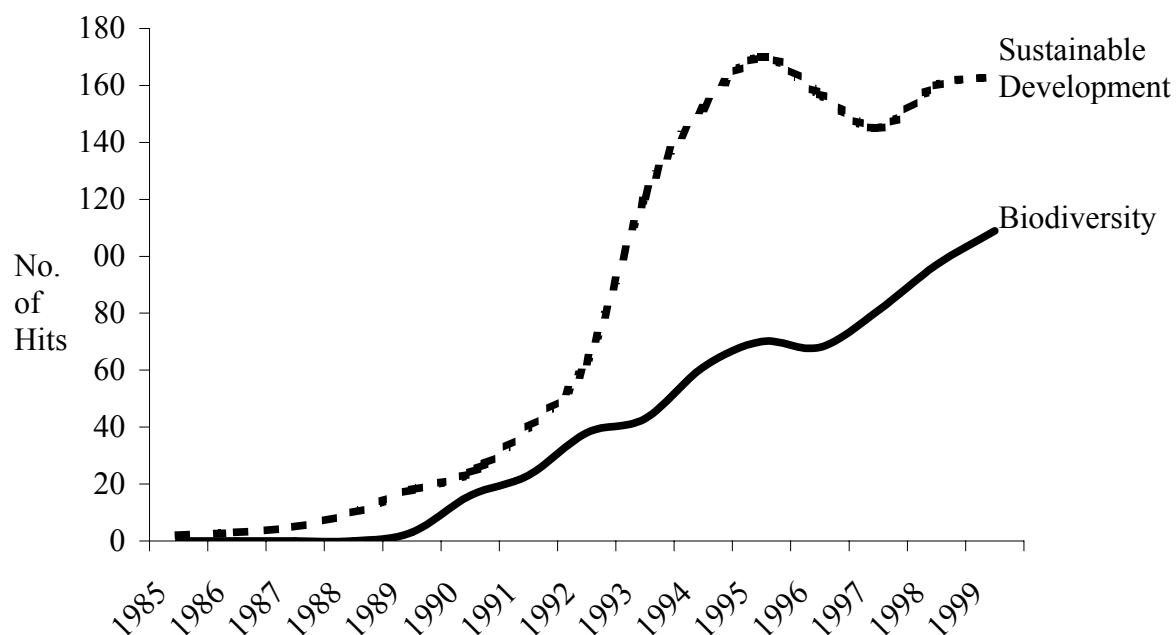
Section 4.3 explores the legacy of U.K. nature conservation, outlining its history and institutions, and the impact of environmentalism upon it. The translation of the CBD into the UKBAP is explored as a key point of proposed reconciliation between the U.K. nature conservation tradition and the discourse of biodiversity conservation. The potential fit and disjuncture between biodiversity conservation and U.K. nature conservation is considered around the themes of society-nature relations, scale and approach. Section 4.4 concludes by considering the uncertainties surrounding biodiversity and nature conservation planning in the urban context.

4.2 Situating BioDiversity

4.2.1 Origins

Given the ubiquity of the term ‘biodiversity’ in contemporary environmental debate and policy, it is indicative to consider that it was not part of the English language thirteen years ago (Oxford English Dictionary 1989). However, since then, the number of academic papers in science and social science journals using the terms biodiversity and sustainable development in their title lines has increased dramatically (Figure 4.1).

Figure 4.1: The rise of biodiversity and sustainable development



Source: BIDS 2000

The data were generated from BIDS (Bath information and data service), the premiere bibliographic service available to the British academic community (David and Zeitlyn 1996), by searching two of its six main databases, Pascal (science, technology and medicine) and IBSS (International Bibliography of the Social Sciences). While far from a complete analysis of relevant literatures, Figure 4.1 clearly represents the genesis of biodiversity in 1988, and its rapid acceptance after the Rio Earth Summit in 1992. The different patterns of increase between biodiversity and sustainable development reflect the cumulative process of scientific knowledge production, as opposed to the trend driven production of social science. However, their tandem ascendancy indicates an ideological congruency between biodiversity and sustainable development. Despite occupying a central position in environmental legislation (Luke 1999), and being the focus of a veritable landslide of research and commentary, biodiversity remains a heavily value-laden, politicised and evocative word (Myerson and Rydin 1996). Scientifically there is no accepted way to measure biodiversity: it can be interpreted at a variety of scales, from ecosystems down to genes (Maddox 1994; Purvis and Hector 2001). After interviewing over twenty leading international conservation biologists and advocates of biodiversity conservation, one researcher concluded that, ‘biodiversity lies at the heart of a complex web; strands radiate outward, taut with tensions’ (Takacs 1996, p.2), and this section explores the complex web.

The recognition throughout the 1980s of the accelerating pace of global species and habitat loss stimulated the emergence of conservation biology, a fusion of ecology and evolutionary biology explicitly addressing the conservation of biological diversity (Soulé 1985). Walter Rosen, a biological programme officer sitting on a sub-group of the US National Academy for Science, coined the neologism biodiversity in 1986, quipping that he had merely removed the ‘logical’ from biological diversity (Takacs 1996). Indeed, of the interviews conducted for this thesis with a variety of conservationists, many bemoaned the imprecise meanings and baggage associated with the term. There is no doubt that biodiversity, once called ‘too glitzy’ by conservation biologist Edward Wilson, extends well beyond the scientific domain, and rather than analysing biodiversity as idea or science, this section uses a genealogical analysis to trace its web across domains and histories.

In 1986, Rosen organised a forum for leading conservation biologists on biological diversity to be held in Washington. The forum received a huge amount of public and scientific interest,

The lectures and panels were regularly attended by hundreds of people...on the final evening a panel of six of the participants conducted a teleconference down-linked to an estimated audience of five thousand to ten thousand people at over a hundred sites...It featured more than sixty leading biologists, economists, agricultural experts, philosophers, representatives of assistance and lending agencies and other professionals...[It had a] huge perceived impact on the public (Wilson 1989a, p.v).

The decision of the U.S. National Academy for Science to fund a forum that strayed outside a strict scientific remit was in part a response to growing public concern over species loss (Takacs 1996), a fact the organisers exploited by overtly promoting the political and emotive aspects of the forum in order to stir public interest (Tanglely 1986).

In that conditions were suitable for the emergence of an environmental buzzword, it was similar to the emergence of Gaia theory some eight years earlier (Lovelock 1979), but unlike Gaia theory, biodiversity retained a mainstream science pedigree. Whereas Gaia drew on a psuedo-spiritual holism that is anathema to many scientists, biodiversity accommodated both holistic and reductionistic conceptions of the environment, making the concept as amenable to scientists and policy-makers as it was to deep ecologists. Most importantly, this broad appeal was encapsulated neatly in one word.

Biodiversity, published in 1989 and edited by Wilson, appeared as a heterogeneous compilation of chapters from forum contributors, and the justifications given for conserving biodiversity demonstrate the complex values bound up in the term (all references are 1989). Ehrlich discusses some practical problems of justifying conservation, concluding that a 'quasi-religious transformation' (p.22) of attitude is needed. Lugo cites evidence from the Caribbean to suggest that ecosystems are surprisingly resilient to large decreases in biodiversity, while Ashton discusses problems inherent in the scientific application of the term, such as speciation over time, and tensions between species and ecosystem conservation. Norton and Norgaard conclude that economic valuations, and indeed any attempt at the quantification of the value of biodiversity, are not only impossible, but will hinder attempts to conserve biodiversity. Ehrenfeld claims that biodiversity has intrinsic value; Lovelock reaches the same conclusion

via a discussion of interdependence and Gaia theory, while Goodland appeals to Greek philosophy to advocate conservation of biodiversity.

Despite the diversity of approaches represented in the book, in their final analysis the conclusions are united in a reliance on ethical and/or pseudo-spiritual grounds to advocate the protection of biodiversity. The regular anthropocentric argument that we must preserve biodiversity in order to preserve ourselves is questioned, but the conclusion that biodiversity must be preserved is not. The status of biodiversity as science and ethic owes much to the milieu from which it emerged, and the 1986 conference is better seen as the culmination of the conceptual response of biology to environmentalism that had been occurring since the 1960s than the inception of a new science. Of these currents, systems ecology was vital to the institutional and conceptual establishment of global ecology, and pre-figured the importance of equilibrium in contemporary discourses of nature and society.

4.2.2 Systems, Mechanism, and the Limits-to-Growth

The establishment of systems ecology as the basis for international ecological research was a necessary precursor of biodiversity, both conceptually and institutionally. The establishment of global science:

...involves not only the international coordination of assessment and policies but also the difficult task of harmonization at the cognitive level...the ways in which the objects of research are defined, as well as the choice and detailed implementation of preferred methodologies, basic models and concepts (Jasanoff and Wynne 1998, p.47).

It is the business of 'harmonisation at the cognitive level' that is performed by the common discourse of nature that extends across spheres of concern. The circulating references of international ecological science underpin the emergence of biodiversity in its contemporary form.

Ecology began to receive political attention in the U.S. in relation to the newly felt problems of pollution in the 1960s, but was at the time little more than a sub-branch of botany and zoology (Burgess 1981). It was the managerial potential promised by the increasing quantification and mathematization of systems ecology that appealed to politicians and congress (Kwa 1987). As a sub-set of ecology, systems ecology was based upon Lindeman's (1942) study of energy transfer through levels of the food chain. Odum (1953) developed the Lindeman trophic-dynamic concept into a theory of radiation ecology, that in turn furnished the methodology and concepts for a more generalised systems ecology, based upon thermodynamic principles. Odum launched ecosystem ecology research at the US Atomic Energy Commission, being joined later by Auerbach and Crossley at the Oak Ridge National Laboratory.

Concepts such as equilibrium, homeostasis and the quantification of heterogeneous ecological processes in energetic terms promised an understanding of nature that could predict its performance (Kwa 1987). This approach constituted a quantifiable science of natural systems that emphasised the importance of maintaining equilibrium. Under equilibrium conditions, the increasing spatio-temporal stability of natural systems would produce increased diversity of species and hence productivity (MacArthur 1955; Elton 1958).

The decision of the U.S. congress to generously fund the International Biological Programme (IBP) Biome projects in 1968 led to the national and then internationalisation of the methods and concepts of systems ecology. The thermodynamic metaphor of the system was embedded in the central focus of the Biome projects upon controlling and managing the productivity of biological communities (Kwa 1987). The emphasis upon managing systems was carried over into subsequent international ecological research programmes. The International Council of Scientific Unions, a coordinating body of national science organizations, launched the International Geosphere-Biosphere Programme (IGBP) in 1986 to,

...describe and understand the interactive physical, chemical and biological processes that regulate the total Earth system, the unique environment that it provides for life, the changes that are occurring, and the manner in which changes are influenced by human actions (IGBP 1992).

The U.S. congress still endorses the IBP, retaining its commitment to ecological productivity (U.S. Congress Code 2000), and the international funding of these programmes has established

systems ecology as the hegemonic conceptual model for global ecological science. The experts that sat on UNEP's Ad Hoc Working Group of Experts on Biological Diversity and Biotechnology, and the institutional framework of research, funding and dissemination that a global initiative such as the CBD demands to be in place, were drawn from this international scientific community. The groundwork of establishing global ecological science conceptually and institutionally was completed before the Rio Earth Summit, with the saturation of political, scientific and cultural spheres and institutions with the circulating references (Latour 1988; 1999) of systems ecology. It is this saturation that facilitated the rapid global institutionalisation of biodiversity.

Kwa (1987) argues that the management potential of the ecosystems approach, which so appealed to politicians, was founded upon a mechanistic approach to nature. In contrast to the Clementsian tradition of conceptualising ecological objects, such as vegetation communities or ecosystems, as developing and reproducing organisms (Clements 1916), Odum's system-based ecology utilised mechanistic concepts such as homeostatic regulation and stabilisation to quantify ecological relations. This mechanism underpinned popular environmental treatises of the time, such as Buckminster-Fuller's (1969) language of Spaceship Earth, Commoner's (1971) living machine, or Meadow's (1971) 'limits-to-growth' that set environmental limits to human activity, which were seemingly non-negotiable and should not be over-stepped. Scientific mechanism complemented the 'limits-to-growth' mentality that came to dominate the culture of environmentalism (Petulla 1980).

The mechanistic metaphor of nature and popular environmental discourse of limits-to-growth provided the conceptual means of communication across science, culture and politics, necessary for the 'cognitive harmonisation' at the global level (Jasanoff and Wynne 1998). A metaphor is an abbreviation of context into a representation, so that a literal translation of its meaning is not possible (Ricoeur 1977; Barnes and Duncan 1992), and, although the origins of this master metaphor are worth exploring in detail, as they have important ramifications for biodiversity, they resist simple historical analysis.

The idea of limits to human development has unavoidable quasi-religious connections to the Malthusian espousals of moral population control in the late Eighteenth Century. Religious

undertones do inform the wider prescriptions of the environmentalism, which has itself been identified as a movement onto which post-Enlightenment religious consciousness has sublimated. While the moral genealogy of society's relations to nature represents the psychosocial scaffolding of the modern environmental consciousness (Glacken 1967), political ecology focuses analysis upon the relation between ecological thought and the functions of governance. In the same way that systems ecology emerged in response to new governance pressures, so ecology itself can be read as a response to the governance needs of the modern industrial state.

The need to explicitly conceptualise the relation between humans and their environment arose as part of the post-Enlightenment development of the modern state (Horkheimer and Adorno 1972). Extending Foucault's conception of biopolitics, Rutherford (1999) has argued that the need to govern and sanitise large populations in the 19th century led to the need for technologies of state that invented populations and the environment as objects to be mechanistically managed,

...in this process, not only does the idea of a measurable and manageable population come into existence, but so also does the notion of the environment as the sum of physical resources upon which the population depends (p.37).

The man [*sic*]-environment relation is posited as one of exploitation of the environment as a 'resource'. From these beginnings specialised areas of knowledge such as biology, ecology and economics began to emerge (Worster 1977). Modern biology and, in particular, systems ecology, hold this presumption at their very core: consider the agro-economical vocabulary employed by these disciplines such as carrying capacity, efficiency, yield, populations and so forth.

Debates over the metaphorical basis for ecological understandings of nature occurred in the early formative years of the discipline, most notably in the exchanges between the American ecologist Clements (1916), who argued for an organicist conceptualisation of ecological units (i.e. a community-based approach), and the British ecologist Tansley (1935) who, in rejecting an organistic analogy, led ecology down a mechanistic conceptual path (i.e. a species-based approach) (Worster 1977). However, the invention of 'manageable populations' is

indistinguishable from the emergence of ‘manageable environment’, as evidenced by the conceptual continuities between population biology, island biogeography, and conservation biology (MacArthur and Wilson 1967). Ecology retained its mechanistic heritage as a form of ‘biological economics’ (Wells *et al.* 1934).

4.2.3 *From Equilibrium to Diversity*

As ecology became established as a formal discipline and global science, these debates became implicit, and the mechanistic analogy became generally accepted with the explosion of research that resulted from systems ecology in the 1960s. The acceptance of equilibrium encouraged the idea of nature as a static system, requiring humans to limit and manage their interference accordingly. At its root, the assumption that natural systems tend towards equilibrium has led to an axiomatic association of ‘ecological worth’ with ‘lack of human influence’ (Barbour 1996), embodied most notably in Clements’s climax theory of vegetation communities.

It is this belief in the limits of ‘natural equilibrium’ that prompts the need to preserve stability, and hence diversity. Equilibrium theory argues that as competitive exclusion occurs between species (i.e. through progressive niche formation), the energetic transfers between them are maximised, and that the maximum energetic state of an ecosystem will be able to support the maximum level of biodiversity. This stability-diversity relationship, established by the founders of systems ecology (Odum 1953; MacArthur 1955; Elton 1958), and used as the basis of conservation biology, was formulated by solidly welding the long-standing theme of diversity, traceable through Linnaeus and Darwin, to the mechanistic discourse of equilibrium, supplied by systems ecology and the ‘limits-to-growth’ discourse of environmentalism. Appendix 3 offers a detailed discussion of how this metaphor was transmuted into the concept of biodiversity, interrogating Wilson’s work in more detail than is possible here.

The stability-diversity relationship has come under increasing scientific debate since the 1960s, as ecology has undergone a period of general questioning of its equilibrium concepts,

coterminous with a general shift across the sciences towards theories embracing dynamism (Gleick 1988; Botkin 1990). As McCann states,

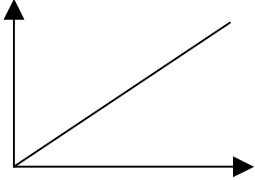
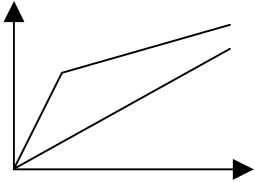
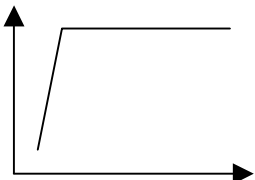
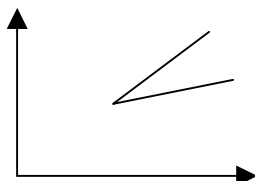
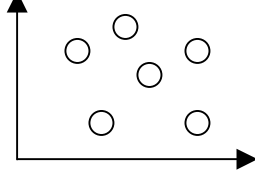
Much of ecological theory is based on the underlying assumption of equilibrium population dynamics...these are strong assumptions with no *a priori* justification (McCann 2000, p.228-9).

The stability-diversity hypothesis represents one of a number of potential relationships between ecosystem processes and species numbers (Table 4.1). Ecosystem processes represent a measure of energetic activity within an ecosystem (i.e. its productivity), while number of species indicates diversity.

In the first case of classic stability-diversity, a reduction in the number of species associated with decreasing stability results in a corresponding reduction in ecosystem productivity and resilience. Stability is therefore key to maintaining optimum ecosystem processes. In the second case, species act like rivets holding the ecosystem together, and while some will be expendable with little effect upon ecosystem processes, the loss or removal of others will have a potentially catastrophic effect upon the functioning of the overall ecosystem. A wide variety of possible trajectories exists for this hypothesis if stability is interrupted. In the third case, the redundant species hypothesis, it is suggested that species reduction as a result of disturbance may have little effect upon ecosystem processes, as many functions are performed by more than one species (suggesting that ecosystems are relatively resilient to disturbance).

The fourth case is derived from non-equilibrium competition displacement theory. At the most basic level, the theory of competitive exclusion contends that species cannot co-exist in similar niches but increasingly dominate a niche to the exclusion of their competitors (Hutchinson 1961). Non-equilibrium competition displacement theory argues that ecosystems actually become ossified under hyper-stable conditions, and that continuing low-level disturbance can increase species diversity by displacing dominant competitor species, creating new niches and opening the system to new competitors. The fifth possible relationship supposes that species relationship and function are so complex that reductions in overall numbers cannot be used to infer any general impact upon ecosystem process. In this case, disturbance produces idiosyncratic responses in ecosystem processes.

Table 4.1: Relationships between ecosystem processes and species numbers

<i>Hypothesis</i>	<i>Description</i>	<i>Relation between number of species (x) and ecosystem processes (y)</i>
Stability-Diversity (Elton 1958)	Ability to recover from disturbance and energetic efficiency decreases with fewer species.	
Rivet (Ehrlich and Ehrlich 1981)	Some species redundant, some vital. Species loss has non-linear effects on stability. Possibility of catastrophic failure.	
Redundant Species (Walker 1992)	Ecosystem processes only decreased if all representatives of a functional group are lost.	
Non-Equilibrium Competition Theory (Huston 1994)	Disturbance disrupts competitive exclusion in ecosystem, increasing diversity.	
Idiosyncratic Response (Lawton 1994)	Changes in diversity alter ecosystem functioning in unpredictable ways, as species have complex roles.	

Source: Huston 1994; Gaston and Spicer 1998

In each case, the relationship between stability and species numbers is different. Recent research concerning the contribution of trophic relations to stability exemplifies the complexities of this debate. Chesson and Huntley (1997) have suggested that stability requires variability in ecosystems, and populations capable of exploiting it through the existence of a variety of potential trophic energy flows through an ecosystem, which results in relatively weak interactions between species. Thus, the fewer species that remain in an ecosystem, the stronger the energetic ties between them would be expected to become, and the more vulnerable the ecosystem would be if one were removed. However, experiments confirming the dominance of weak interactions between species in complex ecosystems highlight the disproportionate effect the removal of certain key species can still have upon the ecosystem (Paine 1984). Similarly, much experimental data exists to suggest that invasions into an ecosystem, an increasingly active force in the globalised world, often have a weak impact upon ecosystem processes (Williamson and Fitter 1996), and can act to maintain functional diversity within the system.

The failure to consider natural systems as open systems, both geographically and energetically, introduces a value discourse of the types of ecosystems that are considered 'natural'. This value discourse is inherently scalar, as the scale at which the environment is articulated will reflect ecological assumptions about its connections (or not) with the wider landscape. The relations between ecological models and knowledge, value discourses and scalar practices ground the politics of ecology, and are explored in detail in Chapter Eight.

No clear resolution has been reached upon the stability-diversity debate, due to the experimental difficulties of capturing the complexity of whole ecological communities, defining 'stability' (McCann 2000), attributing causality to diversity (Tilman 2000), and of scaling between systems (Gaston and Spicer 1998). The function of stability is further problematised by May's Stability Paradox (1986a; 1986b), which shows that steady rates of change in population densities can result in static population levels, cyclical population dynamics, or seemingly chaotic population trends.

It is important to note that there is more experimental evidence supporting the stability-diversity hypothesis than not (Tilman 1996), and that it remains generally accepted. The preceding argument should not be read purely *contra* the stability–diversity hypothesis, as different models are required to describe different ecosystems. Similarly, it is not intended to undermine the precautionary principle of sustainable development (O’Riordan 1995b). Rather, what is being argued here is that scientific models of stability have been simplified, mutated and uncritically incorporated into environmental ideas and value discourses, including that of biodiversity, showing the degree to which the discourses of environmental mechanism and ‘limits-to-growth’ permeate the genealogy of cultural and scientific environmental knowledges. As Sandiland argues,

...the limits that appear in ecology have much more to do with (particular) human, social ideas of the real, the good and the possible than they do with some inherent dividing line in nature (1999, p.80).

As the culmination of a century of ecological thought, biodiversity implicitly subscribes to the idea of natural limits, and hence social limits that are required in order to maintain stability. As Ehrlich and Wilson (1991) note, ‘in biodiversity studies, the systematist meets the economist and political scientist’ (p.758), and the ‘limits-to-growth’ discourse provides the common thread between biodiversity and economics, traceable through Malthusian populations, the ‘environment’, and systems ecology. The marriage of biodiversity to the wider project of sustainable development is founded upon this compatibility. Building upon this critique, the next section explores how the biophilic ethic of biodiversity has been subsumed by the economistic logic of the CBD.

4.2.4 *The Convention on BioDiversity*

The CBD sets out the structural and legal framework for global biodiversity conservation, and this section describes its immediate history and main components. A developmental critique of the CBD adds a contemporary flavour to the analysis of global ecological discourse above, both in relation to sustainable development, and its implementation within the national arena.

The United Nations General Assembly convened the first Conference on the Human Environment in Stockholm in 1972, in response to the recognition by a significant number of nations that environmental protection and action was required on a global scale. UNEP was established in the wake of Stockholm as an umbrella organisation embracing all UN activities impacting upon the environment. UNEP provided an international political focus for global environmental science programmes, such as the IBP and IGBP, and formed sub-groups such as the International Panel on Climate Change to commentate on the state of the global environment. Stockholm also prompted the formulation of the World Conservation Strategy, released in 1980, which drew up plans for national and regional strategies to conserve biological resources, and provided intellectual and practical guidance for living resource conservation (Glowka *et al.* 1994). The World Conservation Strategy proposed a nesting of national and sub-national conservation strategies to achieve the implementation of international conservation convention aims, providing a direct precursor to the format and content of the CBD.

Throughout the 1980s, species loss and the destruction of the rain forest came increasingly into view of the public eye. In 1987, the UNEP Governing Council set up the Ad Hoc Working Group of Experts on Biological Diversity and Biotechnology, later merged (despite U.S. objection) and renamed the Intergovernmental Negotiating Committee for a Framework Convention on Biological Diversity, to explore the possibility of a biodiversity convention to unify, coordinate and broaden the remit of global conservation efforts (*ibid*). The group first met in 1988, and concluded that existing conventions, covering natural sites (e.g. the World Heritage Convention), endangered species (e.g. Convention on International Trade in Endangered Species), specific ecosystem types (e.g. the Ramsar or Wetlands Convention) and

groups of species (e.g. the Migratory Bird Convention) were failing to conserve global biodiversity, due to their piecemeal nature (Canadian Biodiversity Information Network 2001). In 1990, the biodiversity working group concluded that a new global treaty on biodiversity conservation was required to provide a framework for new and existing conventions.

The subsequent year, the United Nations General Assembly responded to the Brundtland Report on sustainable development (United Nations 1987), calling for a global meeting,

...to devise integrated strategies that would halt and reverse the impact of human behaviour on the physical environment and promote environmentally sustainable development in all countries (United Nations 1992).

This global meeting took the form of the UNCED Earth Summit held in Rio 1992, following up that held in Stockholm twenty years previously. Following the Brundtland Report, its focus was 'sustainable development', which proposed an environmentalist interpretation of development as,

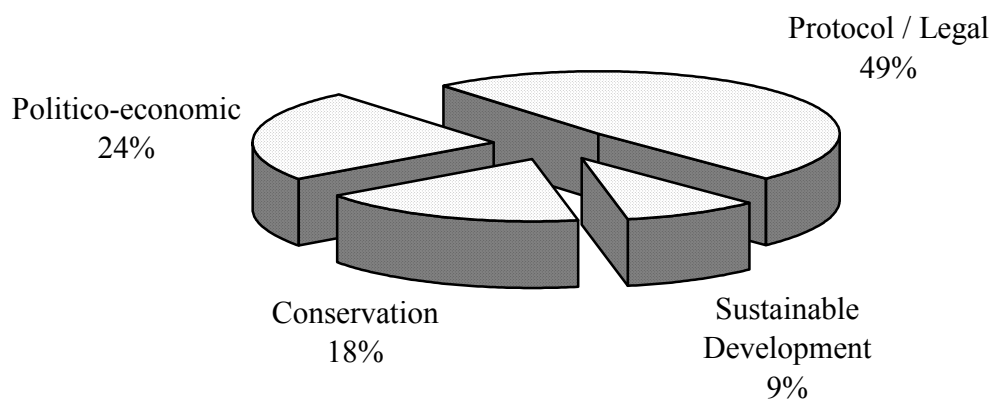
...seeking to meet the need of the present generation without compromising the ability of future generations to meet their own needs....[and] assuring the on-going productivity of exploitable natural resources and conserving all species of fauna and flora (World Commission on Environment and Development 1987, p.43).

The conference was organised around six major themes: conventions; an Earth Charter; Agenda 21; financial resources; technology transfers, and institution building (Halpern 1992). Five major instruments were signed: the Rio Declaration (statement of principles); Agenda 21 (identifying priority actions and guidelines for their achievement, including the establishment of a Commission for Sustainable Development); the Convention on Climate Change; the Convention on Biological Diversity; and a Statement of Principles on Forests. Agenda 21 represented a set of guidelines (or a 'blueprint for global action') through which the declaration of principles could be achieved. It proposed an integrated approach based upon consensus to address all areas of activity that impact upon environmental issues. Within this framework of consensus building, it also promoted flexible action suitable to a variety of specific levels and problems (United Nations 1992).

With the exception of Agenda 21, every document that arrived in Rio had already undergone a long preparatory process, and consensus was generally achieved well in advance of the Rio conference itself (Halpern 1992). The biodiversity working group met every few months, concentrating on the identification of common cross-cultural concerns, financial mechanisms, availability and access to biological diversity and technologies, and how best to involve developing countries (*ibid*). Key disagreements occurred over intellectual property rights attached to plant and gene patents, the need for costly global listings of key species and biological regions. Japan and the U.S. argued against the regulation of biotechnology, only finally agreeing to sovereign rights over the exploitation of national living resources, and that the benefits of any research and development derived from biological resources taken from a developing country should be made available to that country. The issue of global listings was left unresolved.

The final format of the convention aimed to ensure the conservation of biodiversity, and gave guidelines for the sharing of biotechnological products, through the development of plans and strategies to conserve biodiversity. These included *in-situ* and *ex-situ* conservation measures, environmental impact assessments of projects with potential adverse impacts on biodiversity; frameworks for commercial access to biological resources, and bio-safety measures. Between opening in Rio on the 5th of June 1992 and the 4th of June 1993, the convention received 168 signatures (although the US did not sign). Eighteen months after it was adopted, the Convention entered into force as a legally binding agreement, and signatories of the convention began developing national biodiversity action plans to enact global biodiversity conservation (CBD Secretariat 1995).

The wedding of environmental conservation to resource exploitation lies at the centre of the CBD, and separating its forty-two articles and three annexes into scientific, cultural, political and economic concerns by principle topic gives an insight into the overall focus of the CBD (Figure 4.2, see Appendix 4 for a full list of articles).

Figure 4.2: Politico-economic and conservation concerns in the CBD

Source: CBD Secretariat 2002

As may be expected, the figure shows that half the articles deal with documentary protocols and legal agreements. Nevertheless, beyond this, the document is orientated towards political and economic factors, such as the transfer of financial benefits accruing from biotechnology, than actual conservation principles and procedure. The political emphasis of the document may be inevitable given its status as an internationally binding agreement, but is notable for its direct coupling with economic factors. While the US failed to sign on the grounds that the commercial use of biological resources was not given enough emphasis, the incorporation of any commercial interests into the arena of wildlife conservation was not unproblematic. Thus, the convention has apparent fundamental contradictions within it. For example,

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding (CBD Secretariat 2002, Article 1).

The consistent treatment of biodiversity as a resource, and its subsequent economic valuation, means that in a market situation those countries with the most wealth will be able to procure

the lion's share of environmental resources, while the importance of environments to indigenous peoples will be systematically undervalued. Given this, McAfee (1999) claims the CBD is a form of 'green developmentalism' (O'Connor 1988) practised by the World Bank, which acts to extend the current global economic inequalities into the sphere of environmental resources, based upon a newly created legal geography of global ecology. The CBD subsumes ecological concerns into the economic status quo, whereby,

Green developmentalism attempts to maintain a separation between environmental problems and broader political-economic issues...By providing a rationalisation for the pursuit of green goals without reversal of the long-term net transfer of financial and material resources...green developmentalism reinforces environmental injustice on a world scale (McAfee 1999, p.135).

From this point of view, the economic and institutional power of the Western world has allowed it to 'tame the CBD' (*ibid*, p.141), and impose a pro-capitalist set of meanings.

The CBD favours technocratic solutions rather than socio-structural change, but not, as the above quote suggests, because it separates environmental problems from political-economic issues, but rather, as the genealogy of ecological discourse argued, because it builds upon a deeper level of compatibility between the two domains. As the last section argued, the relations between biodiversity and economics are historically rooted through the systematic construction of nature as resource, in response to the developing needs of modern state governance. The internalisation of this relation is exemplified by the transformation of nature into 'environment', which reflects the systematisation of society-nature relations under the paradigm of equilibrium.

These features of biodiversity have serious ramifications for the implementation of the CBD within national, local and urban arenas. Escobar (1996) argues that it is the discursive transformation of nature into a resource under the rubric of sustainable development that has led to the emergence of planning as a key architect of both sustainable development, and conditions of capitalist production and consumption more generally. This opinion is echoed by theorists dealing with applied sustainable development and planning in the First World (Eden 2000), and becomes especially relevant to the implementation of biodiversity through arenas of governance such as urban planning that are considered in Chapter Eight. Before

moving on to consider the urban sphere, it is necessary to consider how biodiversity conservation has been institutionalised in the U.K., a task requiring some discussion of the legacy of nature conservation.

4.3 Implementing the Convention on BioDiversity in the U.K.

4.3.1 Nature Conservation in the U.K.

Nature conservation is inherently political, being founded upon an intriguing relationship between value and science. A recent government report on the U.K. biodiversity process notes,

...the range of people's values for nature mean that some organisms, habitats and landscapes are more highly valued than others...while value judgements cannot be described as 'scientific', scientific methods can be used to defend conservation value (POST 2000, p.4).

As discussed for biodiversity conservation above, nature conservation displays a complex mixture of values and science. However, a major difference can be identified between them, related to the scales that they privilege. The discourse of biodiversity discussed in the previous section lacked background normative cultural values or a governing body to impose a common value upon the CBD process, precisely because it operated at the global level. As a result the dominant underlying values became implicitly incorporated: namely the 'limits-to-growth' axiom of modern environmentalism, itself a product of the demands of national governance. In contrast, the national conservation traditions upon which biodiversity conservation is superimposed are underpinned by a well-developed residual set of national cultural and institutional values. This section examines the tradition of nature conservation in the U.K. to bring out the actual and potential disjunctures and compatibilities between the two arenas.

As the Industrial Revolution stimulated the cultural backlash of romanticism and ideological invention of the rural idyll (Williams 1973), so the concomitant (sub)urbanisation (and mobilisation) of the population stimulated new practices of engagement with nature (Adams

1986; Bunce 1994). Naturalism went from the preserve of eccentric church-men such as Gilbert White in 1789 (Worster 1977) to a major national past-time, with amateur naturalist clubs and societies boasting over 100 000 members by 1873 (Allen 1976). This interest was paralleled by the support for preservation of species, with the foundation of the Royal Society for the Prevention of Cruelty to Animals in 1824, and the Royal Society for the Protection of Birds in 1904. The recreational valuing of nature, or more precisely unspoilt natural spaces, also emerged over the course of the Nineteenth century from its beginnings with the Commons Preservation Society in 1865. The preservation of Wimbledon and Putney Common in 1871 by Act of Parliament for ‘public use under the care of conservators’ (Adams 1986, p.46) set a precedent that culminated in the establishment of the National Trust for Places of Historic Interest or Natural Beauty in 1894, and the National Trust Act (1907) that made their holdings inalienable except by parliamentary decree. It is interesting that this strand of the conservationism emerged from concerns over the provision of natural and semi-natural spaces in the city. These decisions set the precedent for conserving nature through the preservation of specific areas of private land, but not for the future influence of urban affairs over nature conservation.

The related concerns of naturalism and recreation constituted a continual source of tension within the conservation movement (Adams 1997), and by the Second World War there was pressure on the government not only to curb urban development, but establish both national parks and nature reserves (Sheail 1976). The post-war Huxley committee, set up to advise on nature conservation, recommended a hierarchy of site designations be introduced, with four designations lying between national and local nature reserves, and the establishment of a separate ‘biological service’ to run these reserves (Huxley 1947). The three leading members of the Wildlife Conservation Special Committees that delivered the Huxley report (Julian Huxley, Arthur Tansley and Max Nicholson) were ecologists, and argued that conservation should be achieved through the ‘effective pursuit of science in the national interest’ (Adams 1996). The reserves were established with the founding of the Nature Conservancy.

At that time, ecological research required a range of vegetation types and habitats to use as ‘outdoor laboratories’, making the site-based conservation hierarchy a perfectly complementary system. The concept of national nature reserves also fitted in with proposals

for the nationalisation of planning, implemented in 1947 through the Town and Country Planning Act (Sheail 1976). Proposals in the Huxley Report for wider, less intensely managed conservation areas fell by the wayside in acts such as the National Parks and Access to the Countryside Act (1949), which segregated nature reserves from the wider landscape.

The institutionalisation of nature conservation began ‘the great divide between ‘scientific’ nature conservation and the conservation of landscape and amenity’ (Adams 1986, p.58). The subsequent history of nature conservation is in many ways that of the establishment of relations between the naturalist movement and formal ecology within the pragmatic constraints of governance. Although ‘conservation discourses are imbricated with the practices, mind-sets and narratives of the science of ecology’ (Adams 1997, p.280), scientific legitimisation for site conservation declined through the 1950s and ‘60s, as research ecology, under the influence of the systems ecology paradigm, moved away from habitat-based field experimentation towards reductionistic lab-based analysis (McIntosh 1985).

In 1973, this growing divide was internalised, with the Nature Conservancy being split into an executive body (the Nature Conservancy Council (NCC)) under the DoE, and a scientific research body (the Institute of Terrestrial Ecology) under NERC. This move effectively,

...ended the Nature Conservancy’s attempt to apply ecology to all ecosystems and all aspects of national economic life. It...focused engagement between conservation and ecology on the specific area of reserve management (Adams 1997, p.282).

This site-based system created the need for management knowledge, and ecologists ‘presented themselves as the ideal scientific ‘managers’ of the environment, the engineers of nature’ (Livingstone 1995b, p.368). The essentially static conception of nature embodied in the principle of preserving a diversity of ‘unspoilt’ areas was extended through ecosystem energetics and systems ecology to management plans that aimed to preserve natural equilibrium in a quite mechanistic manner. In this way,

The words and concepts borrowed so blithely by ecologists from engineering to describe nature, such as ideas of thermodynamics, energetics, equilibrium and control, were absorbed uncritically by conservationists (Adams 1997, p.285).

The role of systems ecology in undermining the scientific justification for conservation, while simultaneously providing a management framework, is key to understanding the ideas and methods of contemporary conservation.

The discrete site-basis for conservation has endured in the absence of scientific need, and a continuous body of work concentrating on the classification of the diversity of British vegetation communities can be traced from Tansley's (1911) *Types of British Vegetation*, through to Rodwell's (1991) *National Vegetation Classification*. The importance of classification in allowing conservation concerns to influence other areas of decision-making is well established. Tansley's classification, based upon the survey work of the Botanical Exchange Club, was used by Rothschild in 1915 to lobby the government to stop the ploughing of areas of natural value (Sheail 1976). Tansley's subsequent classification of 1939 was used as the basis for the selection of National Nature Reserves (NNRs) and Sites of Special Scientific Interest (SSSIs).

Ratcliffe's *A Nature Conservation Review* of 1977 cemented the principle that every type of habitat should be included in a site protection system, despite the diminished scientific need for a diversity of 'outdoor laboratories'. Rodwell's *National Vegetation Classification* in 1991 represented the culmination of this trend, in proposing a representative classification based upon a vast amount of survey data, with the aim of guiding site conservation and planning decisions. The logic of classification that emphasises the need to retain a representative diversity of vegetation types thus outlived its scientific origins, becoming central to the conservationist agenda as a tool with which to influence the national spatial planning system.

As the politics of the nature conservation movement became re-invigorated by environmentalism in the 1960s and '70s, the NCC became more of an in-house pressure group upon government (Cotgrove and Duff 1980), fighting extensively against agricultural organisations such as the erstwhile Ministry for Agriculture Fisheries and Foods. Conservation policy became increasingly divorced from national concerns that extended beyond agriculture. The Wildlife and Countryside Act (1981) represented the first concerted attempt to add a statutory underpinning to the site-based (particularly SSSI) protection of individual species and

natural habitats, through a system of fines and compensation, but lack of details concerning exactly who would pay for compensation to owners of designated land made the bill something of a 'dead-end' (MacEwan and MacEwan 1982, p.71). Furthermore, the bill followed rather than bridged the divide between ecologists, who emphasised the protection of habitats, and preservationists, who emphasised the protection of species (Szerszynski 1995).

The Environment Protection Act (1990) engendered a major reorganisation of governmental agencies to address a broader range of environmental concerns. The NCC was split into three statutory bodies, EN, Scottish Natural Heritage and the Countryside Council for Wales, with the JNCC being established as the Government's wildlife adviser, undertaking national and international conservation work on behalf of the three nature conservation agencies. The subsequent Environment Protection Act (1995) merged the National Rivers Authority and the government's pollution regulator to create the EA, a non-departmental public body who act as environmental adviser and regulator in England and Wales.

This institutional reshuffle further divided nature conservation into amenity, science, aesthetics and pollution concerns (Lowe 1983), and overall, the political ecology of British nature conservation can be seen as a progressive segregation of nature conservation from wider concerns. The reconciliation of these conceptual and institutional divisions through sustainable development, and specifically the implementation of the CBD, is now explored with reference to the UKBAP. Section 4.4 considers these themes together in order to discuss points of potential confluence and divergence that structure the subsequent study.

4.3.2 *The U.K. Biodiversity Action Plan*

The UKBAP, published in 1994, sets out exactly how the CBD is to be interpreted through existing British institutions and traditions (DoE 1994a). The UKBAP was drawn up in consultation with over 300 organisations by the JNCC, in accordance with the consensus-based approach advocated by Agenda 21. It does not consider the issue of biotechnology, which is dealt with in the U.K. Strategy for Sustainable Development (DoE 1994b). The UKBAP is written in three sections: the first outlines commitments, the British legacy, and the role of science; the second describes the U.K.'s strategy and programmes for addressing the conservation priorities laid out in the CBD; and the third section sets out a framework for future action.

The arguments for conserving biodiversity follow those of the CBD, emphasising the importance of biodiversity as a living resource, and the interdependencies of this resource,

A balanced assemblage of species...in an ecosystem ensure the satisfactory functioning of all parts of that system...depletion of these natural resources will affect the global exchange economy (DoE 1994a, p.12).

Setting out a resource-based definition of biodiversity, drawing upon the mechanistic logic of systems ecology explored above, allows an economic argument to be made for the sustainable management of this resource.

Chapter Two, 'The U.K. Science Base', is of particular interest in its description of how this approach can be accommodated within the British ecological and conservation tradition. A disciplinary progression is outlined, moving through taxonomy, biological systematics, biogeography, ecosystems, island biogeography and population biology. These disciplines draw directly on the stability-diversity paradigm of conservation ecology outlined in the previous section. It is argued that this progression is manifested in the U.K. tradition of nature conservation, through a temporal sequence of emphasis upon collections, site-based preservation, and finally scientific institutions.

This history is discussed uncritically, with no recognition of the conceptual and political tensions that structure it, and is presented as a progression, rather than a splintering, of concerns. The introduction of EIAs in the 1980s, and the Government's first White Paper on the environment (DoE 1990), are discussed as major points at which the holistic approach demanded by the CBD can be realised (DoE 1994a, p.22): EIAs through their unification of habitat protection with pollution control; and the White Paper by emphasising the need to ensure that, 'sound science underpins our policy and programmes' (DoE 1994a, p.22).

Chapter One notes that the definition of biodiversity includes three levels of biodiversity: diversity between and within ecosystems and habitats; diversity of species; and genetic variation within species. Some of the scientific difficulties raised by this triple problematic, such as the relations between ecological scales, are acknowledged at the end of Chapter Two. There is recognition of the need to expand the scientific approach, but no discussion of how the scalar uncertainties associated with biodiversity are to be negotiated. This broadening of scope takes two forms: increased monitoring of habitats and species areas, numbers and health, and a stronger emphasis upon research. This is a task that has been undertaken for specific species and habitats across Britain in the past- recording certain species of birds, for example, has always been of importance to the popular nature conservation movement. However, the concept of biodiversity as a 'resource' demands that monitoring is formalised, standardised and undertaken scientifically (DoE 1990).

Two important issues follow from this. Firstly, the emphasis upon monitoring occurs alongside the traditional emphasis upon preservation of rare and 'unspoilt' habitats and species through spatially discrete site-based conservation. The common link between these very different approaches is the logic of classification that is used for each. Chapter Three examines the current state of U.K. biodiversity using the National Vegetation Classification (NVC) to assess habitat types, and the so-called Red Data Books (RDBs) that cover rare species by taxonomic group. The NVC is based upon a number of ideal habitat types, while the RDBs are only available for a limited number of taxonomic groups, and concentrate exclusively upon species that are rare in the U.K. As the UKBAP notes, the RDBs need to cover all major taxonomic groups, and include species of national and international importance, not just

national rarity. It is suggested that these pre-existing classifications are expanded, in addition to the identification of species and habitats of importance to the UKBAP in particular.

Secondly, the emphasis upon monitoring itself raises a number of challenges. Firstly, monitoring requires spatio-temporally coherent datasets. There is an overall lack of survey data across the majority of the U.K., and it is only specific sites that can boast coherent datasets, and even then usually only for a highly selective range of species. This dearth is a result of the difficulties of surveying, which is time-intensive, often requiring equipment and trained personnel, and hard to standardise in any meaningful way. The UKBAP suggests that this problem is avoided by concentrating upon surrogate and proxy measures for biodiversity. ‘Indicator species’ take the fortunes of one species as representative of overall biodiversity in an area or system, while ‘pressure measures’ infer biodiversity and ecosystem functioning from key environmental conditions. Proxy measures have the advantage of being cheaper and quicker than complete surveys of biota, but their status and reliability is often unclear:

I’m very nervous when you mention indicators, because I’m not sure we have a common idea in the U.K. of what we mean by it. I think there are at least four very different definitions of what a biodiversity indicator is (Biodiversity Information Systems Officer, JNCC, 17th January 2001).

The report acknowledges the need to use varied sources to monitor biodiversity adequately, such as Geographical Information Systems (GIS) land-cover maps to assess habitats, indicator species, or using the large networks of voluntary conservation organisations along the lines of the common bird census.

Proposed action in the report bifurcates down two potential avenues. Firstly, by suggesting the modification and extension of the site-based national system of conservation sites to reflect the international conservation priorities enshrined in the CBD, and secondly, by the setting of targets and goals within local action plans. Local Authorities are required to produce an action plan facilitating action across sectors, and the UKBAP emphasises the need to produce guidance and policy to allow local authorities to fulfil this role. Key species and habitats are identified within the LA area as being of importance, either nationally or locally, and action plans are drawn up detailing the resource, targets for its conservation and enhancement, and actions to achieve this. A number of key documents informing this process are examined in

Chapter Six, such as the guidance notes for the drawing up of LBAPs, and PPG 9, released in the wake of Rio, concerning nature conservation and planning. These key areas of emphasis in the UKBAP are reflected in the choice of case studies used in this research, that address formulation and implementation at the local level.

4.3.3 Biodiversity and Nature Conservation Compared

Both biodiversity and nature conservation are inextricable from the values and concepts bound up with ecology, and the wider dynamics of environmentalism over the Twentieth Century. This section considers the conceptual, practical and institutional congruencies and disparities between these approaches to nature.

The process of industrial-agricultural expansion in Nineteenth Century Britain stimulated a similar response from Nineteenth Century naturalists as the global expansion of capitalist development into the rainforests of the Third-World did from conservation biologists in the latter half of the Twentieth Century. The idea of a stable nature is defined dialogically against the idea of human disturbance, leading to the assumption that nature requires preservation from human destruction. This axiomatic model of society and nature underpinned the emergence of ecology in both cases, at first the national, and then the global scales, although its specific scientific articulation varied. Articulating this process another way, the national origins of international science impart both a similar axiomatic basis, and the establishment of global science represents an extension of the dominant scalar hierarchy of ecology.

The ‘limits-to-growth’ conceptualisation of the relationship between society and nature structures both the aesthetics and practices of the U.K. nature conservation tradition and the ethics of global biodiversity conservation. The dualism of society and nature allows both the conceptualisation of the environment as resource and the development of a preservationist ethic, exactly because nature is idealised as separate from human action. Subsequent reconciliation between economic development and conservation concerns is founded upon this dualism, through the insertion of biodiversity as a resource into a market equation.

The desire to impose limits represents a masculine psychological ordering of the relationship between humans and their environment (a desire to control), classically cast as a man [sic]-environment relationship (MacCormack and Strathern 1980), resulting in an asymmetry, whereby only the negative effects of humans upon the environment are visible. When given statutory underpinning this preservationist bias can be unhelpful, ‘one of the dangers of a no net loss policy is that you end up with no net gain either...no net loss ends up meaning no net gain’ (UNESCO Man and Biosphere Forum contributor, WT Regional Director for the Midlands, 11th January 2001). The opposition between society and nature, which underpins the political ecology of nature conservation and biodiversity, is the major conceptual continuity between them, but operates against the holistic approach that the rhetoric of sustainable development advocates.

This point assumes added poignancy in the urban context, where the environment is typified by human disturbance. From a structuration point of view (Giddens 1984), a duality always constrains and enables simultaneously, and readings of the relation between society and nature are possible that reveal the beneficial aspects of human impacts upon the environment, such as the creation of new habitats through human development. A key feature of post-Rio environmental discourse has been the so-called ‘browning’ of the environment, whereby traditional ‘green’ environmental concerns, such as the plight of rare exotic species, have given way to issues of sustainable development and environmental justice, such as overall environmental quality. This shift introduces a tension between traditional preservation, and proactive enhancement of the environment.

In line with the approach of sustainable development, biodiversity conservation is to be worked out in each locale:

Our role is to say biodiversity is something you should be considering...it is the people who are the implementers and deliverers who make the judgements because they’re working with it on the ground- we’re not, we don’t do anything on the ground (Deputy Director, U.K. Biodiversity Policy Unit, 29th November 2000).

The mediation between these two readings of the human-environment interface is nowhere

more tangible than in the urban sphere, and the terrain in which these dynamics unfold is explored in Chapter Five.

The emphasis of biodiversity action planning upon the work of volunteers at the local level is a major source of convergence with the traditions of nature conservation. However, this tradition must accommodate the managerial emphasis of biodiversity conservation upon monitoring and research, and the integration of local and national records. The marriage of the managerial and science-driven elements of biodiversity conservation to the lived experiences of voluntary workers (Macnaghten and Urry 1998) and wildlife NGOs is crucial to the operationalisation of the biodiversity process. The integrationist agenda of biodiversity requires the enrolment of new stakeholders into the British wildlife institutional terrain. This tension is expressed linguistically between 'biodiversity' and 'wildlife': 'biodiversity' extends conservation across a range of concerns, invoking a more rationalistic approach that can appeal to a wide range of stakeholders, while 'wildlife' draws on a much narrower, but stronger, discourse of grass-roots action. The practical marriage of the two traditions underpins the practical success or failure of the biodiversity agenda.

Lack of resolution upon the question of classification in the CBD has meant that classification is occurring largely along pre-established national lines. A new list of protected species and habitats has issued forth from the UKBAP itself that overlaps and stands alongside RDB species lists, protected habitats and so forth. As recognised in the UKBAP, a more integrated conservation categorisation system must be driven by proactive knowledge of what flora and fauna actually exist in an area, but this imperative requires extensive standardised surveying, and still begs the question of what spatial scale constitutes an area. A number of different elements can be extracted from the official definition of biodiversity (Table 4.2), and each of these biological units entails a very different spatial logic of conservation.

Table 4.2: Scaled elements of biodiversity

<i>Ecological Diversity</i>	<i>Genetic Diversity</i>	<i>Organismal Diversity</i>	<i>Scale</i>
Biomes		Kingdoms	Global
Bioregions		Phyla	Regional
Landscapes		Families	Landscape
Ecosystems		Genera	Landscape
Habitats	Genes	Species	Site / ex situ
Niches	Chromosomes	Subspecies	Site / ex situ
Populations	Populations	Populations	Inter-site / ex situ
	Individuals	Individuals	Site / ex situ

Source: Heywood and Baste 1995; Gaston and Spicer 1998

While proponents have suggested that the components of Table 4.2 interlock (Noss 1992), the U.K. model for nature conservation emphasises the protection of specific sites and species. This evolved out of the origins of nature conservation with wealthy landowners purchasing land perceived to be ‘unspoilt’ privately for conservation that fed into the remit of the National Trust (Gaze 1988), and the amateur naturalist traditions of species collection. This model of conservation was endorsed (via the selective adoption of elements of the Huxley Report, 1947) through its compatibility with the site-based planning system introduced by the Town and Country Planning Act (1947).

The question of the optimum size and distribution of discrete habitats in a landscape needed to support various levels and types of biodiversity (Soulé 1987) forms the central pre-occupation of conservation planning. This field has traditionally been dominated by MacArthur and Wilson’s (1967) model of island biogeography (Margules and Pressey 2000), which states that species numbers are limited by the size and connectivity of islands. Their model has been transplanted into terrestrial conservation planning to model the optimum size and distribution of conservation sites in a landscape.

There is thus a major congruency between site-based British nature conservation and biodiversity conservation, which can be traced again to their common separation of nature from society. Concordant with the stability-diversity model, only species and habitat diversity is recognised within the site conservation system. However, given the complexities of the stability-diversity model discussed above, conserving biodiversity at the other scales indicated in Table 4.2 is a potential challenge to maintaining long-term ecosystem health.

Given the plethora of land-use planning issues that demand consideration in the urban context, the incorporation of biodiversity into a landscape is inflected by questions of scale. The drawing up of action plans negotiates this tension at a basic level, as HAPs and SAPs need to be matched up with the existing geographical network of protected sites in a LA area. New models of conservation planning that challenge the dominant site-based scale of conservation are investigated in Chapters Seven and Eight.

4.4 Conclusions

The recent political and ecological ascendancy of biodiversity has been outlined, and contextualised in terms of its conceptual and institutional heritage. Its gestation was traced through the mechanism of systems ecology and the limits-to-growth discourse of popular environmental consciousness. The subsequent incorporation of biodiversity into global ecological governance in the CBD reflects its underlying origins as an economic and managerial discourse of nature. Key points of similarity and difference were identified between the UKBAP and the British tradition of nature conservation, in order to guide the applied analysis of subsequent chapters.

Both adhere to a 'limits-to-growth' conception of society-nature relations, but whereas this translates into a resource-based conception of nature under the rhetoric of biodiversity, it engenders an aesthetic sensibility in British nature conservation. The tendency of nature conservation to be driven by voluntary work and NGOs fits the intended local political profile of biodiversity conservation, but these networks may have problems achieving scientific levels of monitoring, and involving conservation concerns with traditionally distant activities. The transformative potential of biodiversity conservation may be limited by the continuing emphasis upon site-based conservation and rare species.

The superimposition of the global political ecology of biodiversity upon the national traditions and institutions of nature conservation may be problematic, especially in light of the integrative aims of sustainable development within which policy is increasingly couched. As Margules and Pressey (2000) state,

Conservation planning is riddled with uncertainty...uncertainty pervades the use of biodiversity surrogates, the setting of conservation targets...decisions about how best to locate, design, implement and manage new conservation areas...competition from other uses (p.251).

This thesis explores how these myriad uncertainties are being manifested and played out through the dominant scales of ecological governance in the U.K., and in a specifically urban

setting in which ecological concerns are juxtaposed practically and ideologically against other uses in an acute manner. Chapter Five explores how these tensions fit into the legacy of urban and brownfield planning in the U.K.

Chapter 5 Nature and the City

5.1 Introduction

Chapter Four argued that ecology and nature conservation are underpinned by an antagonistic relationship between society and nature, manifested as a scientific paradigm of equilibrium and cultural preservationist discourse. This chapter develops this theme, contending that the British planning system adheres to a similarly antagonistic conception of society and nature, through its fundamental division of national planning into urban and rural spheres. It is argued that this national binary geography nourishes a negative pejorative discourse of urban areas, and particularly brownfield sites, as anti-natural spaces. This discourse is reinforced by the scientific and aesthetic bias of ecology and nature conservation against environments characterised by human disturbance, such as urban environments. However, it is possible to identify ecological and popular movements that recognise and value the dynamic character of urban environments, and these are explored as potential sources of support for formal urban LBAPs.

Section 5.2 discusses how the early town-planning movement became subjugated to the dual ethic of urban containment and rural preservation in the establishment of the modern British planning system. The emergence of brownfields as a national planning problem and subsequent incorporation into and identification with the urban agenda is outlined, and the sublimation of this discourse onto current urban regeneration policies is analysed. Although the term brownfield is not mentioned in the 1988 Oxford English Dictionary, it is representative of a more diffuse cultural reaction to industrialisation and urbanisation, which exerts a major discursive influence upon the contemporary agenda of sustainability. Brownfield sites are explored as a microcosm of the wider cultural split in British culture.

It is argued that under the aegis of sustainable development, environmental aspects of brownfields have been reduced to considerations of contamination and remediation, concealing their ecological worth and legitimating a range of economically oriented urban regeneration policies, that reinforce a developmental discourse of urban space. The

implications for urban form, and specifically attempts to conserve urban biodiversity, are explored through a consideration of current urban regeneration and housing policies that prioritise economic development on brownfields.

Section 5.3 considers the dynamic status of urban space and brownfields in order to present an alternative reading. Rather than 'spare' or 'wasted' urban space, it is suggested that brownfield sites represent the continual transformative element of urban space. Problems of definition, turnover and hidden dereliction are described as factors contributing to the difficulties of managing these disruptive spaces within a traditional planning framework. These transitional qualities lend unique social and ecological qualities to these spaces in the urban landscape. Periodic disturbance of sites give rise to non-equilibrium ecologies, while the stochastic physical factors associated with the specific histories of brownfield sites exaggerate the general traits of urban ecology, which escape traditional ecological, and indeed cultural, categories. As spaces that are constantly created, disturbed and destroyed, they frustrate equilibrium models of ecology, and conflict with the dominant cultural aesthetics of 'nature' conservation.

The liminal status of these spaces has made them key spaces for grass-roots movements that have sought to recover nature in the city, and they have become a recognised natural resource in the city. The role of these spaces as focal points for the rediscovery of urban wildlife is explored over the last thirty years, using Moseley Bog in Birmingham as an example that has importance at the national and local levels. As grass-roots social movements, these networks have not only forced positive formal recognition of these spaces, but provide a framework through which the LBAP process has been articulated in the urban context.

These two discourses of urban space coexist uneasily in recent government policy. In 1998, the government set a new target for 60% of new homes to have been built on brownfield sites by 2008, in order to protect the countryside and regenerate urban areas. At the very same time, the BAP process has begun to stimulate conservation policy in urban areas (Wheater 1999), giving voluntary urban wildlife groups and communities a foothold in the mainstream planning agenda and forming an important basis for the re-articulation of these spaces.

Highlighting these two very different readings of urban space, the discussion of brownfield sites is not intended to suggest that one reading is necessarily more valid than another, but to demonstrate the dialogic relationship between different discourses of urban space. The positive informal recognition of these spaces is not intended to suggest that all formal policies concerning urban natural spaces were poor, or that cultural aesthetic bias towards environments that display little or no apparent human disturbance is 'bad'. Rather, following Chapter Four, analysis aims to show how the cultural bases of 'post-industrial' society are mediated through loaded terms of debate, that mutually reinforce political and ecological representations of urban nature.

Section 5.4 concludes by considering the conceptual continuities between the themes of Chapters Four and Five, suggesting that urban political ecology revolves around the re-articulation of the idea of equilibrium that informs the fundamental binaries of society and nature, urban and rural. It is suggested that the major practical challenge to urban biodiversity conservation is the transition to scales of planning able to articulate landscapes that are typified by dynamic interchanges between humans and nature, a task that involves addressing both the structural and conceptual biases of formal planning and conservation discourses.

5.2 Losing Nature

5.2.1 *The U.K. Planning System*

In contrast to rural areas, where agricultural land is governed partially outside the planning system and landownership is relatively static, the implementation of the CBD in urban areas is highly dependent upon planning (DoE 1994a; Rydin 1998). Planning allows a state to control the use of space across its territory and, 'as such is imperative: only the form it takes is optional' (Cullingworth and Nadin 1997, p.12). It is a fundamental force shaping geographies and the environment in which we live, and represents an 'important institutional terrain for the contestation of the meanings and relations of the natural environment' (Whatmore and Boucher 1993, p.168). Sustainable development and biodiversity conservation take place against the backcloth of planning, and this backcloth must be considered historically, as part of a highly distinctive national political ecology that structures current attempts to translate international conservation to the local level in the U.K.

It is important at the outset to distinguish between classical town planning, an aesthetic tradition dating back to Ancient Greece (Mumford 1965), and the modern town planning tradition that constituted a necessary response to the massive industrialisation and population growth of the Nineteenth Century (Nicholson-Lord 1987). The population of Birmingham grew from 71 000 in 1801 to 765 000 in 1901 (Ashworth 1968), with the last remnant of heathland that characterised the area being enclosed and built over in 1799 (Hoskins 1985). The associated transformation from an agrarian to an urbanised population created a number of environmental problems associated with sanitation and infrastructure (Ryder and Silver 1990), stimulating municipal attempts to manage and plan modern urban space. The amelioration of urban industrial squalor was of major concern to literary figures such as Charles Dickens, William Morris, and Beatrice Webb, and philanthropic industrialists such as Robert Owen and George Cadbury alike, sparking debate over the ideal spatial balance that could be struck between city and country when planning new communities. It is no exaggeration to claim that the outcome of this debate has largely determined the geography of the U.K. in the Twentieth Century.

Ebenezer Howard's book of 1898 *Tomorrow: a Peaceful Path to Reform*, later renamed *Garden Cities of Tomorrow* in 1902, represents a landmark utopian spatial response to industrialisation that combined the romanticist concerns for nature and humanistic concerns for people of his contemporaries. Howard believed that by mixing country and city in the form of a garden city it would be possible to relieve the growing urban industrial dystopia while retaining the benefits of industrialisation (Blowers and Pain 1999). Howard's garden city was a low-density poly-nuclear settlement of six small towns (9000 population) located around a central city (population 15 000). The settlements were interspersed with green space, forming an integrated regional network when spread over a landscape.

Organisation along these lines,

...would result in planning on a national scale as eventually a complete network of cities would be created covering the whole country, whilst existing cities would return to a more normal size and a more pleasant environment (Greed 1993, p.89).

The Town and Country Planning Association was formed in 1899 as a pressure group to promote Howard's Garden City principles, and his ideas were applied in the design of a number of settlements in the early Twentieth Century, such as Letchworth, built in 1903, although never applied as a regional plan.

The stabilisation of a new class structure in the early Twentieth Century, coupled with the availability of farmland, establishment of building societies and extension of road and rail networks led to the rapid suburbanisation and deurbanisation of the middle classes (Greed 1993). Between 1930 and 1940, 2.7 million houses were built (Legrand 1988), mostly located in the South East and Midlands, and mostly developing in an uncoordinated fashion as urban sprawl. Alarm at the encroachment of development into the countryside stimulated the establishment of the Council for the Protection of Rural England (CPRE) in 1925, the passing of the first Town and Country Planning Act (1932) and the Restriction of Ribbon Development Act (1935). The fact that Patrick Abercrombie, the most prominent British planner of the time, founded CPRE is indicative of the shift in the planning agenda at this time, from a concern with social well being to urban containment (Hall *et al.* 1973). This shift coincided with falling birth rates in the 1930s, and the emergence of Keynesian

economics, which replaced a paradigm of planning for constant growth with a fixed blueprint for future urban form.

The Second World War cleared the way for a modern planning system, legitimising a greater level of state intervention than would previously have been accepted. The system to 'Build a Better Britain' was delivered by the Town and Country Planning Act (1947), and no other government act has had such a structuring influence upon the political and ecological geography of the U.K. The Town and Country Planning Act (1947) followed the Scott Report (1942) into land utilisation in rural areas, which argued that agricultural self-sufficiency was a matter of national security at the time, and could only be ensured by protecting agricultural land:

It is hard to reach the conclusion that the objectives [of Scott] were rational in a strict sense. They were mystical. In the special circumstances of a war that is perhaps understandable. But the effects were felt long after the war was over. The most important was to give the new planning system a pronounced preservationist bias (Hall *et al.* 1973, p.52).

CPRE sided strongly with the conclusions of Scott, and, *contra* the Garden City approach of the Town and Country Planning Association, the separation of urban and rural planning, as much a reaction to urban sprawl as a comprehensive vision for national land-use, became the basis of the land-use settlement enshrined in the Town and Country Planning Act (1947) and the British planning system since.

Howard's vision of integrated urban and rural planning fell by the wayside as his insights were applied exclusively to urban areas. Abercrombie, one of the leading planners of the wartime era, produced the Greater London Development Plan in 1943, in which ten-mile wide green belts were used to control urban sprawl (Abercrombie and Forshaw 1943). Abercrombie went on to produce a number of city-plans, all featuring greenbelts. With the Greenbelt Circular (1955), which made it compulsory for all urban plans to incorporate a greenbelt (Ministry of Housing and Local Government 1962), the control of urban sprawl became tantamount in the planning of urban form.

Howard is, of course, cited as the father of the greenbelt. Yet the essence of his garden cities was the interpenetration of city and country. Instead, his swathes of green became *cordons sanitaires*, vaster and more intractable than any city wall...It had clearly become an instrument of containment- and, as such, an almost total perversion of Howard's ideas (Nicholson-Lord 1987, p.20-21).

The doctrines of urban containment and rural preservationism are symmetrical and mutually reinforcing aspects of a position that has almost exclusively structured the modern English landscape. For example, George Cadbury's model village of Bournville in South Birmingham was created as an urban area that retained rural characteristics. This design was undermined, however, in the post-War period, as Birmingham City Council forced the Bournville Village Trust to increase housing density in order to bring it into line with national guidelines at that time (Bryson and Lowe 1996).

While this national political ecology of an urban - rural split supported an institutional, ideological and spatial denaturing of cities, nature was incorporated into the urban fabric indirectly through the provision of open spaces, parks, greenways and allotments. Abercrombie highlighted the need for 'parkways' or green networks to give greater access to green space (Abercrombie and Forshaw 1943), and his targets for multiple-use green-space, networks of green-space, and amounts of green-space per thousand people still form the basis for the articulation of urban nature in town plans today. Abercrombie also indicated that the tendency to adopt a 'hand-to-mouth' policy in the provision of open space is unsatisfactory, and while house building is a priority on many available sites, the secondary use should be open space.

However, it is hard to ignore the pejorative suggestion running through this discourse that urban green-space is little more than a poor substitute for the countryside, and, worse, when it is designated merely as 'open' space that it is literally empty (Nicholson-Lord 1987):

Parks, however, beautiful, cannot serve the purpose of the countryside in providing an effective antidote to town-dwelling...The people of London need all the green-space they can get and nothing should be done to increase their isolation from the surrounding countryside (Abercrombie and Forshaw 1943, p.39).

The great parklands of the Eighteenth Century created out of the rural landscape around stately homes by designers such as Humphrey Repton and Lancelot ‘Capability’ Brown were deemed necessary modifications to nature, taming and making it more acceptable (Daniels 1999). Their designs went on to form the basis for the great urban parks of the Nineteenth and Twentieth Centuries. However, the establishment of a Romantic ethical and aesthetical reverence for wilderness and unmodified landscapes towards the end of the Nineteenth Century prompted the cultural degradation of artificial natural spaces, such as parks.

Urban areas became analogous with artificiality and natural inferiority in Britain. As with the creation of commons in the late Nineteenth Century, urban site protection continues to be based upon amenity, and urban wildlife concerns have largely been superimposed onto amenity concerns in the post-War era. Before considering how this discourse structures contemporary debates concerning sustainable urban environments, it is necessary to explore how the brownfield debate has bolstered the national segregation of urban and rural space, and the associated denaturing of cities.

5.2.2 *The Browning of the City*

Brownfield sites represent land that has been used and abandoned by industry. Problems of dereliction and contamination conjure up a number of negative social, economic and environmental perceptions that reinforce the moral and aesthetic dimensions of planning discourse described above. This section explores the emergence of brownfields as a specifically urban problem and their subsequent articulation in policy.

Brownfields were first recognised as a problem in the early Nineteenth Century, with Lord Dudley planting trees on his old limestone quarries at Wren’s Nest in the West Midlands as early as 1815 (Teagle 1978). The general unattractiveness of these landscapes is reflected in British culture by, ‘a long tradition of literary description which equates industrialization with squalor and degradation of the landscape’ (Wallwork 1974, p.19). In Hoskin’s *The Making of the English Landscape*, first published in 1955, the Potteries landscape of Staffordshire and

the Black Country is described as ‘the landscape of hell’ (Hoskins 1985, p.222). While this comment may be understandable, Hoskin’s history of the English landscape nostalgically yearns for a rural aesthetic throughout, a potent testimony to the origins of anti-urban discourses of nature. Drawing on Williams’ (1973) deconstruction of the rural idyll, Oakes (1997) explores how the duality of urbanity and rurality was forged from urban and industrial society during the eighteenth and nineteenth centuries as:

Rural places were transformed by urban viewers from landscapes of work to landscapes of aesthetic appreciation...the urban gaze which idealized the timeless pastoral landscape was part of the same force of agricultural and industrial capitalism which was transforming rural society (p.514).

The image of the countryside was made in the town: the town is not the countryside and the countryside is not the town. The moral and aesthetic polarisation between urban and rural landscapes was prompted by ever-greater socio-economic dynamism between the city and the country (Gracey 1973). This paradox is explained as a dialogic reaction to the industrialization of the British landscape, which forged an aesthetic polar symmetry between urban and rural, and society and nature.

The increasing visibility of derelict and contaminated landscapes, and degenerate urban living conditions, throughout the Nineteenth Century was an important part of the dynamic that stimulated the emergence of the Romantic nature conservation movement discussed in Chapter Four, and the TCPA movement discussed above. It is indicative that 1844 was the year in which Engels first bemoaned the state of Manchester’s working class, and the forefather of the modern environmental movement, Henry David Thoreau, left Boston to live an ecocentric lifestyle in Walden (Nash 1989). The emergence of schools of landscape painting, such as Joseph Wright from Derby, developed a particularly English version of the rural landscape at exactly the same time as they were disappearing. Although these binaries are inseparable, this thesis is more concerned to explore the demonisation of cities than the idealization of rurality (Williams 1973). The moral and aesthetic alignment of industrialism with cities is inscribed in the history of brownfield planning.

Various philanthropic societies sprang up to tackle problems of dereliction in specific localities, such as the Midlands Re-afforestation Association, which planted 650 acres of trees on

waste, slag and pits between 1904 and 1924 (Teagle 1978). However, industrial dereliction remained outside the direct remit of the state until the creation of the British planning system in 1944, and was only recognised in the 1960s as an issue in its own right, when it was differentiated from the very specific problems associated with colliery slag (Wallwork 1974). The Hunt Report of 1969, released in the same year as Barr's ground mark description of dereliction and reclamation in the Lower Swansea Valley, *Derelict Britain*, emphasised the adverse social and economic impacts of derelict land, or so-called 'blight', and the consequent need for a national programme of reclamation and redevelopment to be established in the worst affected areas.

The post-war Keynesian climate of 'social engineering' in the 1950s and 1960s spawned a clutch of parliamentary acts designed to address the brownfield problem (Evans 1999). The Local Employment Acts (1960 and 1970) and the Industrial Development Act (1966) subsidised the costs of acquisition and reclamation of land in designated Intermediate and Development Areas respectively for the purposes of directly or indirectly developing industry, while the Local Government Act (1966) provided a lower but universally available subsidy for the acquisition and reclamation of derelict land for the improvement of amenities. These acts represented the first formal recognition of blight, and established brownfield planning as a key strand of national planning policy.

Deindustrialisation in the 1960s (Massey and Allen 1988) lent the brownfield problem a decidedly urban bias (Handley 1996), as general manufacturing decline displaced primary extraction industries as the major cause of dereliction and contamination. Counter-urbanisation in the 1970s compounded this trend due to the sheer magnitude of depopulation in many inner city areas. Between 1961 and 1981, almost a fifth of the total populations of Birmingham, Liverpool, Leeds, Manchester and Sheffield left those cities (Nicholson-Lord 1987). The figures for inner city areas were far worse; less than 100 people were registered as living in the central Birmingham ward by 1982. In the 1980s, free-market Thatcherism shifted the primary aim of reclamation policies away from removing eyesores towards "hard end uses", with the Local Government Planning and Land Act (1980) and the subsequent Derelict Land Act (1982) encouraging industrial, commercial and residential development.

As the brownfield problem became increasingly aligned with specifically urban malaise, so their redevelopment became the central aim of urban policy. As a result, subsequent urban regeneration policy has focused upon the formation of specific organisations in specific cities to redevelop or facilitate the redevelopment of brownfield land. English Partnerships were formed to aid the development of brownfield land, with specific Urban Development Corporations being formed to facilitate urban regeneration. This brought property booms to many inner cities, but preferentially developed larger sites leaving many cities with a patchwork of small, and often highly contaminated sites bereft of appeal to developers (National Audit Office 1988). The fragmentation of planning functions under the Thatcher government of the late 1980s (Thornley 1991) meant that these policies brought little benefit to the poorer inhabitants of inner cities (Evans 1999).

Over this time, brownfields were not only seen as the main indicator of urban blight, but were also increasingly emblematic of a range of urban ills (Raynsford 1998). Although green belts and the greenfield / brownfield categorisation are not conservation tools (Shirley and Box 1998), their ecological connotations reinforced the discursive purging of nature from the city that the ideology of rural preservation demanded. Others have argued that the discourse of brownfield sites represents the sublimation of racial agendas of inner city degradation and poverty onto urban planning discourse (Keil pers. comm.). Brownfields became firmly associated with cities (Alker *et al.* 2000), with a public poll claiming that the equation of brownfields with 'dirtiness' was a culturally diffuse assumption (MORI 1995). A contemporary policy report conveys this feeling:

Dereliction is like a blight. It destroys beauty, then growth, and ultimately community life itself. A businessman [*sic*] will never choose an area that is visibly decaying for his new premises (Loveless 1987, p.17).

A range of alternative terms circulated in policy, such as derelict or vacant land, were united in their definition of these spaces by non-use, which suggests wasted space and economic stagnation. The national political ecology that imparts a generally negative view of urban environments is supported by an associated logic of urban development. This discursive axis dominates debates concerning urban space.

5.2.3 *The Sustainable City*

Following the 1992 Earth Summit, the U.K. government declared that sustainable development would become the 'touchstone of its policies' (DoE 1994a), promising to avoid the problems experienced in the 1980s by addressing the social, economic and environmental needs of a locality together (DoE 1991). The vehicle for delivering urban regeneration remained the bespoke urban development organisation, although the terminology changed from the corporations of the Conservative governments of the late 1980s and early 1990s, to the partnership approach of the New Labour government that came to power in 1997. The Leasehold Reform, Housing and Urban Development Act (1993) created the centrally funded Urban Regeneration Agency, an organisation that operated through English Partnerships, with 'wide powers to acquire, manage and develop land or give financial assistance to private developers' (Evans 1999, p.6). In May 1999, the regions of the Urban Regeneration Agency were transferred to the newly formed Regional Development Agencies, leaving English Partnerships to operate nationally (English Partnerships 1999).

The rhetoric of sustainable development shifted political emphasis towards 'development and environmental improvement to promote nature conservation and historic preservation and to foster local policies' (Evans 1999, p.5). This balance was reflected in government funding priorities: the Urban Regeneration Agency targeted eyesores and sites in poverty stricken areas (Cullingworth and Nadin 1997) using the Single Regeneration Budget (SRB), an initiative begun in 1994 to simplify the assistance available for regeneration from various government departments (DTLR 2001a). Five Partnership Investment Programmes schemes cover direct development, gap funding for known end-users and for sale, community regeneration, and environmental regeneration (DETR 2001a).

Two separate resolutions can be discerned within the brownfield debate. On the one hand, the negative economic impact of brownfield sites associated with the loss of industry necessitates economic redevelopment, or so-called 'hard' end uses. On the other, the negative aesthetic impact of brownfield sites associated with degraded landscape prioritises the recovery of amenity and appearance, or so-called 'soft' end uses. Indeed,

...the government seems to have two sets of objectives in relation to vacant land; to reduce dereliction and improve the environment, and to regenerate the economy. Different policy instruments are used to meet each set of objectives, but it is not always clear where the two diverge (Cameron *et al.* 1988, p.v).

The need to balance environmental and economic factors lies at the heart of the philosophy of sustainable development, and it is informative to examine how these challenges have been articulated in brownfield policy for achieving sustainable cities.

With the Environmental Protection Acts (1990 and 1995), increasing emphasis was placed upon the remediation of brownfield space. This shift of focus was a reaction to the increasing proportion of contaminated sites relative to overall brownfield stock (due to preferential development of uncontaminated sites), but also served to make a tacit equation between the aesthetic strand of traditional brownfield policy and the environmental dimension of sustainable development. Construing environmental considerations as the remediation of contamination negates the holistic consideration of environmental factors implied by sustainable development. This implicit equation of environmental 'concern' with environmental 'protection' has placed the brownfield problem firmly within the remit of hard physical sciences, to the detriment of positive social and ecological elements that may have accrued to these spaces (Lindley 1986).

The idea of remediation houses an assumption that there is some state to which urban space can be returned. It is no coincidence that regeneration and remediation share a similar etymology: 'regeneration' is a highly flexible term (Furbey 1999), and the idea of remediation begs the question of end-use: what may be contaminated for one end-use may not be harmful for other potential end-uses. In most cases, the implicit benchmark is suitability for economic development, raising the scenario in which 'environmental concern' actually has no bearing on the environmental value of a site. The slippage between these conceptions resides with words such as 'beneficial' and 'attractive' (DoE 1991, p.2), which are very different in relation to the logics of living, working or investing. As far as the planning process is concerned, due care is to be taken of amenity, sadly in the absence of any formal statutory definition of amenity.

As such, urban environmental regeneration in the early 1990s became increasingly synonymous with the remediation of brownfield sites for development, giving rise to the ironic situation in which the environmental improvement of urban space acts to degrade its ecological worth (Kaika pers. comm.). As the chair of the Urban Renewal Foundation (a major regional organisation facilitating brownfield redevelopment, based in Birmingham) stated, 'I think there was this assumption that urban redevelopment meant build on everything and redevelop everything' (5th January 2001). There is an interesting return to the original meaning of environment as 'surroundings' within this discourse, and a suggestion that the 'environment' as nature does not exist in the urban sphere.

The language of 'recycling land' employed recently by the DETR (1998) suggests that this developmental discourse of urban space is persevering under sustainable development. For example,

Organisations like the House Builders Federation argue that sustainable development requires more houses and workplaces to be built...while CPRE uses sustainable development arguments to lobby for less development and stronger protection of green areas (Bruff and Wood 2000, p.523).

Much policy associated with sustainability seems to adhere to the dominant national political ecology of urban development / rural preservation, a conclusion supported by the emphasis of the recent 'urban renaissance' upon the development of urban brownfield sites to increase the density of urban areas (Breheny and Hall 1996; Pearce 1998). This trend has been compounded by the emergence of a world space economy, studded with cities competing for investment on the global stage (Daniels and Bobe 1993; Pryke 1994; Sassen 1994). This impacts doubly on brownfield sites, as they are simultaneously the key supply of land for development, and a deterrent to investment (Ward 1998).

Nowhere has this urban developmental logic been more obviously manifested than for housing policy (Shirley and Box 1998). The DoE (1996) report *Household Growth: where shall we live?* stated that the objectives for the planning system are to pursue better implementation of sustainable development, taking especial account of urban forms. Since the inter-war spread of suburbia, housing has been seen as the primary cause of urban sprawl, and is a key variable in the wider urban/rural planning debate (POST 1998). Given rising

demand, this has involved building a higher proportion of houses in urban areas, especially on brownfield sites. The Housing White Paper stated that 50% of new housing should be built on brownfield sites (DoE 1995), a total that was raised to 60% in a second white paper (DETR 1998). The Urban White Paper, formulated by Lord Rogers' Urban Task Force, included proposals for high-density developments, and followed the Green Paper on housing location (DoE 1996) in prioritising the remediation and use of contaminated land for house-building and urban developments in general (DETR 1999a).

The U.K. Round Table on Sustainable Development (UKRTSD) released a report on housing and urban density suggesting that 75% of new housing should be located on brownfield sites (UKRTSD 1997), a figure supported by CPRE and Friends of the Earth (Rudlin 1998), demonstrating the considerable influence traditional conservation discourses exert over the articulation of sustainable development principles. It is a tribute to the political strength of the rural lobby that the fourteen strong Urban Task Force who compiled the Urban White Paper included the policy director of CPRE in preference to any representatives of urban wildlife, ecology, environmental or open space issues (DETR 1998). The brownfield-greenfield debate can thus be seen as a microcosm for the wider national political ecology of the U.K. Lord Rogers states in his introduction to the Urban White Paper that, 'building more than 40% of new housing on greenfield sites...will...damage biodiversity' (DETR 2000b, Introduction). The tacit assumption is that biodiversity occurs on rural greenfield sites, but not on urban brownfield sites (Shirley 1999).

The separation of Britain's blueprint for a sustainable future into separate rural and urban white papers has reproduced the established divisions of U.K. planning. While sustainable development rests upon a decentralist philosophy that asserts the need to integrate the planning of environmental, social and economic factors across an area (Pepper 1993), the fragmentation of regions into urban and rural houses an 'assumption of centrality' (Harvey 1973), wherein value declines away from the urban centre. The separation between the physical challenges facing environmental planners in rural and urban areas (Muir *et al.* 2000) has been accentuated spatially over time by greenbelts.

Separating the planning of the city from the planning of the country flies in the face of sustainable development, as cities lose 'control of the areas where their growth would naturally go' (Gracey 1973, p.77). Locating increasingly dense developments in the city exacerbates the environmental, social and economic problems within the city itself (Elias and Keogh 1982). As the chief economic planner for Birmingham City Council stated,

When you start to look around the city there isn't much actually physically empty space...bringing into question the boundaries of the city. The greenbelt has got into the psyche of the nation, and it has distorted the concept of how we let cities breathe...There shouldn't be artificial distinctions between rural and urban (11th December 2000).

Because the rural preservationist agenda has largely framed the sustainability debate in the U.K., brownfields have become synonymous with a developmental discourse of urban space.

However, a counter-current has emerged within the urban arena, 'greening the brownfields'. Remediating contaminated sites for hard-end uses often requires 'considerable and expensive work that is likely to cost more than the site will be worth' (Ling 2001). This is especially the case where a site is located in an economically poor area that is less attractive to developers, opening the door for soft end uses such as ecological reclamation, that have obvious positive impacts upon biodiversity. Between 1988 and 1993 over 19% of brownfield sites reclaimed in Britain were converted into green-space (De Sousa 2002); a trend reflected by the establishment of a number of large and well-funded NGOs, such as Groundwork, to encourage the sustainable reclamation of these spaces. Increasingly, mixed-use solutions are being preferred that allow development but retain ecologically valuable habitat on sites.

This counter-current informs the current urban biodiversity debate, and is now explored through a consideration of brownfields as dynamic space in the urban landscape.

5.3 Recovering Nature

5.3.1 *The Unruly Space of Brownfield Sites*

It is possible to identify four periods in U.K. urban regeneration policy since 1945 (Oatley 1998): social engineering up to the late 1960s, social welfare up to the late 1970s, entrepreneurialism up to the early 1990s, and sustainable development up to the current day. However, in spite of changing policy approaches to brownfields, estimates of the total amount of brownfield land in England and Wales indicate that levels have remained steady, at about 40 000 Ha over the last thirty years (Barton 1999). Indeed, the URA's record of derelict land reclamation was little better than it had been under the previous Derelict Land Grant programme (in place since 1982), costing some £15m more per year and achieving a net decrease in derelict land of only 2% in a five year period up to 1993 (ARUP 1995). Three characteristics of brownfield sites hinder the effective planning of these spaces: problems of definition, problems of turnover and hidden dereliction. These factors are worth considering in some detail, as they reveal the unique status of these spaces in the urban landscape, and have important ramifications for their study.

Problems of definition seriously impede brownfield planning (Select Committee on Environmental, Transport and Regional Affairs 1998), and an entire industry operates in the grey area of brownfield definition (Alker *et al.* 2000). Essentially, because these spaces are defined by non-use, the range of previous uses to which a piece of land may have been put are concealed, giving rise to a number of terminological complexities and overlaps. For example,

There is no clear line between vacant, derelict and contaminated land (or neglected, underused, waste and despoiled land). The terms are used in different ways, sometimes for different purposes, sometimes with the same or similar meanings (Cullingworth and Nadin 1997, p.158).

The different connotations bound up in these terms are important indicators of different conceptions of the derelict land problem over time.

The term brownfield has no singular or official definition, but can be traced to two sources. The first is in opposition to the term 'greenfield', which is taken to mean land that has not

previously been developed (POST 1998), and the second is from the American usage of the term, which implies contamination (Alker *et al.* 2000). This dual source has created confusion amongst British users between derelict and contaminated land, to the extent that the EA have relinquished the term 'contaminated land', referring instead to 'land contamination issues' (EA 2002). The current National Land Use Database project has produced its own definition, Previously Developed Land (DETR 2001b). However, this has only added to the confusion by excluding some types of site that have traditionally been included in the brownfield classification (Alker *et al.* 2000), and creating further grey areas over what should and should not be included, such as 'empty homes', or sites that have reverted to their 'natural' [*sic*] state.

The influence of terminology is vital to the categorisation and enrolment of these spaces into formal governance and decision-making discourse and procedure. It,

...determines, for example, the viability of reclamation and the sorts of uses to which a brownfield site can be put...It is as true now as it was 20 years ago that non-physical factors principally determine the use of brownfield [sites] (*ibid*, p.56).

Various groups such as developers, planners, conservationists and so forth use different terms to refer to brownfield sites: terms that harbour diverse assumptions about 'nature', 'the city', 'development', 'space' and so forth, and these discourses constrain and enable future uses of these spaces (Barrett *et al.* 1978). For example, the term 'urban commons', much favoured by urban conservationists evokes a very different mental picture to the term 'contaminated land', that would be used by developers. The emphasis of this thesis upon genealogy, discourse and case studies of knowledge formulation processes acknowledges the influence that non-physical factors exert over the fate of brownfield sites.

A popular conception amongst planners is that of 'turnover', whereby as brownfield sites are lost to redevelopment, others are created. Locational obsolescence (whereby a location becomes unprofitable due to national, regional or local economic forces), building obsolescence (whereby the physical infrastructure is outmoded), property development markets (Bryson 1997), regional prosperity, and state intervention affect the overall stock of brownfield sites, as the built form and structure of the city is continually transformed through

a process of creative destruction (Harvey 1978). The potential uses of a particular site vary greatly depending upon whether land is in public ownership, corporate ownership or private ownership; and whether the ownership rights are divided or multiple (Adams and Hutchison 2000).

The constant turnover of brownfield sites hinders attempts to gather data on amounts and locations of brownfield land, and efforts to incorporate them into conventional management systems. *Laissez-faire* planning approaches to turnover are easily attacked however. Locational obsolescence serves to increase polarisation between areas, as those that are more prosperous decrease their brownfield stock, while those that are less attractive have an ever-increasing stock. This geographical unevenness is concealed at different scales of surveying: for example, national figures conceal regional differences, while figures for a city conceal variations between districts.

Attached to complexities of ownership, hidden dereliction poses a further problem to re-assimilating brownfield land into economically productive use,

...if your land was posing significant harm, that's a legal term, to... principally the neighbours, the public or the water table, then you must do something about it. If it doesn't then you can sit on that land forever in the U.K., which is a bit wasteful because you can put a big fence around it and walk away (Derelict Land Specialist, West Midlands Regional Development Agency, 10th January 2001).

No requirement or system exists for recording the passage of land into non-use, or for registering privately held contaminated land, and sites under a certain size are not recorded. Sites are often boarded up and marked incorrectly upon land-use maps, or form only part of a larger site, making attempts to measure amounts of derelict land difficult. According to the EA,

Estimates vary between 50,000 and 200,000 hectares, an area larger than Greater London. There may be as many as 100,000 sites, which is almost one per cent of Britain. In 1988 some 27,000 hectares (65 per cent) of derelict land in England was estimated to be contaminated (2002).

Chisholm and Kivell (1987) estimate that the actual amount of derelict land in urban areas was approximately ten times that recorded in the derelict land survey of 1993, while Barton (1999) suggests that the rate of new dereliction is matching the rate of reclamation (although noting that more recent surveys have been more thorough and inclusive, picking up higher levels of derelict land).

While dereliction is an anathema to the developmental logic of capitalist urban space, the unruly spatial dynamics of brownfield space creates a number of obstacles to their assimilation back into the planned urban landscape. It is for precisely this reason that these spaces harbour wildlife, and formed the focus of many popular urban wildlife movements in Britain. This tradition is of considerable importance to current efforts to conserve biodiversity at the local level.

5.3.2 *The Unofficial Countryside*

About one fifth of urban areas are composed of green space (Shirley 1996), but such is the strength of the urban/rural divide that the rediscovery of urban wildlife only began in the 1970s, as the philosophy of environmentalism led people to look for a greener existence in their day-to-day lives. Mabey's *The Unofficial Countryside*, published in 1973, exemplifies the roots of this movement as a triptych of urban ecology, urban conservation and alternative urban lifestyles. In this country, urban ecology emerged from urban conservation concerns that began to be articulated in the 1970s (Mabey and Evans 1980) and, following existing East European work, became established in universities in the 1980s. The recognition of the urban landscape as a legitimate, and indeed interesting, topic of study within physical geography, displaying distinct meteorological, climatological, and hydrological characteristics (Oke 1978), prepared the way for the academic recognition of urban ecosystems (Douglas 1981). As Gilbert's phrase 'the urban commons' suggests, the rights of wildlife to have space to live were advocated as part of the rights of city-dwellers to have natural spaces available to them (Gilbert 1992). Public protests over the proposed development of urban sites prompted the

first recognitions of urban ecology within urban planning, and brownfields formed the key spaces for these conflicts.

As Mabey's 'unofficial countryside' suggests, semi-natural urban spaces are liminal (Zukin 1991): marginal and transgressive in a number of ways. Because these spaces are hidden from the formal planning system, they accumulate unofficial ecological and amenity value (Collins and Savage 1998), disrupting the public-private segregation of the urban landscape through transgressive recreational practices. Because these sites lie outside the logic of increasingly regulated urban spaces, Häkli (1996) has dubbed them fourth natures, an extension of Marx's conception of first (untouched) and second (transformed) natures, and the idea of third 'created' natures such as parks, to capture their status as highly artificial spaces of nature that are simultaneously biodiverse, ecologically unique and intimately linked to local communities.

...for many people some of the richest and most diverse brownfield sites will be virtually indistinguishable from areas of encapsulated countryside in towns and cities that have never been developed (Shirley and Box 1998, p.5).

The following example of Moseley Bog in Birmingham demonstrates the importance of grass-roots mobilisation around liminal spaces to the formal recognition of urban nature (Shirley pers. comm.).

Moseley Bog comprises some nine hectares of remnant heathland from the pre-industrial countryside, and marsh and meadows associated with the milling operations that occurred there up until 1919. The site is a remnant of a much larger wetland area that was damned in the 1750s to form a backup pool for nearby Sarehole Mill, called Moseley Old Pool. The rapid growth of Birmingham in the late nineteenth century surrounded the site now known as Moseley Bog by large Victorian villas, and the influence of their gardens is reflected today in the site's exotic flora. In 1980, surveying began for the construction of over thirty houses, prompting a local school, which visited the site regularly, to begin a campaign to save the bog. The campaign was extremely well supported by locals, partly due its importance as the inspiration for Tolkien's *Lord of the Rings*, receiving over 12 500 signatures in one month,

and running for six years, and succeeded in reducing the development to only eleven houses (Nicholson-Lord 1987).

The campaign had two striking outcomes. Firstly, it raised awareness that such sites actually existed in the city. Unused land tends to be hidden behind houses, or fenced off, often to the degree that inhabitants are not only unable to get to it, but are unaware of its existence (Collins and Savage 1998). The dawn chorus was broadcast from Moseley Bog on the BBC World Service and day-trippers came up from the West Country to see Moseley's wildlife,

This is a site with variety and abundance, accessible to many people. Previously wildlife had to be considered rare and in the countryside to be thought worth saving and then only the privileged few could gain access. People did not believe that there was any wildlife in towns (Moseley Bog Conservation Group 2002, p.1).

Secondly, it uncovered the fact that these sites can be of great ecological value. Moseley Bog was host to two nationally rare plants, the Royal Fern (*Osmunda regalis*) and Wood Horsetail (*Equisetum sylvaticum*), and a vast array of biodiversity, leading to its designation as an S.S.S.I. in 1980. Various factions of the campaign, including local naturalists, planners, and teachers formed the West Midlands Urban Wildlife Group (Bennett pers. comm.), expanding rapidly under the funding of the Manpower Services Commission to take over management of Birmingham's existing nature reserves, and start new projects such as Project Kingfisher along the River Cole (*ibid*). This group conducted the first ecological survey of the West Midlands conurbation, and formulated a West Midlands County Nature Conservation Strategy (NCS) in 1984 in conjunction with the local authorities (Ward pers. comm.). Habitat survey data became appended to the development plans produced by Local Authorities in the region, and the West Midlands County NCS formed the basis for the Black Country NCS (1994) and Birmingham NCS (1997).

Similar movements occurred in London, Bristol, Manchester, and cities all over the U.K., and are of major importance on three counts. Firstly, they highlighted the value of these spaces not only to biodiversity, but also as an increasingly scarce local amenity in the local and national media (Pearce 1998). Developing these sites removes what semi-natural open space is left in urban areas, resonating with the emphasis of sustainable development upon local

quality of life issues (Box and Harrison 1993; Rohde and Kendle, 1994). As Shirley and Box (1998) note,

The crucial element missing from the debate are the contributions made to local biodiversity and the quality of human life by open spaces of all kinds (p.2).

Secondly, by locating and labelling contaminated sites, disused railways and so forth as green corridors and semi-natural open-space, the strategy re-packaged many kinds of urban space to local authorities as natural spaces, forcing the formal recognition of urban natures. Thirdly, local networks were established that linked planners, conservationists and residents in an area, establishing the local grassroots networks that are utilised by the LBAP process.

While the brownfield debate has stimulated media and scientific recognition that the countryside is not necessarily more biodiverse than some urban areas, the cultural under-valuing of these spaces should not be under-estimated. As one of the founding members of the Urban Wildlife Partnership says,

...there is still this conceptual barrier in society that we have to face. I try wherever possible to talk about wildlife in urban areas rather than urban wildlife because that implies there's rural wildlife and urban wildlife and that is simply not true (Regional Director for Urban Wildlife Trust, West Midlands, 11th January 2001).

There is an ever-decreasing amount of urban brownfield sites left to build on, and the Town and Country Planning Association have suggested that this will limit the national average of housing built on brownfield sites to between 30 and 35% (Town and Country Planning Association 1998). However,

The image of industrial decline and anti-social activity targeted at brownfield land has created a negative public image of these wasteland habitats. This poor image also exists within the conservation sector and consequently, ecological research and evaluation of wasteland has lagged behind that of more conventional habitats. Wasteland sites of high biodiversity value that have been set aside for public access, are often managed inappropriately, with the introduction of amenity grassland and tree planting (London Biodiversity Partnership 2002, p.3).

Moving from traditional formal articulations of urban amenity based around ‘third nature’, or parks, towards recognition of the fourth nature of the ‘unofficial countryside’ represents a considerable cultural and institutional challenge. The organisation of council departments means that nature conservation management priorities still fall within the remit of parks maintenance, which limits the possibilities for enrolling these personnel into the BAP. LA land management grounds people and park rangers who deal with the maintenance of council owned sites work within a ‘parks mentality’, whereby ‘mown grass and lollipop trees’ are seen as the desirable state of management. As one ranger wryly commented,

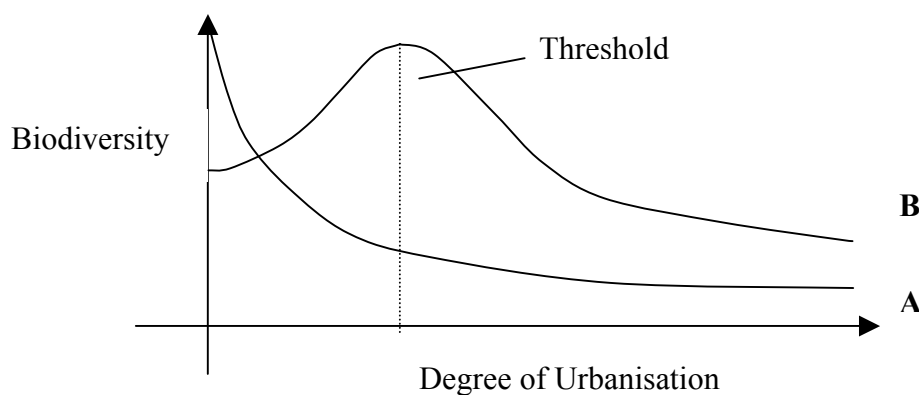
Whenever there is a panic, like someone complains there's litter in the car park, its 'where is he? I suppose he's counting birds again'. That's the sort of argument you have all the way through. Monitoring's very important, everyone knows that, but counting birds isn't (Ranger, Sandwell Metropolitan Borough Council, 22nd June 2001).

The LBAP process can play a vital part in recognising the ecological worth of these spaces, in terms of raising public awareness, creating expert management knowledge and establishing relations with all levels of the planning system. But before moving on to discuss this process in Birmingham, it is worth considering how the ecology of these spaces conflicts with traditional ecological management models based upon notions of equilibrium, in order to fully understand the challenges to the urban LBAP process.

5.3.3 Non-Equilibrium Ecology

Generally, as urbanisation increases, biodiversity decreases, so that ‘effectively what you get with urbanisation is a degraded flora that’s everywhere’ (Sadler pers. comm.). Overall, inner city biodiversity represents a flattened ‘tail’, with little biodiversity. However, two potential gradients exist between countryside and inner urban areas (Figure 5.1). Plot A shows the traditional model of curvilinear response to urbanisation, whereby biodiversity decreases exponentially. Plot B shows a second relationship, whereby biodiversity increases through outer urban areas that are characterised by a mosaic of habitats (parks, gardens, brownfields, etc.), up to a threshold point at which a collapse occurs (due to, for example, the critical level of sealed surfaces in inner city areas).

Figure 5.1: Relationships between urbanisation and biodiversity



Source: Sadler pers. comm.

The urban landscape is characterised ecologically by habitat fragmentation. The urban mosaic comprises semi-natural spaces that are fragmented by built and sealed surfaces, and as a result, their size, location and isolation in relation to one another are key determinants of the biodiversity an area can support. Both larger sites and closely grouped small sites support higher levels of biodiversity, acting as sources and sinks for various species within a

fragmented landscape matrix. The removal or reduction of a site can upset the meta-population dynamics of a set of sites, having adverse and irreversible ecological effects beyond the boundaries of the site itself. Chapter Four highlighted the ambivalent scalar status of biodiversity, and it has been argued that the sterility of our inner cities is a result of the failure to realise a landscape view of society (Baines 2001).

In contrast to largely un-built rural landscapes, planning at the site scale exacerbates the fragmentation of habitats in urban landscapes. The landscape context of a site is crucial to biodiversity in the types of complex fragmented landscapes that typify urban ecosystems (Dunning *et al.* 1992). However, very little meta-population data or theory exists concerning the actual effects of removing or reducing sites in relation to overall biodiversity in urban areas, and considering the role of a site at the landscape scale conflicts with the discrete site-based scale of town planning. The ecological aspects of brownfield sites in relation to development are reducible to the traditional conservationist concerns with individual rare species. As a result, the discourse of remediation has tended to emphasise the relocation of rare species found on brownfield sites, rather than *in situ* protection.

A second major feature of urban ecology is recombination. Recombinant communities are composed of species drawn from a wide range of bio-geographic zones (Soulé 1990), as the result of exotic species escaping from gardens, their introduction via transport conduits, the presence of diverse artificial habitats that can host non-native species, and specific features of the urban environment such as the urban heat island, and increased nutrient flows. Between 20 and 35% of urban flora is typically composed of non-native, so-called 'alien' [*sic*] species, such as exotics from gardens and other species newly established in the wild (Shepherd 2000). Alien [*sic*] species are those not found among the native flora of the U.K., but there is no ecologically valid definition of nativity; no temperate species existed in Britain until the end of the last glaciation some 10 000 years ago (Birks 1997), making no historical cut-off point any more valid than another (Trepl 1990). This indeterminacy extends spatially; as the further back the cut-off is set, the fewer areas can claim to be purely native.

Paralleling the recognition that large monocultures of chemical drenched cereal crops are essentially barren deserts for biodiversity (Shirley 1996), an increasingly visible body of

ecological research suggests that urban sites can support high levels of biodiversity (Gilbert 1992; Mabey 1999). Within the fragmented and recombinant ecology of urban areas, brownfields are increasingly recognised as being particularly valuable as habitats for rare and interesting communities of organisms,

Many of Britain's best wildlife habitats are now to be found amid the bleak remnants of the nation's industrial past. Flora and fauna which make botanists and ecologists tremble with excitement live on old colliery spoil heaps, railway sidings, wharves, abandoned factory sites and quarries (Independent 26th October 1996, quoted in Bennett 1997, p.49).

It is only over the last fifteen years that the post-industrial ecology of brownfield sites has been scientifically studied. The entomologist Falk has extensively surveyed brownfield sites in the West Midlands region over the last twenty years, and concludes that,

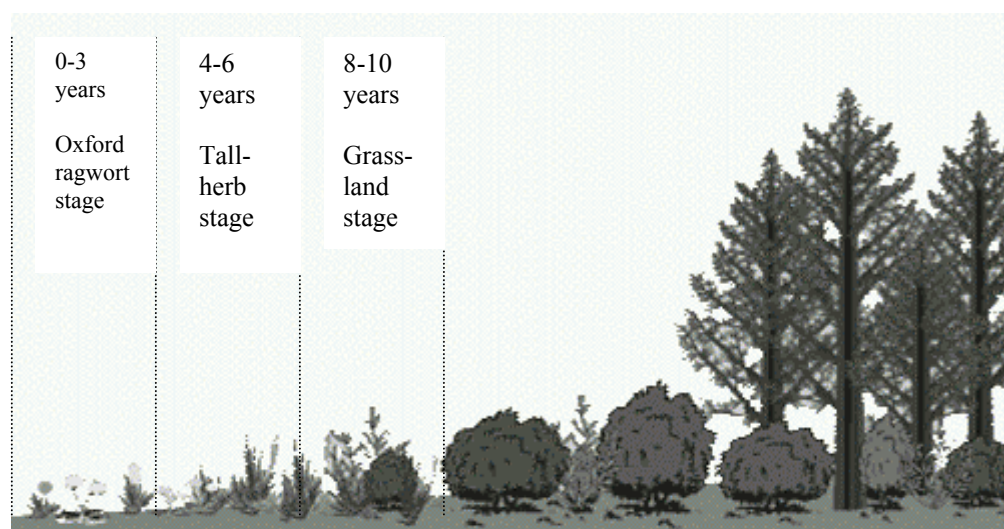
...many urban and suburban brownfield sites are amongst the top sites for rare species...for insects rarity scores for the best brownfield sites are only equalled by those for the best ancient woodlands (2000, p.18).

Further, he claims that many species in the sub-region depend entirely upon urban and suburban brownfield sites for their continued existence, and that many of these sites have regional and national significance. For example, urban sites are crucial habitats for endangered species such as the Great Crested Newt (*Triturus cristatus*), and the Black Redstart (*Phoenicurus ochruros*) and Little Ringed Plover (*Charadrius dubius*), which are fully protected under Schedule 1 of the Wildlife and Countryside Act (1981, as amended). The fact that such sites are often unmanaged also makes them attractive breeding and feeding grounds for larger species in the fragmented urban landscape.

As brownfield sites are the product of economic disruption, so in ecological terms they are shaped primarily by disturbance, where disturbance is defined as a discrete event causing physical destruction. While 'there is no such thing as a typical disturbance' (Huston 1994, p.215), four aspects of disturbance are ecologically critical: frequency, intensity, scale and resource change. All four dimensions are very high in cities compared to rural areas, as sites are demolished, built upon, abandoned, polluted and so forth, and the ecology of a site will reflect the specific physical history of disturbance on that site. This lends brownfield ecology

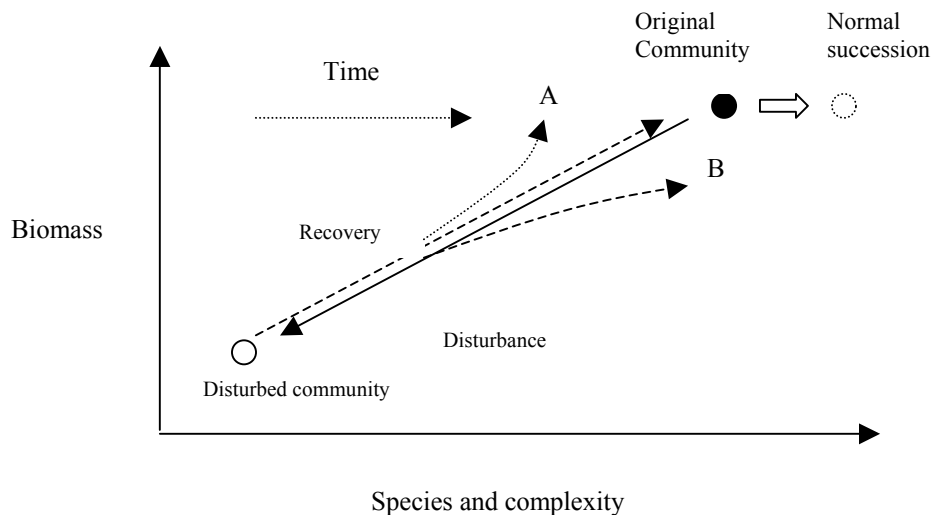
two defining characteristics. Firstly, they tend to be ruderal in nature as repeated disturbance limits vegetation to an early stage of secondary succession in which communities are characterised by non-specialist opportunistic species. Figure 5.2 shows the typical post-disturbance sequence of succession on a brownfield site, and it can be seen from this that disturbance every, for example, five years will keep a site in the pre-grassland stage.

Figure 5.2: Succession on brownfields



Source: Gilbert 1989

Secondly, disturbance can enhance biodiversity because of the variable recovery succession pathways that result. If disturbance occurs, species complexity and biomass decrease, but subsequent recovery of the community will not return it to an identical state, as the physical conditions of the site will have changed, creating diversity. Similarly, as Chapter Four argued with reference to the stability-diversity model, disturbance does not necessarily lead to a reduction in diversity (Table 4.1, p.89). Hence succession will follow different routes to that which the undisturbed community would have taken (indicated by A and B on Figure 5.3).

Figure 5.3: Recovery pathways of disturbed communities

Source: Bradshaw 1984

Because disturbance can create diverse conditions, from topography and relief to drainage, soil composition and contamination, brownfield sites encourage rare species or assemblages of species that tolerate specific stresses. The communities that develop are thus a product of the physical and chemical variability of the site, and the biological potential of the area (Bullock and Gregory 1991). This relationship can be shown as a matrix between stress from extreme conditions and rate and intensity of disturbance (Figure 5.4). Where disturbance and stress are high, the space will be largely uninhabitable for macro-organisms, and where each is low, few species will be excluded from competing to inhabit the space and a common pattern of succession will ensue. When disturbance is high, the sites tend to be characterised by ruderal vegetation, such as Oxford Ragwort that will grow almost anywhere, and resembles a classic ‘degraded’ vegetation community of brownfield sites. However, when specific stresses are introduced more interesting and rare species and assemblages of species occur.

Figure 5.4: Effect of disturbance and stress on species

		LOW	<i>STRESS</i>	HIGH
<i>DISTURBANCE</i>	LOW	Competitors		Stress-tolerators
	HIGH	Disturbance-tolerators		Uninhabitable

Source: Grime 1979

For example, the contamination history of brownfield sites and their high levels of disturbance tends to result in diverse underlying soil conditions, resulting in what is often a unique juxtaposition of habitats and associated species (Sukopp and Werner 1983; Gilbert 1989; Kowarik 1990). Demolished buildings and piles of rubble provide ideal habitats for certain invertebrates, and thermophilic species in general (Davis 1978; Gibson 1998), while tall derelict built structures simulate natural cliff faces, a feature that has made the cities of the U.K. a major habitat for Mediterranean Black Redstarts. Table 5.1 lists some of the stresses that typify brownfield sites, and their effect upon the ecology of a site.

Table 5.1: Post-industrial ecological variables

<i>Site Variable</i>	<i>Ecological Effect</i>
PH	Extremes create rare habitat types
Topography	Extremes create rare habitat types
Hydrology	Extremes create rare habitat types
Toxicity	Heavy contamination can prohibit plant growth, but host rare microbes Medium contamination can support rare plants that require special soil types
Structures	Derelict buildings are essentially human-made cliffs, and host specialist species Rubble is key habitat for invertebrates Old gardens host exotic species
Public access	Some species require human use to form their habitats, while others can only be found in the seclusion afforded by certain sites

Source: Handley 1996; Barker 2000

The ecological dynamism of brownfield sites is fundamentally at odds with dominant equilibrium based models of nature. As Chapter Four argued, the idea of natural stability (and its attendant manifestation in wilderness and limits to growth discourses) underpins a range of knowledges from ecology to planning. These disjunctures represent major barriers to the re-articulation of brownfield ecologies, and are now considered.

Because sites are often of most natural value in the earlier stages of secondary succession, traditional preservation measures, such as fencing sites off for long periods, actually reduce the value of a site by halting dynamic processes of change (Handley 1996). Unlike wetlands, which are managed so as to retard normal succession to dry land, the ruderal importance of

brownfields is not recognised and they are not managed as such. This is partly due to negative perceptions of human interference,

By their nature brownfields are ruderal, and that doesn't carry much weight in the ecological field...in the city they are just seen as indicative of us (Urban Advisor, EN, 17th January 2001).

Some of the most ecologically valuable brownfield sites have been disturbed for hundreds of years (most commonly through mining or quarrying), and are host to disturbance-loving communities of plants that are technically as well established as ancient woodland in terms of longevity. However, the negative aesthetic discourse of these brownfield spaces, outlined in Section 5.2, tends to mean that disturbed land is viewed as unattractive, and ecologically poor.

This disjuncture is compounded by the unusual and recombinant communities found on many sites. Because these communities do not fit in to standard ecological categories or criteria for worth that are based upon stable rural habitats, such as the national Ratcliffe Criteria classification (Shepherd 2000), their ecological worth is systematically under-represented,

...they have a relatively high percentage of exotics, although if you listened to some ecologists you'd think they were dominated by all aliens...exotic flora, weird sites with weird assemblages don't fit the national textbook models (Urban Advisor, EN, 17th January 2001).

The terminology of 'native' and 'alien' species is itself indicative of the negative connotations associated with atypical vegetation assemblages. The presence of alien [*sic*] species is taken to be indicative of a degraded or contaminated ecology (Soulé 1990), even though the majority of newly introduced species are actually benign (Kendle and Rose 2000; and again see the discussion of the stability- diversity debate in Chapter Four). This discourse of nativism has been linked to that of nationalism (Peretti 1998), making an explicit political connection with ecology (this compares interestingly to the arguments of Appendix 3 concerning the biological determinism inherent in socio-biology, a major strand of thought informing the concept of biodiversity).

As noted in Chapter Four, ecological categorisation is crucial to the mediation of nature against wider interests in the planning system. The failure of traditional ecological models to

value brownfield ecologies (Mabey 1999) results in their systematic under-representation in the planning system. Because ecological assessment procedures fail to recognise these ecologies they are less likely to be designated as sites of importance or recognised in environmental assessment procedures. For example, when deciding the fate of a brownfield site,

The search for a technical solution can all too often obscure the landscape, wildlife and cultural values which may have accrued to derelict land through time (Handley 1996, 5.5).

The same discourse of stability informs the remediation of brownfield sites, which implicitly assumes that there is some singular unspoiled state to which land can be restored. Seen in light of the rhetoric of contamination, reclamation to a flat covering of non-toxic soil actually improves the urban environment, in spite of its inherent reduction of biodiversity (*ibid*). The management of brownfield sites may be cheaper than either the cost of decontamination for development, or the notoriously costly labour intensive traditional park-management techniques. Proactive environmental planning is obfuscated by the assertion that standardised remediation is possible, and indeed desirable (Higgs 1997). Closely linked to the discourse of remediation is the discourse of restoration, whereby contamination is remediated and the site then managed to restore the ‘original’ vegetation. Added to the problems of identifying what the single authentic natural state is for a piece of urban land, restoring an original community is costly, of dubious natural value, and often physically impossible.

In failing to fit traditional ecological models, urban areas, and particularly brownfield sites, reinforce the dominant national political ecology that associates nature with rural areas and development with urban areas. However, as this section has shown, more dynamic understandings can capture their ecological value, and these ideas are complementary to the popular grass-roots recognition of urban natures in challenging dominant views of urban space. The LBAP process must harness these traditions in order to be successful.

5.4 Conclusions

This chapter has highlighted the existence of a national political ecology that is organised through the binaries of urban and rural, nature and society, brownfield and greenfield. These binaries have a common conceptual root in dualistic equilibrium and ‘limits-to-growth’ discourses of society-nature relations, which emerged as historical reactions to industrialisation. The dynamism of urban nature, and brownfields in particular, disrupts the root metaphor of equilibrium at a number of scales: from the impossibility of classifying dynamic spaces according to ecological notions of an undisturbed state, to the problems of recognising their informal social worth within the developmental logic of urban space.

Spaces that are perceived as indicative of humans are undervalued with the result that ecological and cultural discourses tend to militate against urban natures. The history of brownfield policy exemplifies this trend: with urban blight reinforcing the rural preservationist agenda, and discourses of urban regeneration and contamination associated with sustainable development maintaining the polarised terms of debate that structure urban and rural planning. Within this dichotomy, the fate of a site owes more to its location in relation to an urban area, than its actual ecological or social value.

Academic recognition of urban and brownfield ecologies, and public urban wildlife movements, represent important potential sources of resistance to the dominant developmental discourse of urban space. Because brownfields represent the dynamic elements of an urban landscape, they can never be completely assimilated into the formal planning system. Their liminal character and unique legacies of human use has given them ecological and social value as semi-natural habitats and amenity to urban dwellers. Conserving urban biodiversity requires the abstract and practical re-working of the deeply ingrained national political ecology that informs current ecological governance. The mediation of these tensions through the LBAP process must negotiate these broader binaries between the urban and the natural. However, at the same time the LBAP process is voluntary and largely un-funded, raising important questions concerning its ability to implement its mandates.

The remainder of this thesis can be seen as an exploration of current attempts to re-conceptualise and manage non-equilibrium landscapes in which human activity is inseparable from natural. Chapter Six explores the formulation of the BAP for Birmingham and the Black Country, elucidating the role locally embedded networks play in developing new knowledges and procedures, and rearticulating the binaries of urban nature through the establishment of new scales.

Chapter 6 The Local Biodiversity Action Plan Process

6.1 Introduction

The preceding chapters have situated the BAP process in relation to the international discourses of biodiversity and ecology, and the national political ecology of nature conservation and planning in the U.K. This chapter uses primary data compiled from twenty-five interviews with contributors to the Birmingham and Black Country BAP, local, regional and national policy-makers, and professional and lay experts, to address how these discourses are articulated and mediated at the local level. Attention is paid to the social and geographical locale in which actors formulated the LBAP, and subsequently how the conceptual boundaries of dominant ecological and conservation discourses were renegotiated.

Building upon the understanding of material discourse outlined in Chapter Two, the assertion that knowledge production is related to the social circumstances of its production is used to structure this chapter. Following Ursin's (2000) interpretation of Blacklers' (1995) conception of group dynamics, the knowledge formulation process is seen as a network that is: situated (historically and geographically in time and space); provisional (constructed and dynamic); pragmatic (action oriented); mediated (through language), and contested (through power relations).

Section 6.2 describes how guidance for constructing LBAPs was put into practice, exploring the sociology of knowledge formulation within the LBAP. This follows Selman and Wragg's (1999) conceptualisation of LBAPs as 'vision-driven Super-networks', in describing how the network was situated in the local historical and geographical context, and extended practically through space and time. The interaction between and within networks is discussed, specifically exploring the roles of individual actors in formulating and negotiating LBAP knowledge, showing how contributors, mediators and gatekeepers constrained and enabled the production of new knowledges. In describing the sociology of knowledge production within these networks, it is argued that the LBAP process is people-driven and geographically embedded, and these idiosyncrasies create wide geographical variation between LBAPs.

Section 6.3 investigates the content of the LBAP, contrasting urban land use and habitat based HAPs in terms of approach, and their categorical status. Having explored the sociological process of LBAP formulation, an instance of contestation is described, which highlights the power relations between actors. The conclusion considers the ramifications of the BAP production process for sustainable development, and the discursive reformulation of the natural and urban spheres. While the process of BAP knowledge formulation contributes to a partial reformulation of the hegemonic discourses of urban nature, and has opened up the potential for a more sustainable form of urban governance, it is argued that the operationalisation of the BAP is crucial.

The LBAP itself comprises interlocking SAPs and HAPs. Two habitat plans, the UHAP and the DHAP, are used throughout the text to contrast the formulation process and resulting product. The UHAP covers the category that most brownfield sites fall into, but does not have a strictly ecological basis as a habitat type. By contrast, the DHAP is an important ecological habitat that overlaps with a number of urban habitat categories, including the UHAP. In ecological terms brownfields and woodlands are at either end of the stability continuum: while disturbance is the condition for existence of the former, it is synonymous with the destruction of the latter.

Rather than seeing these contrasts as prohibitive of valid comparison, they are used to explore how new urban ecological knowledge differs from traditional forms of ecological knowledge. Chapter Five highlighted the instability that characterises urban landscapes, and the contrast between an urban land use HAP and ecologically based HAP offers insights into the success of the LBAP in formulating new knowledges. The contrast between land use and habitat type is recognised by the BAP itself, both in the introduction (Birmingham and Black Country BAP Steering Group 2000, p.12) and in the listing of the plans (*ibid*, p.iii). Table 6.1 shows this division by the BAP broad habitat types.

Table 6.1: Division of Birmingham and Black Country LBAP HAPs into rural habitat types and urban land use types

<i>Urban land use type</i>	<i>Rural ecological habitat type</i>
Urban wasteland	Woodland/ trees / scrub
Parks/ playing fields/ public open spaces	Grassland
Gardens and allotments	Heathland
Buildings and built environment	Farmland
	Wetland

Source: U.K. Biodiversity Steering Group 1995

The two HAPs furnish detailed examples of each stage of the LBAP process, following actors through the process of formulating very different types of ecological knowledge, comparing the evolution of the written products, and how the resultant knowledge was related to wider concerns. Appendix 5 (the DHAP) and Appendix 6 (the UHAP) have been reproduced from the Birmingham and Black Country WT web-site, and should be referred to throughout the chapter.

6.2 A Social Process

6.2.1 *The Framework*

Post-Rio approaches to environmental governance, such as the LBAP initiative, are closely linked to wider transformations of the civil sphere. Goodwin (1998) identifies three dimensions of change. Firstly, Neoliberal modes of governance have militated against government bureaucracy, prompting a so-called ‘hollowing out’ of the state apparatus (Jessop 1991). The switch of emphasis on local government from provider of public goods to facilitator of redistribution has prompted a shift from government to governance, or the ‘Third Way’ (Blair 1998; Giddens 1998), characterised by increasing expedience to central government and dependence upon collaborative forms of local action (Healey 1992). Secondly, this undermining of the government institutions of post-war social Keynesianism has been accompanied by an increased questioning of grand political narratives in the face of growing intrusions by global processes (and especially global environmental threats) upon society (Giddens 1991; Beck 1992b; Buttel and Taylor 1994). Thirdly, and accordingly, the weakening of individual faith in expert knowledges and traditional institutions (Lyotard 1984; Wynne 1996) has prompted a rearrangement of civil relations around consensus action at the local level (Crouch and Matless 1996; Harvey 1996), such as LA 21 forms of governance.

It is within this context that Selman (1998) claims approaches to knowledge formulation such as the LBAP are ‘rationalist-collaborative’, displaying a mixture of rationalist and communicative models of emergent action. The ascendancy of such models of governance brings the geography of local networks through which they are enacted centre-stage (Bryson *et al.* forthcoming). These general insights are complemented by the work of Gibbons *et al.* (1994), concerning the changing dynamics of group knowledge formulation. They (amongst others- see Ziman 1994; Godin 1998) argue that traditional research groups, underpinned by disciplinary academic interests and protocols of review and assessment (Mode One), are giving way to transdisciplinary groups that are oriented towards the context of application and are socially reflexive (Mode Two). The LBAP format clearly represents an attempt to move towards Mode Two, and insights from this school of thought are drawn upon to structure and support the micro-sociological analysis of the knowledge formulation process. The work of

Selman (1998) and Gibbons *et al.* (1994) highlights three key components of these initiatives: a commitment to scientific underpinning, organisation around collaborative processes of knowledge formulation, and an emphasis upon cross-cutting action at the local level respectively. The success or failure of Local Authorities in achieving the transition to this new collaborative planning paradigm is crucial to the success of the LBAP, and sustainable environmental planning (Healey 1997).

The implementation of national obligations under the CBD follows a nested hierarchy, scaling from national, to regional, to local (DoE 1994b). Based upon the LA 21 process, the LBAP process is driven by the bottom-up construction of plans and policies, reflecting local expertise and institutional capacity, and responding to local needs within a national framework. Local plans are collated to the regional and national levels (Selman and Wragg 1999). In line with the 'think global act local' rhetoric of Rio, this type of approach emphasises action at the local level. As a spokesperson from the national Biodiversity Policy Unit stated,

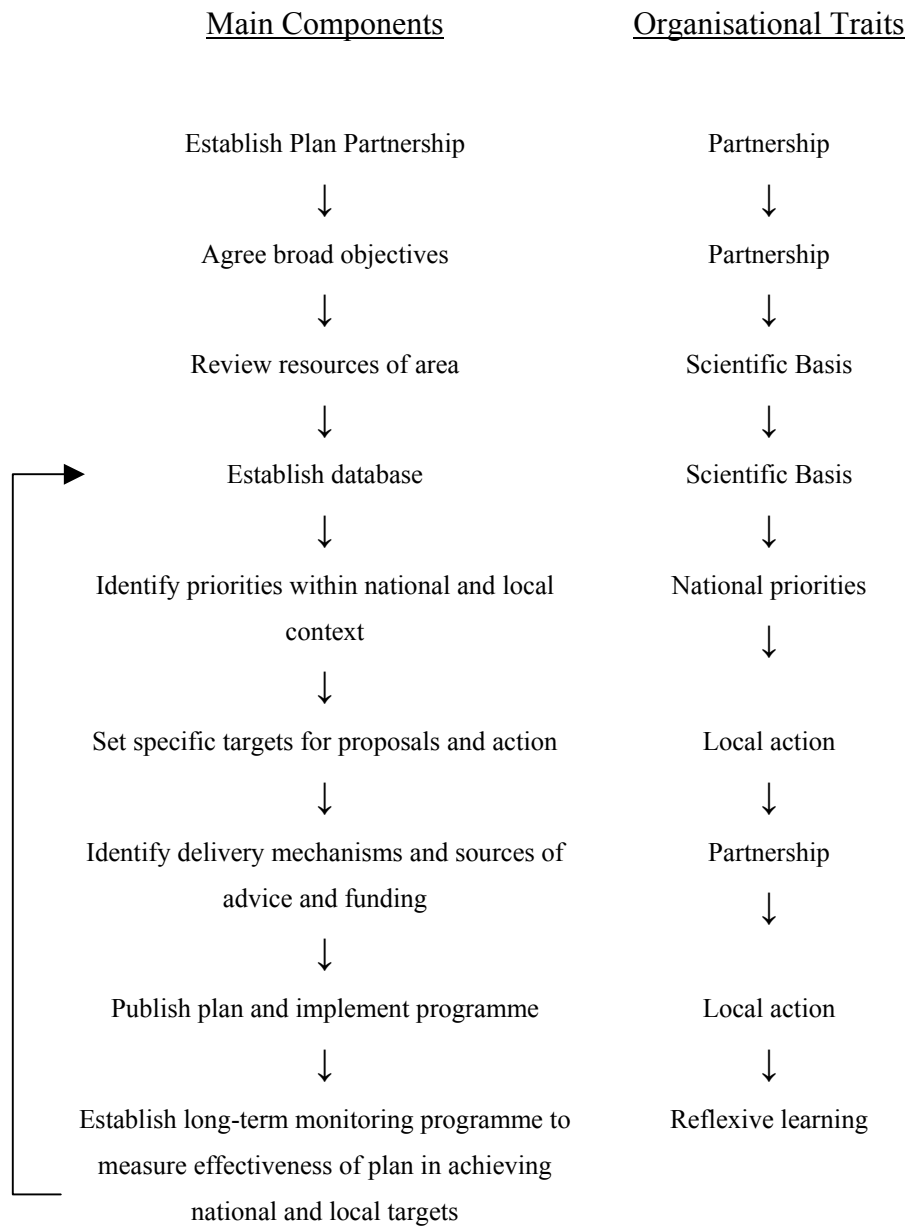
Our role is to say biodiversity is something you should be considering...it is the people who are the implementers and deliverers who make the judgements because they're working with it on the ground- we're not, we don't do anything on the ground (Deputy Director, U.K. Biodiversity Group, 29th November 2000).

As a consensual approach, it also subscribes to the facilitation and maintenance of networks of stakeholders to establish cross-sectoral partnerships. Such processes of consensus building create mutual understandings and coherence which are drawn upon to establish a common general vision (Innes 1994), and, in the case of BAPs, a set of specific targets (United Kingdom Local Issues Advisory Group (UKLIAG) 1997a). The logic of the partnership approach to LA 21 is threefold. Firstly, it is inclusive, involving the entire range of relevant bodies; secondly, it allows resources to be pooled and tasks to be delegated; thirdly, it creates a shared commitment to and ownership of the plan process (UKLIAG 1997b). The partnership approach is designed to facilitate 'working knowledge', in the form of 'actions' that can be taken to enhance biodiversity. As a result, the LBAP represents a framework for influencing a wide range of other activities, as well as being a product in its own right (UKLIAG 1997c).

National guidance outlines a rigorous format for the LBAP process, starting with an ecological summary of the status of a habitat or species, then considering threats and current actions being taken to protect it, and finishing with a list of actions to be taken to enhance the resource. These actions are listed with targets for achievement, lists of partners and lead partners undertaking them, and a ten-year timetable for completion. However, underpinning this process scientifically is problematic in the context of nature conservation, where comprehensive or objective data concerning habitats and species are not generally available, and difficult to acquire in terms of cost and time. This has resulted in the incorporation of tenets of ‘institutional reflexivity’ (Power 1994), whereby the construction of an information base and subsequent monitoring of progress against it provide the capacity for reflexive organisational learning and measuring progress through a dynamic process of feedback. This chapter explores how this model of knowledge formulation and action is socially and geographically embedded.

At the outset, it is beneficial to outline the structure of BAPs, both for clarity, and to justify the analytical focus of this chapter upon HAPs. BAPs are composed of SAPs and HAPs, which reflect national and international conservation priorities, and the local biodiversity of an area. Habitat types from the UKBAP Priority Habitats list and species listed on the Species of Conservation Concern (SoCC) list form the core of the LBAP (DoE 1994a). These two lists were devised at the national level, as part of the UKBAP process, to consolidate the plethora of international and national species and habitat lists that existed previously. These are then supplemented by species and habitats considered to be of particular local interest or worth (Figure 6.1).

Figure 6.1: Functional components of the LBAP process

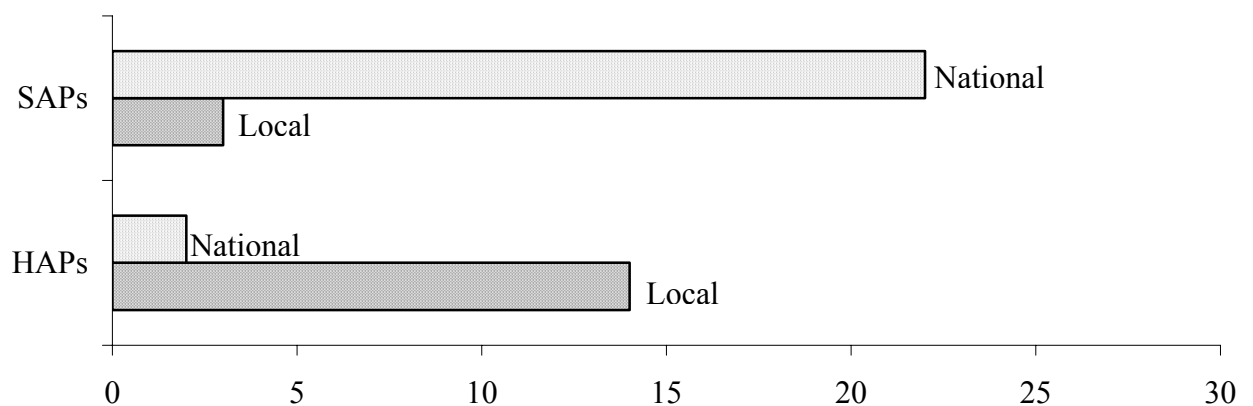


Source: UKLIAG 1997a

The two-tier national and local priority framework runs through every stage of the BAP process, representing the recognition that national priorities cannot always be responsive to local needs (UKLIAG 1997a), or that local needs may not reflect national needs. The proportion of HAPs undertaken due to their national level status is far lower than the proportion of SAPs. This is for the simple reason that the number of nationally rare species is far higher than the number of nationally rare habitats, and as national rarity must be included in the BAP the majority of SAPs are derived from national lists, while the majority of HAPs reflect local habitat types that are not deemed to be of national importance for conservation.

Figure 6.2 shows the proportion of HAPS and SAPs completed for the Birmingham and Black Country by their status as either national or local priority BAPs (see Appendix 7) for a complete list of HAPs and SAPs).

Figure 6.2: National and local priorities in the Birmingham and Black Country LBAP



Source: Birmingham and Black Country BAP Steering Group 2000

At the local level, the choice of HAP categories is not constrained by the BAP classifications. These categories are drawn from a wide range of classificatory systems, including the Phase 1 ecological surveying typology, U.K. Broad Habitat Types, Countryside Survey, and so forth

(Table 6.2). The difference between the number of species and the number of habitats makes the selection of HAPs less constrained than the selection of SAPs. Nationally rare species have a higher visibility prior to the BAP process, and it can be expected that for groups such as birds, badgers and amphibians there are conservation groups already operating in an area that will take on the relevant SAP duties, with very little change in existing emphasis or approach. By contrast, the emphasis of the BAP process upon habitats demands the formation of new groups to decide how to formulate each HAP. The conservation of habitats reflects the integrative emphasis of sustainable development more generally.

Table 6.2: Habitat / land use action plans in the Birmingham and Black Country LBAP listed by classification system

<i>Habitat / Land Use Action Plan</i>	<i>Classification System</i>
Arable fields	Broad Habitat Type
Arable field margins	UKBAP Priority Habitat Type
Buildings	Phase 1 Habitat Type
Canals	Broad Habitat Type
Deadwood	Ecological
Eutrophic urban ponds	UKBAP Priority Habitat Type
Gardens, allotments and open space	Phase 1 / Planning
Garden ponds	None
Hedgerows	Phase 1 Habitat Type
Lowland dry acid grassland	UKBAP Priority Habitat Type
Lowland neutral and base-rich grassland	UKBAP Priority Habitat Type
Lowland wet grassland	Phase 1 Habitat Type
Lowland heathland	UKBAP Priority Habitat Type
Rivers and streams	Broad Habitat Type
Urban wasteland	Countryside Survey, 1990 / planning
Woodland	Phase 1 Habitat Type

Source: Birmingham and Black Country BAP Steering Group 2000 and Jackson 2000

Hence, although HAPs and SAPs are closely linked, within the BAP formulation process HAPs offer the greater challenge for innovative knowledge creation. As such, the analysis of this chapter concentrates upon the formulation of HAPs.

6.2.2 Establishing the Network

LBAP guidance recommends that BAP partnerships be initiated by an organisation that is already a lead player in nature conservation within an area (UKLIAG 1997b). In Birmingham, this role was performed by the Birmingham and Black Country WT. The Wildlife Trusts partnership, established in 1912, is the U.K.'s leading conservation charity exclusively dedicated to wildlife, and has 47 local Wildlife Trusts across the U.K. (Wildlife Trusts 2002). Wildlife Trusts operate at the local grassroots level, but also have a U.K. voice. With the increasing interdependence of state and private sector organisations that accompanies the shift to 'Third Way' forms of governance, the WT has increasingly become engaged with state functions. As part of the voluntary sector, they provide a number of functions in different contexts. For example, in Birmingham, the WT engages in a range of voluntary 'charity' activities such as reserve management, surveying and educational activities, but also has service level agreements with the metropolitan local authorities to comment upon planning applications and undertake contractual site surveying work.

Given the obvious overlap between biodiversity and wildlife conservation, it is not surprising that Wildlife Trusts are lead partners in the majority of the 160 LBAPs in the U.K. (UKBG 2002). The geographical heterogeneity of the voluntary sector is widely recognised (Owen 1964; Kendall and Knapp 1995), and the unique historical characteristics of the Birmingham and Black Country WT exert a major influence over the LBAP process. The Birmingham partnership consisted firstly of a small group of key players, with the ability to identify and approach a range of wider stakeholders. The Birmingham and Black Country BAP Steering Group was set up by the Birmingham and Black Country WT in 1997, with officers from the five Local Authorities (Birmingham City Council and the boroughs of Walsall,

Wolverhampton, Sandwell and Dudley), and representatives from the EA, EN, University of Wolverhampton and the Royal Society for the Protection of Birds.

The steering group was responsible for setting out the basic principles of the LBAP process, including the decision-making processes, links to other plans, communication within and external to the partnership, resources (including information, funds, time), a timetable and monitoring arrangements. The first act of this steering group was to appoint an ecologist working for the Birmingham and Black Country WT as the BAP Officer, and to secure funding for the post for at least two years from EN and the Local Authorities. From this point on the BAP Officer was the key facilitator of the LBAP process.

The members of this initial steering group reflected the Birmingham and Black Country WT's immediate contacts. Conservation planners from the local authorities liaise with the Birmingham and Black Country WT regularly concerning their work with planning departments, while representatives from the government agencies and Universities either were, or had previously been, formally involved with the Birmingham and Black Country WT. Even at this stage, the influence of pre-existing relations between organisations within the locale was apparent. For example, while the University of Wolverhampton is one of four major university establishments in the Birmingham and Black Country conurbation, their academics were invited onto the steering group, due to strong personal links between the WT and academics at the University of Wolverhampton.

After identifying the relevant BAP categories, the Steering Group held a forum at Wolverhampton University in June 1998 to discuss the format of a draft plan with a wider group of interested parties. After the forum this nascent network largely disintegrated, due to a six-month gap in funding:

This break in activity caused a loss of interest and credit...when more funding was secured we needed some way to really set the ball rolling again (LBAP Officer, Birmingham and Black Country, 3rd March 2000).

The solution was to broaden the network, and invite all relevant parties to a larger inaugural meeting of the Birmingham and Black Country BAP, held at the Sandwell Valley Park Centre

in January 1999. This wider group of stakeholders who could contribute significantly to the LBAP process were identified by the steering committee through a variety of informal channels. Many contributors were contacted through organisations on the steering committee, such as LA reserve managers and tree specialists, local conservation groups through the Birmingham and Black Country WT, or personal contacts.

The preponderance of conservationists and LA personnel, supplemented by individuals with (or with access to) expert ecological knowledge or information, fuelled the process of formulating ecological knowledges and practices that are of use to conservationists and local authorities. However, groups whose interests would be affected in a less wildlife-oriented manner, such as commercial or landowning interests, were absent at this stage of the process. As one member of the steering group stated,

...the steering group are nearly all...either LA ecologists, or conservationists, reps of the major utilities and bodies...So I'm not terribly sure that that is absolutely the correct way of going...what I feel we ought to have rather than ecologists and conservationists, is regeneration department people in here (Sandwell Metropolitan Borough Council Ranger / BAP contributor, 22nd June 2001).

The reasons for this were threefold. Firstly, the overall balance of contributors to individual BAPs tended to be similar in composition to that of the Steering Committee, because the network was built up by extending the network of the steering committee. Secondly, the dynamics of landownership in cities starkly contrasts with those of the country. Ownership of open land in rural areas tends to be static, making the managers of that land key players in the BAP process. In the urban context, the ownership of land changes far more quickly (driven by developmental and speculative pressures), and the LA itself is the main long-term owner of semi-natural open space. Thirdly, key areas of urban landscape change, such as inner city regeneration, are often planned and undertaken by bespoke organisations, without any formal or informal links into the network of urban nature conservation. Not only were pre-existing links with these organisations absent, but the difficulties of enrolling urban regeneration organisations into the LBAP network were seen to be considerable, due to perceived antagonism between nature conservation and development. While the composition of the

Steering Group was undoubtedly the most obvious and effective partnership to form, it exerted a major strategic bias upon the orientation of the wider process.

A variety of channels were utilised by members of the steering group in order to establish the wider BAP partnership. The UHAP lead author was an active member of the Wildlife Trust, and known to have a political interest to match his academic knowledge of urban wasteland ecologies: 'being interested in urban ecology I said I'll do urban wasteland, gardens, open space and so on' (Lead Author, UHAP, 13th March 2001).

A number of less straightforward channels were utilised. The recruitment of the eventual lead author of the DHAP into the BAP process demonstrates this random element,

I wrote a letter to the council saying they had destroyed the habitat of many invertebrates probably for twenty miles around- quite a unique habitat had been destroyed...and a guy from the council rang up about the letter, and actually ended up coming over to find out why deadwood is such an important habitat...They wanted it [the DHAP] done on account of my previous letter (Lead Author, DHAP, 2nd May 2001).

It was only on account of this contributor that the DHAP became a fully-fledged HAP, having originally been proposed as a multiple SAP by a member of Birmingham City Council. The person in question happened to have had a life-long interest in Diptera (flies), which constituted a 'hobby' only in terms of never having needed to formally exploit it, rather than being in any way an amateur. It was only having retired from a career in petrochemical geology that time had been freed to pursue this interest full-time in the West Midlands, and through studying locally valuable sites became involved in the BAP process via a chance encounter. While not in question in this case, it remains a moot point as to the need for contributors to prove competence in matters of conservation or ecology: as with most voluntary endeavours, enthusiasm and time were ample compensation.

A list of plans was put on display at the launch meeting, and attendees 'signed-up' to those that they were interested in contributing to. The list of categories was intended to be aspirational- it was not expected that all the BAPs would be taken up. This method of

organisation was selected as a way to efficiently match a large pool of expertise and resources to the BAP priorities quickly,

We were given a list of subjects to look at, and there was one or two I was interested in...and there was a place for each of the proposed subjects, and we just went and hung around these places (Lead Author, DHAP 2nd May 2001).

Or similarly,

When we got there it was just a case of allocating yourself to what you wanted to work on...you could move yourself around and allocate yourself onto various BAPs (Ecologist, DHAP, 27th March 2001).

This voluntary mode of organisation allowed new networks to be formed quickly and efficiently, but also had negative aspects. A number of people signed up to more than one BAP, which then became untenable in the light of the work involved. This left some BAPs, such as the UHAP, being constructed by one person, while others, such as the woodlands HAP and DHAP, were written by teams of more than ten contributors. As expected, a number of BAPs were not taken up. Hence as one BAP officer stated,

...it was pointless trying to find info on rare woodlice if we didn't have anyone who could write the plan...we were obliged to put the stuff in from the UKBAP, but when it got down to the local stuff, we just put in things we knew about (BAP Officer, Staffordshire, 22nd February 2001).

For example, Urban Wasteland is not included separately in the U.K. standard habitats classification (Jackson 2000) against which habitats requiring HAPs should be identified (UKLIAG 1997d). The inclusion of the UHAP was dependent upon there being an expert urban ecologist who also actively promotes biodiversity conservation on wasteland amongst the Local Authorities in the area. Similarly, the DHAP only emerged as a fully-fledged HAP because of interest and enthusiasm from the attendees at the Sandwell launch.

The flexible nature of the process also had negative consequences however, as people were not always allocated to the most needy or relevant BAPs. For example, an academic with specific expertise said,

I started out on three, the woodlands, the hedgerows and the deadwood, but in the end it was too much so I stayed on the deadwood [Interviewer: You didn't go on the UHAP?] No, in retrospect it seems a bit silly. It was all very voluntary, it was structured so you could do as little or as much as you wanted (Ecologist, DHAP, 27th March 2001).

In a few instances, political and personal factors became apparent in off-the-record conversations, concerning antagonism between people or institutions, such as a degree of 'bad blood' between academics at the University of Birmingham and University of Wolverhampton over a recent funding decision from NERC.

A large degree of latitude exists in the organisation of the LA 21 process (Wilks and Hall 1994), and accordingly LBAPs in other places were organised very differently. As the BAP officer for a predominantly rural area said,

We got everyone together who we knew were good ecologists, so we had the county ecologist, a rep from EN, a rep from EA, reps from a couple of LAs, one from BCTV and ourselves of course. So we got a very select group, as I didn't want people starting to go on about Red Squirrels or something. So we probably had the best group of nature conservation people in the country, and sat down and discussed what we wanted in it and how we wanted it to look...I know that's different to Birmingham where they involved everyone from the beginning with lots of people in a big room (BAP Officer, Staffordshire, 22nd February 2001).

While this approach allowed more control and direction of the process, it was also less cross-sectoral, being seen very much as an exercise purely in nature conservation. The difference in approach undoubtedly reflects the preferences of the BAP officers concerned, but also relates to the differences between nature conservation in urban and rural contexts. Urban nature conservation is implicated both more deeply and more widely in a range of human activities, demanding engagement with diverse Local Authority departments, residents and business. Thus, both the existing network of nature conservation in Birmingham, and the sustainable development remit of the BAP process militated towards the adoption of a more wide-ranging approach.

The groups formed at the inaugural meeting each set about building and solidifying their own networks, electing a lead author, responsible for driving that particular plan through arranging

further meetings as well as collating and drafting the BAP, and coordinating it with other relevant BAPs. They set the general scope of the BAP, and identified additional individuals needed to cover each aspect identified for the individual BAPs (UKLIAG 1997d). This process was again undertaken through existing contacts and networks on a flexible ad hoc basis,

...because I don't have a job it was decided I should run it, and also at that time I think we decided to get the fungus people on board...Mike [blank]-dipterist living in West Brom, I knew him through the dipterous forum, Mike knew fungus people as did Jon, so we put together a list. Eric [blank] living down the road, coleopterist, two or three people for each (flies-dipterist, beetles-coleopterist, fungus)...we needed some people who worked for the council. Peter [blank] is the guy in charge in general of the parks in Wolverhampton who I had corresponded with about the trees...he recommended Tim [blank] in charge of trees in Walsall (Lead Author, DHAP, 2nd May 2001).

Thus, the BAP groups themselves were extended through informal personal contacts. An overall timetable was then set by the BAP officer, to coordinate the sub-groups and ensure that cohesion was achieved within the network through 'effective and regular communication' (UKLIAG 1997b, p.3).

6.2.3 Formulation

The BAP formulation process is rigorously laid out in the guidance notes, and consists of three stages: review of species and habitats, evaluation and prioritisation, and the setting of local targets (UKLIAG 1997d). This section addresses how each of these stages was undertaken, and considers the dynamics of the process itself.

Within each habitat plan, the first task involved compiling a list of species, as one lead author stated:

First of all the strategy was to build up a list of species...we need to know how big the problem is and how important it is...local lists and estimates of what's in Britain and is therefore likely to be here (Lead author DHAP, 2nd May 2001).

Very few standardised species databases or comprehensive records exist at either the local or national levels (DoE 1994a). For example, the Birmingham and the Black Country WT maintain the EcoRecord database, which is a collection of survey data from the area over the last twenty years. While this resource is actually better than those of most areas, it is still limited in three ways. Firstly, their data are not systematically consistent, being of varying quality and type. Secondly, only species for which surveys are regularly carried out, such as birds or vascular plants, are represented. Thirdly, although unlikely, one animal could theoretically be recorded ten times over the course of its life in ten different places, giving a misleading picture of population distribution (Jarvis pers. comm.).

Their lack of visibility means that very little surveying work has been done for most deadwood organisms, such as arthropods. Estimates of what species are where entails corraling a wide range of records and sources. For the less known species of the DHAP, this involved some ingenious usage of the BAP network,

We all knew people who had contacts. For example, we had access to the local recorder, various of us knew people working on national recording schemes- people like Keith [blank] who works for the National Trust has done a load of work on species occurring in deadwood- he just sent us a disk of

deadwood species outright before publishing, Falk's survey of Sutton Park and so on. So we knew many people, and if I didn't Jon did (Lead author, DHAP, 2nd May 2001).

By comparison, the UHAP involved little data collection. This was due to the lack of data available for urban wasteland, either in terms of spatial or ecological data. No surveys have been undertaken either to identify the total amount of wasteland in the area, or to identify the biodiversity present on these sites. For example, paragraphs 2.1.4, 2.1.5 and 2.1.6 of the UHAP, concerning 'available flora', 'available fauna' and 'area' respectively, use seed bank theory, corridor theory, and patch dynamic theory (the size and proximity of similar sites) to infer functional value, only mentioning the possible presence of rare invertebrates on xeric (dry) sites. Hence, the UHAP justifies conservation through biogeographical principles, portraying these sites more as a sink and source for the general biodiversity of the city, than through the existence of any particular species. The next section follows up this difference.

Evaluation criteria for species and habitats are set out in the LBAP guidance notes (UKLIAG 1997d). Wikström and Normann (1994) identify a four-fold taxonomy of knowledge: information (discrete pieces of factual knowledge), 'know-how' (situated knowledge of the individual), explanatory (scientific/academic) and understanding (ability to create new knowledge). The mix of knowledge required to evaluate habitats and species includes local ecological data, local ecological expertise, local conservation expertise, and land use data (Table 6.3). However, as this table shows, many of the criteria are based upon data concerning distribution and temporal dynamics. Due to the lack of temporally coherent ecological datasets, quantified estimates of species or habitat decline were not applicable for habitats such as deadwood and urban wasteland.

These gaps in data further increase the importance of local expertise borne of familiarity with an area. Criteria such as 'local threat' and 'local distinctiveness' directly specify the need for local knowledge of sites and the pressures upon them, adding a further geographical bent to the process. Evaluation and prioritisation short-cuts the information vacuum by following three logics: information of what species of nationally recognised importance were present in an area, expert ecological knowledge to identify keystone species indicative of wider biodiversity, and expert knowledge of locally important sites and species.

Table 6.3: Evaluation criteria for habitats and species

<i>Evaluation Criteria</i>	<i>Information Required</i>	<i>Knowledge Required</i>
U.K. priority	List of local habitat types / species	Survey information
Local decline rate	Changes in habitat area / number of species	Survey information
Proportion of U.K. habitat in local area	Area of local habitat types / number of species	Survey information
Local rarity	Area of local habitat types / number of species	Survey information
Local threat	Knowledge of real and potential, direct and indirect threats	Local and ecological expertise
Key species	Relation between habitat types and local key species	Ecological expertise
Local distinctiveness	Appreciation of cultural and historical heritage of area, and local ecology	Local expertise
<i>Habitat Only</i>		
Fragmentation and restoration potential	Map of habitats patches and surrounding land uses	Survey information
Minimum viable size	Understanding of local habitat types	Ecological expertise

Source: UKLIAG 1997b

In the case of the DHAP, these streams of expertise were gathered through each contributor writing a BAP from their expert point of view, which were then edited together by the lead author. A number of people involved with coordinating individual BAPs noted that their structure placed them at the intersection of a multitude of top-down priorities and bottom-up information, which tended to create large amounts of work. This process took eight meetings over about a year, and involved an iterative process of writing sections, distributing them on email, editing them and so forth. As one contributor stated, ‘it was quite a heavy procedure and took quite a long time’ (Ecologist, DHAP, 27th March 2001).

The first draft of the DHAP was ten times longer than the final draft. Within this framework, the identification of actions and targets for enhancing habitats established a clear set of dynamics between the contributors. Evaluation and actions,

...were based on expert knowledges of the people at the meeting, and there were people at the meeting who worked on beetles like me, a guy who worked on fungi and a group of people from forestry related disciplines, people who worked for actual forestry companies, and people who worked for the council who were aware of the actual orders that were placed on trees, so there was lots of complementary expertise that fed into it (Ecologist, DHAP, 27th March 2001).

The academic ecologists provided general guidance on how to improve habitats, which was translated into practical actions by conservationists, within the limits set out by end-users and managers (typically LA personnel). For example,

More popped out of the expertise of the people on the BAP like myself [research ecologist]...although there was lots of documentation [from EN] that informed our decisions (Ecologist, DHAP, 27th March 2001).

While the input of Local Authorities personnel was critical in making the BAP practicable:

Being a LA official, you do get an idea of what is achievable and what is not, which the voluntary sector wasn't able to do particularly. They saw the council as being responsible for everything (Strategic Conservation Planner, Birmingham LPA / LBAP Steering Group, 8th November 2000).

This opinion was shared by an amateur conservationist,

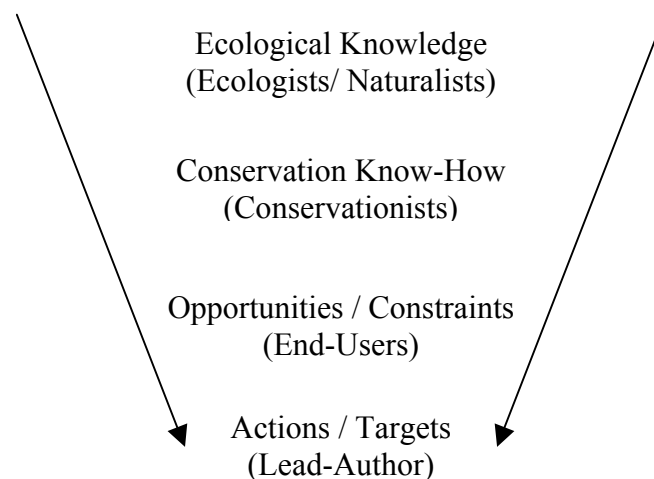
What we needed was people on the inside, and Peter [blank] was marvellous. He told us what the council would do, what they would take no notice of, how to get in, how to influence them, and how to embarrass them! A wonderful guy to have, because what you've got there is essentially a group of specialists (Lead Author, DHAP, 2nd May 2001).

Similarly,

The... [Local Authorities] people were very active. They had very clear ideas, they knew how the park regimes worked and they were very useful people to have around...I think otherwise we would have been useless (Ecologist, DHAP, 27th March 2001).

There was thus a discernible division of labour within the BAP groups, which began by gathering ecological knowledge and expertise, and progressively refined this knowledge through the more practical knowledges of conservationists, and finally end-users, to yield actions and targets. This division of labour was in effect internalised in the case of the UHAP, with the single author providing all three levels of expertise. Figure 6.3 depicts this division of labour as a funnelling of knowledge into actions and targets.

Figure 6.3: The LBAP division of labour as knowledge funnel



This division of labour, and the partnership / collaborative format for BAPs meant that the formulation stage did not entail lengthy conflicts,

There was actually very little disagreement in the end...after you've taken out or re-worded the bits people disagree with you're just left with a long document that has to be cut down (Lead author, DHAP, 2nd May 2001).

However, within this division of labour, there was an important sociology of personal involvement. Some contributors mentioned their motivation to raise their profile on the local conservation 'scene', whilst others were involved purely through institutional commitment. Amateur naturalists who have retired have more time to expend upon the process than a senior strategic planner from a LA does. A SAP was intended for Swallows and House Martins, each on the SoCC list and each found in the Birmingham and Black Country area, but the intended author was too busy to write the plan.

This is an inevitable part of voluntary processes based around group work, but the fact that some actors were far more active than others imparts an unavoidable bias to both the process and product. As one BAP author commented off-the-record, 'if you want to get your views across, you have to write the document yourself'. The UHAP represents the extreme case, being compiled by a single author. Due to motivation and time factors, the majority of BAPs were lead authored by conservationists. It could be argued that within the general process of knowledge production they stand between ecologists and end-users, and are thus well placed to coordinate. This point is discussed further in relation to the actual content of the BAPs.

The individual plans were then edited and compiled together by the steering group. This was a relatively straightforward task of achieving a consistent format across the plans and cross-referencing them, but took over a year to prepare the document for publication.

6.3 New Networks, New Knowledges?

6.3.1 Contrasting Urban and Ecological Knowledges

The following discussion compares and contrasts the content of the DHAP and UHAP. Analysis is linked to the general processes of formulation outlined above, and supported by arguments concerning the specific influence of contributors over the respective BAPs. Detailed reference is made to the DHAP and UHAP documents (Appendix 5 and Appendix 6 respectively). Although a difficult task for both analyst and reader, this detail is required in order to substantively legitimate the conceptual argument of the thesis, concerning the multi-scalar political ecology of urban nature. Quantified content analysis of these documents and related local and national policy documents would demonstrate the differing power of certain discourses of urban nature, but in line with the discursive approach of this thesis, analysis concentrates on highlighting the existence of differing approaches.

Before moving on to a comparison, it is important to note that every BAP includes two generic sections derived from the overall emphasis of the BAP process, concerning the raising of public awareness, and the improvement of monitoring and surveying. The UHAP and DHAP are no exception to this. Both are aware of the need to dispel their negative images in order to improve general appreciation of the habitat, and to improve ecological understanding through surveying and recording. In fact, of all the BAPs, these factors probably apply most forcefully to the UHAP and DHAP. Consider the similarities between paragraph 2.1 of the DHAP, and paragraph 1.1 of the UHAP concerning public image, and paragraph's 3.2.2 for both concerning the current base level of ecological information. These similarities make the differences between the two plans especially informative.

In the first section, concerning habitat status, the DHAP concentrates upon the ecological relations between fungi and invertebrates in deadwood, whereas the UHAP devotes seven out of ten paragraphs to the relationship between the habitat and human activities. This differential emphasis is carried into the next section concerning threats. Whereas the UHAP casts threats in terms of land use and aesthetics, the DHAP casts threats in terms of ecologically unsound management. For example, UHAP paragraph 2.2.1 states the turnover

principle, whereby losses of habitat through processes of urban development and obsolescence are acceptable. Particularly, this paragraph marries issues of urban change to the dynamics of ecological succession on brownfield sites, noting that turnover may, 'be a fortuitous means of retaining a series of habitat patches in early stages of succession within the region as a whole' (UHAP paragraph 2.2.1).

Paragraph 2.2.2 qualifies this by noting the potential of increasing brownfield development to upset this balance, and paragraphs 2.2.5, 2.2.6 and 2.2.7 note changes in human land uses that affect these areas. Paragraph 2.2.4 concentrates upon the aesthetic dimension of ecologically unsound reclamation. By contrast, in the DHAP, paragraphs 2.2 to 2.6 focus upon the need to rectify mismanagement of deadwood by landowners and managers. In recognising the human element, the UHAP has less to say about static ecological processes.

A combination of these traits is found in the objectives and actions for each plan. The DHAP devotes three of six objectives and seven of fifteen actions to ecological management issues, while the UHAP devotes one of five and two of sixteen respectively. This emphasis provides the parameters for the approach and scale promoted in each document. The DHAP emphasises action by existing personnel managing areas in which deadwood occurs, eschewing top-down or bottom-up approaches in favour of influencing the existing middle level of park and land managers and maintenance personnel. Implementation in the DHAP occurs through the translation of expert ecological knowledge into management guidelines and procedures for these groups. This is reflected in the wealth of ecological information and knowledge that dominates the first section, and is contained in the appendix, which is considerably longer than the actual plan itself. The production of this guidance is to be undertaken by Local Authorities and wildlife NGOs, based upon 'principles of deadwood management guidelines' set out in the appendix.

By contrast, the UHAP emphasises human interactions with the habitat, in terms of both its constitution and use, linking the HAP actions to wider processes of governance, such as planning policy, and everyday uses of the site by residents. Actions 5.1 and 5.4 aim to make planning policy and decision-making more sympathetic to the worth of these habitats, involving the Local Authorities and WT, while action 5.6 promotes the adoption of sites by

local communities, through the LA 21 process. The more wide-ranging approach leads to a less ecologically focused mode of implementation, with importance attached to the provision of these sites for local communities in actions 5.1 and 5.2.

By concentrating on mid-level ecological management, the DHAP prioritises biodiversity conservation at the site scale, including the protection of existing features within sites (actions 5.1 and 5.2). This corresponds to the traditional emphasis of nature conservation upon discrete site management outlined in Chapter Four. By contrast, the UHAP (action 5.2) recognises the need to improve the connecting network between green spaces, both to improve habitat connectivity and residents' access to green space, at the landscape level. The two themes of site-turnover and community use lead to a form of conservation knowledge that is more informed by biogeography than ecology (see paragraphs 2.1.6 and 2.2.3).

The UHAP articulates a more open definition of urban ecology, which recognises the dynamic interactions between social, economic and ecological processes (Grimm *et al.* 2000). This difference forms the basis for a reformulated urban ecology, but also raises the issue of the scale at which biodiversity conservation needs to be undertaken. Much of this difference is attributable to the foundational differences between the two categories: the DHAP is an ecologically based habitat type, while the UHAP is a category of urban land use. Urban wasteland results from human actions, and thus cannot be satisfactorily dealt with separately from the human sphere.

Given this, it is perhaps not surprising that the DHAP approach is mainly ecological, and is directed at land managers and conservationists, while the UHAP situates urban wasteland within the broader context of urban planning and community land use. As a result, the DHAP is confined to ecological consideration at the site scale that can be articulated by middle-level management, while the UHAP utilises a biogeographical approach at the landscape scale, which demands wider policy priorities to be considered. This distinction maps onto a broader divide within urban ecology, between ecology in the city, and ecology of the city (Grimm *et al.* 2000) outlined in the Chapter Five.

6.3.2 Contestation

Agreement by all parties upon the desirability of the LBAP meant that the formal process of contestation, whereby the LBAP was sent out to stakeholder organisations for consultation, did not involve lengthy or major conflicts. In the spirit of LA 21, BAPs are intended to be aspirational documents (Selman and Wragg 1999), and the caveat is made on the first page of the document that carrying out all the actions is beyond the resources of the organisations involved (Birmingham and Black Country BAP Steering Group 2000). However, Habermasian communicative approaches to knowledge formulation obscure the fact that within a plurality of values there will always be conflict (Mouffe 1996). In spite of shared objectives, partners have different roles to play and interests that will be affected quite differently by the BAP process, giving rise to differential power relations within these partnerships (Hillier 2000).

In practice, all knowledge, targets, and measurements are contestable from different points in a network (Latour 1987). The LBAP process is action based, which gives end-user orientation, but creates problems of accountability. Similarly, although its rationalist element is supposed to allow quantifiable progress, the lack of base line ecological data hinders the allocation of responsibilities. As a result, it is a contestable process and product. Consultation upon the DHAP concentrated upon the editing of a relatively long draft plan into a standard BAP, while consultation upon the UHAP concentrated upon issues of accountability and responsibility.

The UHAP provides an instructive example of target contestation. Guidance states that targets for priority species and habitats should be: realistic but ambitious, measurable, set within a clear timeframe, based upon data, and proportional to the biodiversity of the local area (UKLIAG 1997b). In other words, they should be ‘smart’ targets: targets whose achievement can be measured. In spite of the joint formulation of the document with LA personnel, the acceptance of new or different practices entails costs, whether temporal or financial. The focus of accountability falls upon the quantified targets for achievement, and

actions pertaining to them. The only quantified target in the plan concerns bringing urban wasteland sites into usage by local communities.

The UHAP action 5.6 thus aims to ‘encourage local communities to identify suitable nearby wasteland sites and develop community resources through fostering a sense of ownership, by giving the site a name and erecting appropriate signage.’ This type of initiative resonates with the urban wildlife movement, and is recognised within LA 21 and the biodiversity process itself. In the penultimate draft, the target for this action had been set at two such sites per year for each LA, with two sites every year for ten years for each of five local authorities, resulting in an overall target of one hundred sites. In the final plan, the target had been reduced to five such sites over the next ten years. Taking the discrepancy between the original target of one hundred and the revised target of five, the author says,

...my original suggestion was that it wouldn’t be too much for each LA to have two of these sites for every ten years...and they panicked at this and very reluctantly suggested that each would have one site every ten years, so instead of a hundred we finished up with five. I’ve looked at this as rather scant really (Lead Author, UHAP, 13th March 2001).

The author suggests that the reasons for the contestation of this particular target are to do with divergent readings of the objective by planners and conservationists,

I’ve talked to planners and they’re worried about costs and responsibilities, but the kinds of sites I’m talking about are the ones that as often as not have been taken over by the tulip planters...what wouldn’t be difficult would be to plant up some of these small areas, and try to get away from the derelict look...no extra costs, no implications for safety. Now there are clearly other larger sites that would be expensive and a hassle for them to do anything on, but these smaller sites aren’t useful for development...this watering down seemed to me to be typical of the whole attitude and approach to this (*ibid*).

The quantification of this target makes the conflict between the proposers of action and the end-users who will have to implement it further down the line clearly visible. In this case, a potential wasp’s nest is opened up for local authorities, concerning land ownership, safety issues, and cost, which contextualises the difference in targets between the author’s penultimate draft, and the final draft commented upon by local authorities that was adopted.

In the urban context, local authorities are the main point of contact for conservation action, through their own activities and holdings, and their role in constraining private development, both in terms of land use and built form. In the case of the UHAP, contestation essentially involved negotiation between conservation groups pushing for greater concessions to biodiversity, and the Local Authorities limiting their own accountability, as the end-users whose activities would be most affected by the BAP (most actions and targets either impact upon their own activities, or require enforcement through the planning system).

The contestation of the UHAP is indicative of the broader underlying political conflicts between local conservationists and local government. Interestingly, the consensus approach of the BAP process is intended to break down exactly such ingrained dichotomies, by including stakeholders who may be long-standing protagonists of nature conservation, in the actual process of formulation. Paradoxically, individuals who contribute in a professional capacity through the voluntary BAP process may then be called upon at work by the LA to contest BAP targets. Government bodies often display ambivalence, acting as both key constrainers and enablers of the BAP process, creating internal conflicts. As one West Midlands BAP officer stated,

I...sent them [the draft plans] out for comment, and in all but a few instances they said 'fine, go ahead'. The only people who objected were the Environment Agency, who objected to one of the plans they had written themselves, which was bizarre (BAP Officer, Staffordshire, 22nd February 2001).

The UHAP involved a direct process of contestation while the DHAP was merely subject to a lengthy process of editing, whereby information falling outside the agreed BAP format was relegated to an appendix. This again indicates the differences between the UHAP, functioning as a governance document, and the DHAP, functioning as a management document.

The lack of baseline ecological data with which to calibrate progress towards BAP targets means that proxies are often used, such as the measurement of LA activities. Examples abound in the UHAP and DHAP such as creating wasteland reserves (UHAP), getting park managers to undertake management and recording duties (DHAP), measuring the number of

WT planning comments that the LA acts upon (DHAP and UHAP) and so forth. Due to the lack of present or future ecological survey data, these markers of BAP implementation by implication become proxy measures of the success of the BAP, thus shifting accountability further onto end-users such as government agencies. While fewer, larger organisations are easier to include in the process of BAP formulation, they are also more wary of the potential implications for themselves.

The division between urban land use and traditional ecological habitat types is recognised in the introduction to the Birmingham and Black Country BAP, but little is made of it subsequently. The HAP titles adopted in the Birmingham and Black Country BAP are drawn from a number of national habitat typologies, in order to allow HAPs to be written that reflect the expertise of local practitioners (Table 6.2, p.155). The urban land use types are made up of amalgamations of habitat typologies, due to the lack of a suitable classificatory system to describe urban ecology, or biodiversity in an urban environment. The handling of buildings and gardens in the four most common U.K. habitat classification systems is indicative of the confusion over the classification of urban habitats (Table 6.4). This classificatory comparison clearly shows the inconsistencies, overlaps and gaps in describing areas such as ‘urban wasteland’, ‘gardens, allotments and open space’, the built environment and so forth. While the comprehensive categorisation of habitats has been recognised as problematic (U.K. Biodiversity Steering Group 1995), the urban land use HAPs present what is at once the greatest challenge and greatest opportunity for urban BAP knowledge formulation.

Table 6.4: Equivalences for urban land use HAPs from U.K. habitat classification systems

<i>Urban Land Use HAPs</i>	<i>Broad Habitat Type</i>	<i>Phase One Habitat Type</i>	<i>Countryside Survey 1990 Habitat Type</i>	<i>Birmingham UDP Land Use Category</i>
Urban wasteland	Built-up areas and gardens	Cultivated/disturbed land - ephemeral/short perennial	Waste and derelict	Brownfield sites
Eutrophic urban ponds	Standing open water and canals	Standing water-eutrophic	Still water	N/A
Buildings	Built-up areas and gardens	Buildings	Residential buildings, Continuous built, Hard areas	Built environment
Gardens, allotments and open space	Built-up areas and gardens	Cultivated/disturbed land - ephemeral/short perennial	N/A	Gardens, allotments and open space
Garden ponds	Standing open water and canals	Standing water	Still water	Gardens

Source: Jackson 2000

Given the complications associated with using urban land use categories, and the ecological confusion of using the terms urban and rural, it is pertinent to ask why the BAP steering group chose to use the term ‘urban’ at all. The answer to this is again bound up with the local conditions and capacity for conservation. In building upon a heritage of urban conservation in the region, a number of contributors, and members of the BAP steering group, were aware of the need to tailor urban conservation differently, and were keen to give it a high profile within the document. The land use groupings owe more to an ecologically informed classification of urban planning classification. For example, the separation of gardens from ‘residential’ or

‘built environment’ reflects the absolute ecological differences between walls and flowerbeds, both in terms of the biodiversity that they support and in terms of the factors that affect them as habitats. Their amalgamation with allotments and open spaces represents recognition of their common land use and features.

This classificatory approach is mirrored in the attempts of the UHAP to integrate social and ecological aspects of habitat use. The UHAP only persisted with the pejorative ‘wasteland’ as its title so that planners could relate to the types of spaces that it was concerned with:

Not all urban wasteland is post-industrial- its broader than that. It includes embankments, vacant houses, unused areas of scrub and so on. I personally like Oliver Gilbert’s term the ‘urban commons’... but the problem is that as a phrase it has never caught on and has never meant anything to planners (Lead author, UHAP, 13th March 2001).

Similar arguments can be made concerning the strategic planning content of the UHAP. The central problem of strategically maintaining a stock of brownfield sites is the fact that succession decreases ecological worth, and thus static site protection measures are not always suitable. The UHAP obliquely acknowledges these facts (paragraphs 1.3 and 2.1.7 cover succession, and 2.2.1 mentions the turnover principle), but does not state them as a problem. Consequently, actions are not solely concerned with the protection of sites. Actions 5.1, 5.2 and 5.3 mention the need to identify sites where valuable ecological processes are occurring, and potentially manage or safeguard them, or specific aspects of them, where appropriate. The potential synergy between community use of sites and management is suggested by action 5.6, but not directly stated. At present, there is no management of these sites in the area, and the recognition that certain aspects of certain sites at certain times may be worth managing, or incorporating into developments, is another key area addressed by the UHAP.

In conception then, the UHAP comprises a two-way extension. On the one hand, a number of land use factors from the realm of urban planning and development are extended into the realm of conservation, while simultaneously conservation and ecological knowledge is extended into the realm of urban planning. This knowledge is to be put into action in an integrated fashion through the BAP process. The content of the DHAP can also be seen as a process of extension of knowledge into different spheres, although the conceptual distance

between conservation and park management is arguably not as wide as that between urban development and brownfield ecology. The problem is also scientific. As Chapter Four argued, the ecology of conservation tends to be based on habitat type (i.e. pattern based), but in urban areas the approach needs to be more dynamic (i.e. process based). This tension sits uneasily in relation to urban BAPs: while the BAP is supposed to be a dynamic process itself, guidance requires it to be structured around the static categories of habitat types. New constellations of knowledge within the BAP, such as the UHAP, recognise the increasing difficulty of separating biological from social processes in the urban environment (Golley 1993), and the need to integrate these areas of concern within models of biodiversity conservation that operate at new scales (Savard *et al.* 2000). Re-working these categories and, by extension, scales is a key challenge to the operationalisation of the BAP.

6.3.3 Embedded Geographies

In line with the understanding of organisations and locales outlined in Chapter Two, the LBAP network forms a geographical matrix of activity, through which structures of meaning are established. The discussion so far has highlighted the stochastic character of the LBAP process, and this section considers the geographical path dependency imparted to the process by embedded actors and networks. Firstly, though, consideration is given to the general characteristics of the LBAP process.

As a consensus based network, the LBAP process utilises the existing pool of expertise and institutional capacity. However, this runs the risk of reproducing existing power relations between actors, and the influence of pre-existing networks lends a degree of path dependency to the process. The same pre-existing networks of actors and organisations that enabled the formulation of the BAP may also constrain its implementation. As a voluntary process, it is flexible enough to create new knowledges, but tends to display idiosyncrasies.

As a cross-sectoral initiative that has integrated diverse knowledges through a relatively messy process of knowledge formulation, its non-statutory basis places its effective

operationalisation into doubt. The BAP is essentially an un-funded mandate, whereby the national government shifts responsibility for an arena of governance downwards onto local organisations, without decentralising funding. The partnership approach provides the basis for funding, which reinforces inclusivity in the process but is far from guaranteed. The official launch of the plan in July 2000 coincided with the end of funding, and there has subsequently been a year without any funding (and hence without a BAP officer). As one contributor said off-the-record, 'it went up on the Internet and that was the last we ever heard of it'.

The problem of achieving consistent funding over time is related to the perceptions of stakeholder (funding) organisations towards the BAP. The production of the document tends to be seen as the end-point, or the fulfilment of obligations, rather than as the starting-point of an on-going process. The steering group have secured more funding from EN and the Black Country Local Authorities to re-employ a part-time BAP officer from summer 2001, but as Muir *et al.* (2000) note, LA 21 and LBAP mandates are not legally binding, and it is the relationship between formulation and implementation of such policies that remains the key to their success. The renegotiation of power relations through operationalisation determines the success of the initiative.

Thus as a consensus based network, LBAPs efficiently utilise local pools of expertise and institutional capacity, but risk reproducing existing relations and networks, introducing considerable path dependency. The voluntary basis makes it flexible, but not guaranteed to have immediate impact in the absence of statutory underpinning. Similarly, as a cross-sectoral initiative, relatively new types of knowledge can be generated, but their implementation will be less straightforward. The contingent and structural effect of these trade-offs in the LBAP process are considered below (Table 6.5).

Table 6.5: Constraints and opportunities in the LBAP process

<i>Feature of LBAP</i>	<i>Opportunity</i>	<i>Constraint</i>	<i>Contingent Effect</i>	<i>Structural Effect</i>
Consensus Based Network	Utilise pool of expertise and institutional capacity	Reproduces existing relations	Influence of pre-existing networks	Path dependency
Voluntary	Flexible	Non-statutory	Idiosyncrasies of content	Stochastic element
Cross-Sectoral	Production of hybrid knowledge	No circulating references	Messy process of knowledge formulation	Mixing of knowledges and expertise

Local expertise and the local institutional capacity in urban nature conservation have imparted a degree of path dependency to the LBAP process, and the core of the LBAP process cannot be fully understood outside of either the idiosyncrasies and motivations of the local actors involved, or the historical context of conservation in Birmingham more widely. The personal emphases of contributors can be seen to have exerted a strong influence on the focus of the LBAPs, determining what issues are included and what issues are not.

The group that formulated the DHAP were typical of the ecological habitat types groups, being dominated by ecologists, naturalists / conservationists, and LA land managers. Given this combination of contributors, the emphasis of the document upon ecologically informed management of existing LA sites is hardly surprising. Pushing this line of argument further, the lead author's own involvement came about through writing to the local council about the clearance of deadwood from a park and nature reserve near his home, which further directed the DHAP focus towards park management. The circumstances of his own involvement in the BAP process could be said, as the lead author, to have structured the subsequent recruitment process and overall direction of the document.

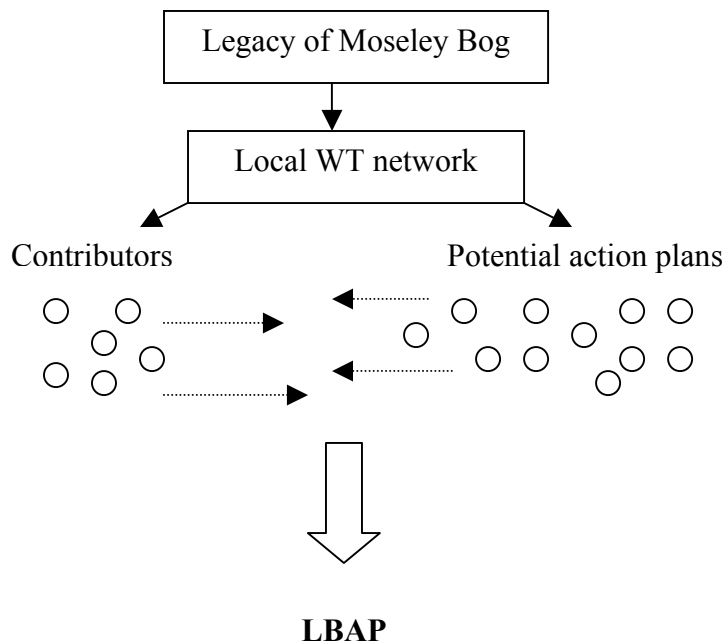
Similar arguments can be made concerning the UHAP. Although formally an academic, the lead author has a background in the Birmingham and Black Country WT working with planners, and is an active contributor to LA 21. He stated,

The crucial thing here is the habitats and species themselves, but that has to be set in the context of people in all sorts of ways...Some of the aims were quite explicitly to get these sites used by people...it ties in with work I've been doing on LA 21...integrating the environment in its broadest sense with the community (Lead Author, UHAP, 13th March 2001).

The experience of the author working on LA 21 projects directly influenced the document's emphasis. There are clear relations between the specific networks of actors who formulate plans, and the resultant knowledge. But further than this, there is a path dependency to these networks, dependent upon the influence of the lead author, as each BAP can be seen as following one of many possible paths between an array of ecological knowledges, and an array of end-user scenarios.

These individual biographies are contextualised by the historical legacy of nature conservation in Birmingham and the Black Country, in terms of both the points of power, and mode of extension. Following the Save Moseley Bog campaign (recounted in Chapter Five), in 1980, a number of local naturalists, activists, planners, and teachers formed the West Midlands Urban Wildlife Group (Bennett pers. comm.). This group then became the Wildlife Trust for Birmingham and Black Country Urban (UWT) in 1990, and later joined with other urban wildlife groups to form the Urban Wildlife Partnership, which is now the foremost national partnership championing urban wildlife. A number of the original actors in the Moseley Bog campaign and founders of the West Midlands Urban Wildlife Group subsequently entered LA planning departments in the area, and the close relationship between the LPAs and local conservationists is maintained through the Birmingham and Black Country WT. The LBAP process in Birmingham was embedded in this legacy (Figure 6.4), that largely defined the LBAP network, the pool of contributors and the resultant action plans that comprise the LBAP.

Figure 6.4: The geographically embedded LBAP process in Birmingham and the Black Country



The region has a rich tradition of urban nature conservation, and a complementary network of actors both within and outside of local organisations who both understand and promote urban conservation issues. The LBAP network was largely an extension of the Birmingham and Black Country WT who have a history of progressive urban conservation, and this legacy has imparted an avowedly urban slant to the process (Shirley pers. comm.). The importance of this local legacy also highlights the geographical basis of what are often huge variations between LBAPs produced for different areas. Following Bryson (2002), the analogy can be made with Massey's (1984) geological metaphor for the accumulation of layers of capital investment over time, as the playing out of the LBAP process accretes over previous networks and relationships. The geographical unevenness of such historical legacies and resources is accentuated by the shift to more voluntary forms of governance, as work on charities has shown that geographies of voluntarism are highly uneven (Wolch 1990).

It is worth noting that contributors to the LBAP were in accordance in considering that the experience had allowed them to engage in an original and fruitful exchange of ideas, knowledge and expertise with people outside their everyday sphere of concern. There was also a feeling that the process had created a forum in which professionals could air and

promote views and opinions that would have not been possible in their formal capacity. This came through in the number of interviews that assumed a two-part format, for example, where half the interview would be concerned with an official take on the LBAP process as a planning officer, and half would be concerned with their input to the LBAP as a local conservationist.

Few of the contributors could be pigeonholed exclusively as ecologists, conservationists or planners; most operated as a mix, or in different capacities depending upon what area of expertise was required. Such actors are ‘situated’ (Haraway 1991) as nodes within multiple networks, and as ‘cross-sectoral’ individuals were key facilitators of the cross-sectoral LBAP process. Again, the historical legacy of the Urban Wildlife Partnership era should not be underestimated in creating an influential pool of individuals concerned with LA functions and nature conservation.

While path determinacy and geographical embeddedness gives rise to diversity between places, they also raise the question of how original the BAP process can be in a locality. For example, the consensus-based mode of knowledge formulation can easily reproduce pre-existing lines of power across a group of actors (Hillier 2000), as can be seen to some extent in the watering down process of contestation. It can also simply reproduce pre-existing divisions between actors and hence knowledges and practices. As a member of the birds monitoring group stated,

...we’ve got back to the situation now where once again the herp (herpetological) group are all herp enthusiasts, and the bird group is all bird enthusiasts with a butterfly person in it (Birmingham and Black Country LBAP Steering Group Member, 22nd June 2001).

Although the duty to produce a BAP is a statutory requirement upon Local Authorities, the actions therein are not legally binding in any way. While it seems obvious to say that only people with either an obligation or interest took part, it is important to note in the context of ‘inclusive’ governance that very few ‘real’ local people were involved. The outcome largely results from the activities of a small group of like-minded, educated middle-class people who were, or had been at some time members of or involved with the activities of, the local WT.

6.4 Conclusions

The LBAP formulation process was driven by a network of actors that efficiently utilised local knowledge resources, but introduced three forms of path dependency: firstly, a pre-existing group of conservation actors largely determined the BAP group; secondly, the personal circumstances and preferences of contributors shaped which plans were written and how; and thirdly, the pre-existing power relations between these actors influenced the final shape of the BAP. This chapter has highlighted the geographically uneven and inherently social character of these three dimensions of the LBAP process, and can be used to infer similar conclusions about voluntary forms of ecological governance more generally.

The overall aim of the UHAP is to make planning policy more sympathetic to the worth of urban brownfield habitats: as such, it is not scientific knowledge, but rather it represents an attempt to facilitate scientifically informed cross-sectoral action. In drawing together a diversity of actions and spheres of concern under the aegis of habitats and species, it has achieved this on paper. However, two major caveats qualify this achievement.

Firstly, the exact conceptual status of these BAPs remains unknown. While the above description suggests that it involves the original juxtaposition of different expert knowledges, the funnel metaphor depicted in Figure 6.3 (p.167) suggests that the temporal organisation of the process results in the simple over-layering of knowledge. In many ways, BAP knowledges represent the directing of ecological knowledge in the face of a greater recognition of the practical constraints on end-users (this is certainly the case for the DHAP park management guidelines, and the planning policy actions of the UHAP). However, because of its unfounded, voluntary basis, it is possible that the most dynamic period of the BAP process will prove to be that of formulation, rather than operationalisation.

Secondly, a dichotomy exists between the conceptual traits of the urban land use HAPs and ecological HAPs. As such, the UHAP attempts to marry urban land use issues with brownfield ecology, while the DHAP operates within a preservationist paradigm of nature conservation as applied ecology (Sukopp 1998). This dichotomy runs through every aspect of

the BAP, and retards it from making a radical break with the dominant equilibrium discourse of society's relation to nature, that structures the national political ecology of the U.K. The UHAP, and by extension sustainable urban conservation, requires more sustained engagement with the dominant political ecology, in order to produce a 'new' model of urban conservation that transcends the traditional oppositions between ecological and urban discourses. This task is inherently spatial, demanding that the urban landscape be viewed and managed at different scales, and unavoidably social, demanding the establishment of new networks and practices.

Chapter Seven explores an academic-end-user research programme, which attempted to provide spatial conservation tools for Birmingham LPA that articulate the biodiversity value of brownfield space at new scales. Exploring this project develops the analysis of this type of knowledge formulation, and introduces an explicitly spatial dimension.

Chapter 7 New Scales of Conservation

7.1 Introduction

Analysis of the LBAP process in Birmingham and the Black Country has highlighted the division between ecological and land-use typologies, mirroring the wider schism between urban and rural issues that structures the national governance of the U.K. It has also indicated the problem of formulating knowledge that moves beyond an equilibrium paradigm of society-nature relations, and transcending these binaries to articulate a more dynamic conceptualisation of urban space. The UHAP tries to resolve these tensions by altering dominant planning practices, and a key arena in which this change might be effected is by addressing conservation-planning tools that explicitly bring ecological models to bear upon wider planning processes. This chapter explores a government funded research project that brings academics into dialogue with planners to assess the ecological efficacy of two such planning tools, in order to improve the mediation of brownfield biodiversity against development interests.

The BUHP project comprises a suite of studies testing the roles played by wildlife corridors and habitat patches in urban conservation. It is directly relevant to the arguments of this study in two ways. Firstly, it is specifically concerned with biodiversity on brownfield sites, aiming to contribute directly to the BAP process by creating decision-support system for Birmingham LPA through end-user – academic collaboration. As such, it provides a continuation of the case study of knowledge formulation undertaken in Chapter Six, involving a number of planners, conservationists and academics who took part in the main LBAP process. Secondly, it has the potential to re-conceive urban political ecology at the landscape level. While corridors currently dominate urban conservation planning in Birmingham, emphasising linear connectivity as crucial to biodiversity in a fragmented landscape, the concept of habitat patches supposes that it is the overall area and proximity of semi-natural spaces that supports biodiversity in a fragmented landscape. These two models value brownfield spaces differently, and imply very different geographies. Interrogating these concepts links the analysis of LBAP formulation to the actual planning practices explored in Chapter Eight.

Section 7.2 situates the BUHP research project within the broader NERC funded URGENT initiative on urban environmental science. The central concerns of the project, wildlife corridors and habitat patches, are contextualised as conservation planning tools and ecological models, and it is argued that the dominance of corridors as a conservation tool amongst planners is not justified solely by ecological evidence, but reflects the pragmatic parameters of planning and hegemonic discourses of urban space. The BUHP is founded upon interdisciplinary groups working with end-users to provide useful knowledge and the specific aims of the project are described, and related to the context and people involved in developing the project through its proposal stages.

Section 7.3 outlines the preliminary results of the BUHP, and addresses the process of translating these insights into planning tools and models. The inclusion of end-users in the project steering process, and negotiation between planners, conservationists and academics concerning the form and provision of end-user products is examined in detail. Conceptual divisions are revealed between these groups, which develop the arguments of the previous chapter concerning the LBAP process of knowledge formulation, and are demonstrative of more general issues concerning the role of science in ecological governance. It is suggested that corridors are hybrid concepts, whose ongoing dominance in urban planning theory and practice is based upon their acceptance within the networks of ecological governance, and their scalar resonance with the dominant political ecology of urban brownfield planning that prioritises the spatial reproduction of capitalist conditions for economic development in cities.

Section 7.4 concludes by suggesting that the BUHP or the BAP have failed to achieve change in the fundamental approach of planners as they contradict the dominant capitalist political ecology of urban space. Structural inertia within the political system hinders the transition to more sustainable forms of planning, and the case is made that to fully understand this failure, it is necessary to explore the applied practices of conservation planning on brownfield sites: a task undertaken in Chapter Eight.

7.2 Urban Conservation Planning and Brownfields

7.2.1 *The Corridor Debate and Biodiversity*

The three traditional components of landscape ecology are the patch, the edge and the corridor (Duane 2000). Patches of habitat linked together by corridors are widely used conservation tools in urban, rural and wilderness landscapes, as linear features that differ from the surrounding landscape, linking habitat areas that were once historically connected (Peck 1998). The boundaries of corridors and patches are called edge habitat. Landscape ecology supposes that a network of linear green corridors linking sites across a fragmented landscape will maintain higher levels of biodiversity (Forman, 1991; Barker 1997) than one in which no links exist.

Corridors are widely used as strategic spatial planning tools in urban, exurban and wilderness contexts across the world. They form the basis for the European network of biogenetic reserves / Natura 2000 network, which responds to the need to maintain key habitats under the Habitats Directive (EEC 1992) in line with the CBD. The idea of connectivity also underpins North American landscape conservation programmes; from the design of individual national wildlife reserves to the Wildlands Project that aims to reconnect the wilderness systems of North America.

However, these terms are species, and thus scale, dependent: what constitutes a series of patches for a small animal will have insufficient resources to support a larger animal, functioning instead as a corridor. Similarly, what constitutes the edge of a habitat to one species may not be a barrier to others. Because these basic elements are not discrete, the scale at which they are applied has major ramifications for the geography of planned landscapes:

The scale-dependent approach to landscape characterisation and analysis is the source of both power and uncertainty in landscape ecology (Duane 2000, p.226).

For example, in the urban context, viewing a site as a patch and edge will lead to its overall size being valued, whereas viewing a site as a corridor will lead to its connectivity being

valued. These differences are particularly germane to the resultant spatial dimensions of the development (or not) of ecologically valuable brownfield space, and are vital to the political ecology of brownfields in the U.K.

The concept of wildlife corridors was championed in the realm of urban planning by Barker, long-standing urban advisor at the Nature Conservancy, and subsequently English Nature. Barker's research report, 'A framework for the future: green networks with multiple uses in and around towns and cities', written in 1997, was as much a reflection of the dominance achieved by the corridor concept in strategic urban nature conservation planning as a manifesto for its adoption. The lineage of corridors runs through almost every planned urban form in history, from cities of classical Greece (Bacon 1967), to Olmstead's parkways of Boston and the Bronx (Little 1990), and from Ebenezer Howard's garden city to the greenways of Milton Keynes.

The current orthodoxy of corridors in urban conservation planning reflects a deep-seated appeal to urban planners, in that they appear to reconcile ecological and human needs in a landscape. The urban sphere has its own not necessarily consistent set of spatial logics, from preferred scales of consideration (building, site, zone, city, borough etc.), to a range of selection criteria (development potential, dereliction, usage etc.), and these land use categorisations can conflict with ecological scales and categories. A key factor explaining why corridors have been, and indeed are, embraced by planners of the city is their linearity. Corridors require no fundamentally new approach to planning because linear features such as transport conduits (roads, railways, footpaths, etc) form the basis for plan making. In ecological terms, the idea that corridors allow natural organisms to move between sites makes intuitive sense, and by being championed as multi-functional spaces, their justification is broadened as conduits of people, nature and the countryside through the city.

As a result,

Coming from a strategic position, it is much easier, and up until now more logical in ecological terms, to argue a basic framework of interlinked linear open spaces... In planning terms, and the general wildlife lobby, it is generally accepted that having these links between places is better than not having them

(Strategic Conservation Planning Officer, Birmingham LPA, 8th November 2000).

In Birmingham, corridors formed the basis for the West Midlands strategic wildlife network established in the 1970s, which culminated at the Ackers, a massive brownfield reclamation project at the confluence of the river Cole, the Spark Brook, and the canal network (Nicholson-Lord 1987). Similar initiatives occurred in the late 1970s early 1980s in London (Greater London Council 1985), Glasgow, Liverpool and the U.S. (Adams and Dove 1989). Since the adoption of the NCS as SPG in 1997, 'the start point [for conservation planning], certainly Birmingham's, is a network of linear open spaces' (Strategic Conservation Planning Officer, Birmingham LPA, 8th November 2000). They are the key spatial ecological planning tool used by Birmingham LPA (Birmingham City Council 1997), comprising largely pre-existing green space that was identified by the Birmingham and Black Country WT when the Birmingham NCS was formulated. They constitute the city's 'open space network', and where two or more corridors meet, a nexus occurs. The Birmingham NCS focuses on the importance of maintaining the integrity of these networks.

However, the ecological basis for corridors is a long-standing point of contention. On the one side lies a wealth of anecdotal and intuitive evidence (Spellerberg and Gaywood 1993) supporting their efficacy. Because human activities are seen to fragment environments, measures to maintain or increase connectivity are assumed to be beneficial (Noss 1987; Beier and Noss 1998). Conversely, little scientific evidence exists to prove that linear connectivity creates higher levels of biodiversity in a fragmented landscape (Nicholls and Margules 1991; Dawson 1994). Research upon the ecological efficacy of wildlife corridors is still inconclusive, due to the difficulties of testing dynamic dispersal attributes for both individual species, and for communities of organisms (Adams and Dove 1989). Species specific research has shown the importance of various surface types to movement, but often what is a conduit for one species will be ineffectual for another (Yanes *et al.* 1995). As a result, it is fair to say that corridors 'appeal more as intuitive constructs than they do as a set of scientifically tested findings' (Boothby 2000, p.283).

The dominance of corridors as a spatial ecological planning tool has three important ramifications for urban wasteland biodiversity. Firstly, given their ambivalent grounding in

ecological theory, the question of how corridors are detected, manipulated and incorporated in assessments, design and decision-making becomes highly political. Secondly, because they play a key role in articulating the ecological worth of brownfield sites, other spatial models of ecology, such as those associated with patch dynamics, are obscured (Whitfield 2001). Thirdly, the idea of multi-functionality in the urban context introduces an unexamined politics of human use in these spaces (Barker 1997).

These factors have introduced an increasing ambivalence towards corridors amongst planners and ecologists. As one strategic planner stated,

We had a real job getting them past the public inspector at the last [UDP] public inquiry, because they're not proven...It's sort of logical that they should work, but you can't prove it (Strategic Conservation Planning Officer, Walsall Metropolitan Borough Council, 10th May 2001).

Stronger sentiments also exist,

We are too much hooked on having wildlife corridors, and when I explored the issue of what exactly corridors are, it is to enable the movement of badgers, hedgehogs, give access to feeding sites and so on, and I've always gone by that. Once someone teaches you that tramline its very difficult to get away from it. But if there is an argument presented to me that it needs something more than a corridor, and we ought to be looking at the wider picture of what is happening, then that's for someone to inform us, and we'll take it and incorporate it into our wildlife strategy (Case Officer, Birmingham LPA, February 2002).

Corridors represent a rare conceptual commodity. Their appeal to conservationists and planners alike makes them very powerful mediators between scientific and political representations, and their latest incarnation as multi-functional spaces draws on this hybrid appeal. However, with respect to the UHAP, their dominance at the cost of other conservation models can be detrimental to biodiversity, and the goals of urban sustainability more widely. With their ecological basis, and increasingly their use in urban planning, being questioned by sections of the planning and ecological community alike, it is now time to examine how this orthodoxy has been challenged by the BUHP research project.

7.2.2 *The Biodiversity in Urban Habitat Patches Project*

Traditional research groups, underpinned by disciplinary academic interests and the protocols of review and assessment, are giving way to trans-disciplinary groups, oriented towards the context of application (Gibbons *et al.* 1994). The URGENT research programme reflects this shift towards interdisciplinary, end-user informed projects, and is earmarked to receive £9.7m of government funding between 1998 and 2005. It aims,

...to stimulate the regeneration of the urban environment through understanding and managing the interaction of natural and man-made [sic] processes...The URGENT programme has a strong emphasis upon links with the needs of decision-makers and...each programme has designated “users” who follow the research closely and have a direct interest in the findings (URGENT 2000, p. iii).

The URGENT initiative shares the rhetoric of partnership and dialogue with end-users with the BAP process. However, it also displays the characteristics of ecological modernisation, prioritising technical and scientific solutions with a commitment to private enterprise (Blowers 1997). The chair of URGENT, a former head of research for ICI and Unilever, recently stated that,

Establishing a scientific basis for sustainable development is terribly important for future planning...The results of URGENT will inform investment, planning and policy discourse (Sir Geoffrey Allen, URGENT Annual Meeting, 4/4/01).

The URGENT programme comprises over forty projects integrating urban ecological and environmental research across the geological, terrestrial, freshwater and atmospheric sciences (URGENT 2000). In addition to the cornerstones of partnership, end-user applications and scientific knowledge, the URGENT programme envisages tackling problems of urban planning and management at new scales,

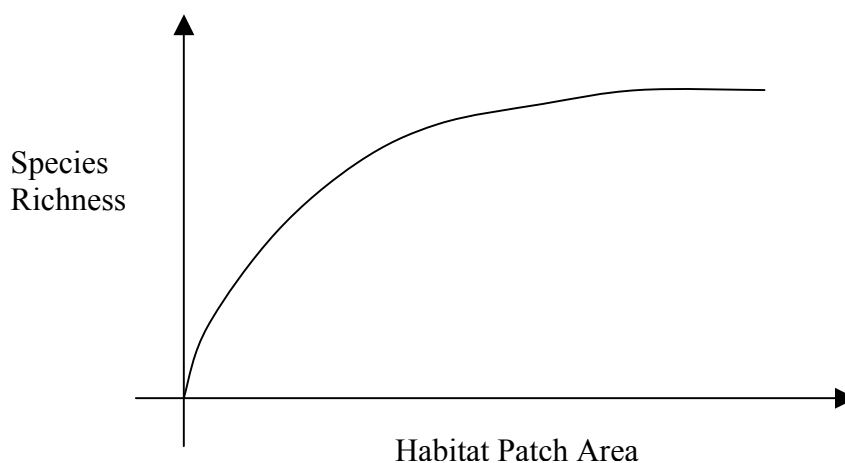
We are only just beginning to relate the sterility of our inner cities to ...our failure to realise a landscape view of society. We need to be far more clever...as regards how the research that is provided at one end or the other feeds into this bigger picture (President of Urban Wildlife Partnership, URGENT Annual Meeting, 4th – 6th April 2001).

The BUHP study is one of eight major urban ecological projects exploring the spatial dynamics of biodiversity in urban environments. It aims to,

...analyse the richness of species, the distribution of genetic diversity, and abundance of selected species in connected and isolated habitats, in order to quantify patch area and distance effects (URGENT 2001, E1).

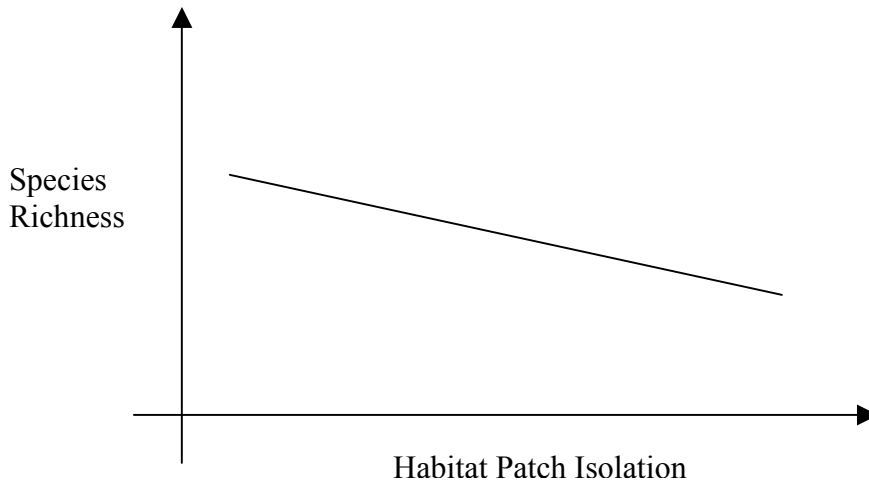
Because urbanisation increases the isolation of habitat patches through fragmentation and encapsulation, it is suggested that the ecology of urban spaces needs to be understood in terms of models of island biogeography (Faeth and Kane 1978). Like islands in the ocean, larger habitat patches can support more species, but this relationship is logarithmic, with the rate of increase in species richness falling off as patch size grows (Figure 7.1).

Figure 7.1: Relationship between species richness and habitat patch area



Source: Lomolino 2001

Similarly, like islands, species richness increases as isolation between habitat patches decreases (Figure 7.2), although this relationship is weaker and only detectable when the variable of patch size is removed.

Figure 7.2: Relationship between species richness and habitat patch isolation (log scale)

Source: Lomolino 2001

Building on the Eastern European school of urban ecology, this work suggests that the key factor supporting biodiversity within a fragmented landscape is a matrix of habitat patches of varying sizes (Sukopp and Werner 1982; Collinge 1996). Existing meta-population research into the exact effects of habitat patch size and proximity upon habitats and species indicates that different species require very different landscapes (Margules *et al.* 1982; Blair and Launer 1997; Rolando *et al.*, 1997; Mortberg and Wallentinus, 2000). However, previous studies seeking to understand the relationship between patch size and isolation within a landscape suggest a number of complexities. A study of plant species distribution in vegetation fragments in the West Midlands (Bastin and Thomas 1999) demonstrates multivariate complexity in dynamic urban landscapes. Analysis of eleven ecological landscape variables (including patch size, shape, isolation, distance from edge of urban area) accounted for a mean of only 20% of recorded species variability. The BUHP study uses species distribution sampling to investigate dispersal patterns and biodiversity levels for remnant habitat patches in the urban environment. A series of field-based studies have been undertaken investigating distribution patterns for a diversity of species in Birmingham.

The URGENT programme prioritises work addressing the environmental problems associated with brownfield sites. This is reflected in the selection of the West Midlands, South Wales and Glasgow/Edinburgh conurbations for study, and the focus of the BUHP study on brownfield sites. Brownfield sites are treated as ‘classic’ habitat patches because,

...they are relatively recent in ecological terms...therefore species that have colonised these sites have dispersed within the city from recent sources, and the concept of the urban habitat patch as an island can be examined (URGENT 2000, p.33).

The initial proposal was written in 1997 for an academically orientated project, although involving Birmingham LPA, based upon the expertise of biogeographers in the School of Geography, Earth and Environmental Sciences at the University of Birmingham, who had been involved with an international research group looking at biodiversity gradients of invertebrates in urban areas. NERC approved the project on the condition that they combine with teams from the Institute for Terrestrial Ecology and University of Newcastle, in order to introduce elements of GIS and modelling expertise respectively. Long-standing links existed between the School of Geography, Earth and Environmental Sciences at the University of Birmingham, and the UWT/ Birmingham and Black Country WT, and they were consulted to introduce a further element of user-community involvement. The Birmingham and Black Country WT indicated the potential importance of urban wastelands to biodiversity, and the relative paucity of ecological information, concerning both species on the sites, and the role of the sites as a mosaic within the urban landscape.

While proposals were filtered on academic grounds in the first round of applications, NERC stressed the importance of user community involvement in the second round of project bids. As one researcher involved with the bidding process stated,

The first remit was effectively a call for science on urban areas that was relevant, and then it kind of expanded a bit, and suddenly we had to have these end-user products. They weren't specified clearly in the first application although they were there in some notional applied aspects...the end-user stuff kind of fell out at the end (URGENT Ecologist, University of Birmingham, 27th March 2001).

Following up the suggestions of the WT, the project expanded its end-user element with Birmingham LPA. A steering committee was formed with the strategic conservation planner for Birmingham LPA and members of the Birmingham and Black Country WT, and the main project proposal was written jointly, with end-uses including the provision of much-needed data on the value of urban wastelands to biodiversity, and supply of a GIS based decision-support system. The BUHP project aims to furnish planners with a biodiversity decision-support system to aid the planning of brownfield sites in the city, and assess the ecological efficacy of corridors in opposition to habitat patches for conserving urban biodiversity on brownfields.

The mediation between scientific and end-user aspects of the project are key to the development of new scales of ecological planning tools, and two key points emerge from this outline of the project's evolution. Firstly, the scientific parameters of the study reflect biogeographical concerns, in terms of the application of island theory to urban habitat patches, and the previous experience of researchers studying urban-rural biodiversity gradients. Secondly, the end-user elements of the study reflect the same network of people and organisations mobilised by the LBAP, with the LA occupying a similar role as end-user / implementer, but in this case with the process being driven by academics rather than the WT. Again, a political element was discernible in interviews with academics from the area. Ecologists from the University of Wolverhampton had been cut out of the project by a government funding decision, and academics from the University of Birmingham saw this as the motivation for their 'hijacking' of the LBAP process. As a result, Wolverhampton academics were generally less enthusiastic about the BUHP project, while University of Birmingham academics were less enthusiastic about the LBAP process.

7.3 The Political Ecology of Urban Planning

7.3.1 *Corridors: Exploding the Myth*

After two years, the BUHP project has yielded interesting results. Although it is impossible to go into the methodological detail here that would be required to fully assess the scientific validity of the work, studies have generally indicated,

...that urban greenways, whilst important habitat, may not function as movement corridors for all species. Sites on corridors may contain more generalist species and be more similar to one another, but do not appear to contain more specialist species than isolated sites (URGENT 2001, E1).

An investigation into the genetic variation amongst species of butterflies within the conurbation adds detail to this picture,

The conclusion so far is that patchiness and limited distribution of butterflies within the conurbation result from reduced availability of suitable habitat rather than from problems of butterfly mobility. The research has found no evidence for butterflies using designated green corridors for dispersal (ibid).

A specific study of invertebrate dispersal and seed banks on urban wasteland habitat patches and wetland corridors in the West Midlands drew similar conclusions (Austin 2002). For example, the connected habitats along the River Cole wildlife corridor did not result in higher numbers of specialist species, although more similar generalist species were found along the corridor than for sites off it. With respect to derelict sites, increased patch isolation did not appear to effect the distribution of poor dispersers (non-winged carabids) more than that of good dispersers (winged carabids), and the similarity of the overall assemblages on these sites was not affected by isolation. Similarly, rare plants were unaffected by corridors. Rather,

The limiting factor is type of habitat- the geography of it doesn't matter a jot, because they are so mobile that if it's there then they're on it. So it's not dispersal limited, it's all about habitat quality, which is quite an interesting finding, and has real relevance to planners because it doesn't particularly matter what they do as long as there is enough of that habitat around overall (URGENT Ecologist, University of Birmingham, 27th March 2001).

Furthermore, larger species have higher resource requirements, and so large patches will be vital to their existence in the urban landscape.

Adding detail to the importance of patches within an urban landscape, the related URGENT project exploring 'recombinant' urban ecological communities states that,

In urban and suburban situations, the best sites for rare species tend to be post-industrial (in a broad sense) ones...at least one hundred insect species and dozens of plants present in the sub-region now rely mainly or entirely upon urban and suburban 'brownfield' sites for their continued existence (Falk 2000, p.19).

The report argues that the urban landscape supports meta-populations of species, and that the habitat mosaics in the urban landscape that nourish them are often older and more established than traditional ecological approaches would conclude.

These projects indicate an ecologically dynamic landscape, rather than one in which nature is confined to greenways: a position supported by urban conservationists exploring the role of gardens, walls, rooftops and other micro-habitats as wildlife refuges and conduits in the urban environment (Frith pers. comm.). Although holding less true for inner city or industrial spaces than residential spaces, the urban landscape is largely ecologically permeable, making questions of connectivity less ecologically pertinent. It appears the 'common sense' underpinning the adherence of many ecologists to the corridor concept is based upon a gross underestimation of the dispersal capabilities of species in urban areas (Whitfield 2001).

Underestimation of species dispersal capabilities is reinforced by overestimation of the barriers to dispersal in the urban landscape. Cartographically gardens, hedges, verges, abandoned buildings, un-maintained or broken up macadamised areas and so forth are represented as built-up areas for planning purposes, leading to a discursive concealment of connectivity. Conversely, extensive areas of mown grass, such as those that occur in parks and around tower blocks that are marked as green space are actually poor habitats, and can prevent the movement of many species (Szacki *et al.* 1994). This cartographical categorisation represents a blind spot in planning perceptions, which reproduces an

ideological dichotomy between the urban and the natural. By assuming urban space inherently un-natural, nature is not perceived in and as part of the urban landscape. Corridors spatialise this discursive separation of city and nature, making it possible to experience nature discretely from the city, and reproducing the urban / rural planning binary within the city. The scientific reality of an ecologically permeable urban fabric disrupts these discourses, undermining the ecological basis of corridors and reinstating the habitat patches as sources and sinks for meta-populations operating in the urban landscape as a whole.

The current focus upon individual sites and overall habitat loss conceals the importance of patch dynamics to actual biodiversity carrying capacities in a landscape. In light of these results, and ongoing genuflection to the logic of corridors, one member of the URGENT Ecology Steering Group claimed that,

...urban planning and management is substantially based on a set of myths. How we communicate these issues to the policy community is vital (URGENT Ecology Steering Group Chairman, URGENT Annual Meeting, 4th – 6th April 2001).

As this and other studies of patch dynamics have noted (Hanski and Gilpin 1997; Boothby 2000), scale is vital. To conserve meta-populations, landscape planning must maximise patch quality, patch size, adjacent patch and overall patch matrix. The habitat project is in the process of yielding indices to predict flora and fauna in urban patches, and models to predict the response of individual species to change in the urban landscape. However, the dominance of corridors is implicated with an array of other ideas, knowledges and practices, as part of a wider political ecology of scale. Changing the ‘myths’ of urban planning and management alluded to above, in this case by championing patches over corridors, involves engaging with the established practices of planners, conservationists and ecologists. Considering urban wastelands at different scales requires a new politics as well as a new ecology.

7.3.2 Planners and Scientists

The end-user steering group met during the period over which the first two project proposals were written to outline possible end-user products, and subsequently to refine these products. Six deliverables were proposed from the project: a handbook of recommendations on urban planning, a GIS database of Birmingham, a computerised decision support system, a mappable index of hemeroby (degree of unnaturalness) for the flora of urban habitats, models of species dispersal and a species database to develop conservation strategies (CEH 2001). The end-user products involve the translation of ecological knowledges for planners, representing a key conceptual meeting ground at which, in the terms of this project, new scales and political ecologies can emerge.

More so than for the LBAP process, it is possible to identify distinct academic and bureaucratic positions in the end-user steering process. The following discussion revisits the understanding of science and policy outlined in Chapter Two, concentrating upon how the differing values and positions of actors and organisation involved with the policy process are worked out. The key products explored here are the decision support system and handbook for planners, as they engage with core planning activities of plan-making and development control.

The decision support system is designed to enable planners to explore the biodiversity of derelict sites in the West Midlands. It includes a land-cover map, a habitats map showing green corridors as linked habitat patches, and a species database. A ‘query site’ function can be used to map sites on and off corridors. The steering group dialogue between researchers and planners reveals interesting assumptions made on both sides concerning what kinds of information would be beneficial. The original project proposals for the decision support system state that the software was ‘to allow planners and developers to analyse the effects of the changing habitat patches in the urban environment’ (*ibid*), but this seemed to be out of step with the requirements of the LPA:

Effectively what they want to know is for any given site, they want to be able to click on a map and have an inventory. [A species inventory?] Yes. And

what they're looking for is anything that has got legal protection...they're not so worried about the science that says 'well you require 17 of those sites every 10km² to make this function. That's all irrelevant; they're questions that are not that relevant. What they are interested in as far as I can tell is a decision-support system that tells them what's where (URGENT Ecologist, University of Birmingham, 27th March 2001).

As another ecologist associated with the project stated this kind of information could not be provided through the project itself. This gap had to be negotiated over the course of the End-User Steering Committee meetings. It was agreed that the survey results of the fieldwork were to be compiled with existing EcoRecord data from the Birmingham and Black Country WT into a visual database of species distribution on those derelict sites sampled for the project. This solution was to be achieved through and integrated with another URGENT project, seeking to develop a GIS system to map the urban environment for planners. Similarly, corridors had to be integrated into the decision support system, as they form the basis for green planning in Birmingham, leading to the idea of 'patches on corridors'.

Other interested parties held their own expectations concerning what the project should be achieving, and indeed upon the relationship between the research and end-users,

They [the URGENT researchers] haven't liased enough with the end-users, it really needed a lot more steering. It's become a purely academic project- there's no decision, no support and no system (Member of conservation NGO, URGENT End-User Steering Committee, 17th January 2001).

Generally, end-users adopted a conservative approach to new forms of urban ecological planning. While more information was desired about what species are where, there was little demand for new types of information, with the emphasis remaining firmly upon the location of brownfield sites in relation to corridors. The decision support system typifies this, making the raw survey data from the research available to planners, but not incorporating this data into a landscape model of patch dynamics.

The indirect contribution of the project to the wider policy debate over corridors is, in the long term, a more realistic arena in which changes to more sustainable scales of planning may be achieved, and the handbook of recommendation on urban planning is a key vehicle with which to achieve this. However, as the most recent project status report notes,

The difficulty with any such manual is that action ultimately comes down to interpreting site-specific data. Many members of the project steering group felt that to interpret ecological data it is necessary to employ an ecologist (URGENT 2001, E1).

As a result,

It should aim to be a simple checklist for strategic planners to consider biodiversity in an urban habitat, and should include the implications of different types of site management (ibid).

The recommendations operate within the existing site-based paradigm of strategic urban planning. The importance of maintaining a habitat patch mosaic through site designation and the UDP in order to preserve critical areas of habitat in particular localities through development control procedures are neglected in favour of models of site management. The central issue here is once again one of translation, 'URGENT's work is very scientific...it's all very impressive but how is it going to feed into policy' (Urban Advisor, EN, 17th January 2001). Because the handbook intends to be of practical use, little is said that challenges the overall framework of urban nature policies, and the myth of corridors perseveres.

7.3.3 Barriers to Urban Biodiversity Conservation

The failure of the LBAP and BUHP to achieve a real shift in the scales of conservation planning in Birmingham is not attributable purely to the conceptual divide between ecological landscape conservation tools and current planning practices based upon morphological form. It is underpinned by and indicative of the practical structural inertia and constraints of the current planning system. As a local green activist and academic at the University of Wolverhampton said,

People have baggage with them, so you will get planners who say one thing over coffee, but then go back to their offices, and are restricted by policies, by resources and so on and there's only so much they can do (13th March 2001).

This section considers practical and conceptual structural barriers to the adoption of BAP knowledges within the planning system.

Under the aegis of sustainable development, proactive planning demands environmental management at new scales and an increased capacity to assess technical data in the arena of development control (Marshall and Smith 1999). However, the legal requirement and capacity for LPAs to react to these changes are absent: no professional bodies exist to regulate or implement more sustainable planning practice, and the training planners receive is still oriented around transport planning and development control. For example, the EIA process generates large amounts of environmental data, which must be interpreted by planning departments that have remained essentially unchanged for fifteen years. Although easy to blame planners for purposefully resisting environmental data or new planning practices that complicate issues such as brownfield planning, many local authorities 'don't appreciate the need for environmental data, let alone have the resources to use or interpret it' (Graham Fairhurst, Telford and Wrekin Dept of Engineering Implementation, URGENT Annual Meeting, 4th – 6th April 2001).

The structural incapacity of local planning authorities to accommodate environmental data and undertake environmentally informed decision-making leads to what the head of the Urban

Research Programme at the British Geological Survey calls an ‘aversion to knowing’ (2001 pers. comm.). New data makes planning departments more accountable for their actions. Brownfield sites represent a classic case, as a complete understanding of the ecological role played by urban wastelands would often impede urban development projects. Information concerning ground contamination levels in a locality directly reveals levels of blight in an area, something which residents and planners alike can be less than keen to discover.

These shortcomings have led many to argue that the rhetoric of sustainable development is moving well ahead of practice (Malbert 1998). While the statutory basis of the U.K. system makes it relatively flexible (Cullingworth and Nadin 1997), it also makes it better at preventing change than facilitating it, displaying a comparative lack of proactive planning in comparison to other European states. Structural inertia partly explains why concepts and tools that are accepted, such as corridors, become so deeply embedded over time, both in practice and equally importantly in policy. Given that Birmingham City’s conservation policies as set out in the UDP and SPG are founded upon green corridors, it is hardly surprising that planners didn’t come to the table asking for landscape planning tools based upon patch dynamics.

In the arena of environmental policy-making, bureaucratic interests tend to seek ‘science for policy’, while academic culture is concerned with ‘policy for science’ (Lekakis 2000, p.70). This certainly appears to be the case here, with planners asking for research to support current models of ecological planning, and academics conducting research that is based upon very different models. Furthermore, whereas the LBAP process created a conceptual space in which actors could operate in more than one capacity, actors in the BUHP project were bound to their official roles. The URGENT initiative was explicitly positioned within the frame of ecological modernisation, and, as a result, based the translation of science into end-user products upon technical, rather than political, solutions.

Deeper conceptual problems underpin the practical problems of achieving real dialogue between the spheres of planning and ecology, linked to the wider frameworks in which each of these activities is situated. Returning to Duane’s (2000) characterisation of scale as ‘the source of both power and uncertainty in landscape ecology’ (p.226), power is articulated in

the urban landscape at the anthropogenic scale, as corridors are generally matched to linear human conduits such as railways, rivers or roads. Similarly, the patches upon these corridors tend to be anthropogenic features such as playing fields or development sites. The BUHP aims to rearticulate these patches at ecological scales, by conceptualising the links between them in terms of ecological efficacy rather than urban morphological form. As for the BAP process, the conflict between urban and ecological articulations of landscapes comes to the fore, although the BUHP develops this critique by beginning to reveal the close relationship that exists between scale and power at the practical level. The axiomatic and material dimensions of scale are considered further in Chapter Eight.

The linearity of corridors fits into this spatial logic, whereas habitat patches contradict this logic by demanding that the overall urban landscape be viewed as a socio-natural phenomenon. The conflicting political ecologies of capitalism and sustainable development explain the mis-match between the expectations of planners, conservationists and researchers in the BUHP project. Capitalist development requires the control of the environment as a resource, maintaining the separation of society and nature, and the developmental logic of urban space is a result of this separation at the national level. Attempts to articulate urban nature at the landscape scale directly contradict existing processes of urban ecological governance, which reproduces the conditions necessary for profitability and competitiveness. Resultantly, the handbook for planners concentrates upon site management, because the site is the scale at which day-to-day planning activity occurs. The level of orthodoxy enjoyed by the corridor concept is being evidenced currently by the massive national and international controversy provoked by the findings of the BUHP project. As Chapter Four argued, the idea of natural equilibrium houses an economistic assumption of society's relation to nature, which spawns the binaries of urban and rural, brownfield and greenfield. These discourses underpin a specifically capitalist political ecology of corridors at the city scale.

7.4 Conclusions

Urban conservation planning tools are crucial to the recognition of biodiversity on brownfields. The BUHP project compared the ecological efficacy of the corridor model, which dominates nature conservation in Birmingham, with the idea of brownfield sites as habitat patches. Corridors have a long history in urban planning; with their linear character appealing to the intuitive sense of conservationists and planners alike. The BUHP project concluded that corridors are not necessary conduits for organisms, because the urban landscape is more ecologically porous than is commonly thought, and that patch size contributes more to the maintenance of urban biodiversity. However, translating these results into end-user products for Birmingham LPA was problematic. Planners remained wedded to a practical and legal outlook upon ecological issues, requesting knowledge concerning the existence of protected species on particular brownfield sites, and information about patches in relation to corridors. The knowledge produced thus reinforced existing conservation planning practices, which focus upon the site, and are organised around corridors, rather than using the scientific findings of the project to ecologise planning practice.

The failure to reform this orthodoxy was related to a number of structural barriers, including the poor capacity of LPAs to adapt to the environmental imperatives thrown at them by sustainable development policy. However, at its root, this incapacity reflects the structural inertia of a system designed to facilitate the development of urban space. The logic of corridors is predicated upon the (incorrect) assumption that urban areas are uninhabitable for many animals, an assumption that resonates with the de-naturing of cities that characterises the national binary political ecology of the U.K. The landscape view required by the habitat patch model contradicts the spatial logic of capitalism, by refusing to segregate nature from society. As such, it could be argued that the entire urban BAP process was doomed to fail, as it contradicts the urban basis of capitalist reproduction and the national political ecology more widely.

Speaking three years after the completion of the Birmingham and Black Country LBAP, one city councillor stated,

...biodiversity suffers from the fact that it's been confined to science and special interest....so it really seems to be miles away (Councillor, Birmingham City Council Development Control Committee 5/2/01).

In answer to Eden's (2000) question, 'is sustainable development something new, or simply business as usual?' it would appear that biodiversity conservation so far is business as usual. However, in highlighting the political ecology of urban planning, this chapter prompts the question 'planning for whom, for where and for when'. Chapter Eight turns to the political ecology of brownfields in an applied planning context, interrogating how the dominant capitalist political ecology is reproduced through networks of planners, developers and ecological consultants, and indeed through 'the backstage power play...which is the real politics of planning' (Flyvbjerg 1998, p.83).

Chapter 8 The Political Ecology of Brownfields

8.1 Introduction

The BUHP and the BAP have largely failed to affect the socio-ecological transformation of urban space, as they contradict the dominant scales of ecological governance in the U.K. Structural inertia within the planning system has been considered as a barrier to more sustainable forms of planning, but in order to fully understand the political and ecological co-constitution of ecological governance, it is necessary to explore the actual practices of conservation planning on brownfield sites. This chapter focuses upon the individual site, to reveal how the ecological worth of brownfields is articulated against development pressures in practice.

The designation of sites in strategic planning and use of ecological assessment in the development control process are explored in terms of the national and local policy framework, in order ground a case study of development proposals upon an ecologically sensitive brownfield site in Birmingham, known as Vincent Drive. A form of scalar politics emerges from the analysis of surveying, mapping and planning practices, which is developed to show how a specifically capitalist form of urban ecological governance is manifested in the everyday practices of planners, developers, surveyors and town planners.

The integrity and efficacy of the planning system and environmental impact assessment procedure are important concerns relating to urban and environmental issues, generating a considerable academic literature (Jones *et al.* 1998; Glasson 1999; Wood 2000). Because the biodiversity conservation process is designed to impact upon a range of planning principles and practices, this chapter unavoidably touches upon these questions where they are relevant. However, while a range of practices and issues are discussed, from map-making and surveying preferences to Whitehall politics, the overriding aim is to knit them into a coherent analysis of urban ecological governance.

In developing a political ecology of the site, this chapter applies the understanding of material discourse outlined in Chapter Two most fully. Analysis concentrates upon showing how society – nature relations, and the binaries associated with them, are manifested and reproduced at the practical level. This involves exploring how dominant representations of nature, such as the corridor concept, become implicit across a range of activities. Addressing these issues develops the axiomatic dimension of scale identified at the end of Chapter Seven as the basis for an integrated urban political ecology.

Section 8.2 examines the UDP policy framework for Birmingham as it relates to brownfields and the UHAP. The UDP is a strategic ten-year spatial plan for the city of Birmingham, which marries national and regional planning policy to local concerns and the idiosyncrasies of particular places, inhabitants and planning heritages. It comprises specific policies governing both existing features and proposed developments in the area. Because it provides the framework for all decision-making in the planning realm, the incorporation of BAP priorities into the UDP is fundamental to the overall success of the UHAP.

The cornerstone of strategic conservation planning is the site protection system (Ward pers. comm.), and within this framework, it is argued that the dominant concepts of critical natural capital, constant natural assets and multi-functional green corridors impress very particular discourses upon urban space. These policy concepts frame the operation of the development control system, which handles individual planning applications. A brief overview of this system and its relation to the policy framework is given, setting the scene for the case study analysis.

Section 8.3 outlines the current planning dispute over the Vincent Drive site. Vincent Drive is a brownfield site that has been subject to a major development proposal, but which also constitutes part of the largest remaining semi-natural habitat in South Birmingham. Its fate has been the subject of ongoing debate between residents, developers and planners for over forty years. A brief history of the site contextualises the current planning dispute, both in terms of its special character, and in terms of its emergence as a strategic ecological space. Its progressive incorporation into the strategic planning framework charts a history of changing political priorities, from ungoverned local space, to ecological resource, to brownfield

development site. This history gives an insight into the practical pay-offs that are made between various agendas, and the shifting political relations between local, city and national levels.

The second part of Section 8.3 considers the current planning application on the Vincent Drive site, to investigate how ecology is articulated in the development control planning system, concentrating on the ecological assessment that was conducted on the site as part of an EIA conducted in 2000. More than anywhere else, in the case of ecological assessment, ecology becomes ‘the articulation of knowledge and power, of statements and visibilities, of the visible and the expressible’ (Escobar 1996, p.46). The increasing importance of environmental considerations, of which the UHAP is part, means that ecological knowledges have played an increasingly central role in the fate of the site. A detailed analysis is undertaken of the ecological reports and counter-reports that have been produced, in terms of their relation to the UHAP, and the strategic planning concepts set out in the UDP, in order to explore the political ecology of surveying and mitigation practices. This analysis is extended to show how the dominant capitalist logic of urban space is supported by a range of current ecological and planning practices, embedded in social networks of actors spanning different spheres of activity.

Section 8.4 explores how these processes reproduce a particular scalar hierarchy, which links the national and international discourses discussed in Chapters Four and Five to practice. A scalar hierarchy of ‘site and city’ establishes the conditions necessary for capitalist development, disembedding urban space ecologically and socially from its landscape context. The articulation of power through the manipulation of scale is realised simultaneously in ecological and political terms, and the role of scale as an emergent property of socio-ecological transformation is considered. Section 8.5 concludes by considering the implications of this for the LBAP, and sustainable forms of urban governance more generally.

8.2 Nature and Planning in Birmingham

8.2.1 Strategic Planning

As discussed in Chapter Seven, a number of structural barriers exist in the planning system to the implementation of the cross-sectoral challenges raised by biodiversity conservation and sustainable development (Blowers 1993; Counsell 1999). The emphasis of biodiversity on nature as a resource has led to renewed interest in strategic planning as a key arena of delivery (Campbell and Marshall 1998), but the planning system has only tenuous links with the management of most natural resources (Owens 1996). Furthermore, as ecological resources, disturbance is the most important process to the value of brownfields in terms of species diversity, and while succession improves the amenity value of an area, it often decreases the ecological value. Given these constraints and complexities, the articulation of biodiversity and brownfields within the strategic planning and development control system in Birmingham is a highly political process.

Councils are required to draw up UDPs in order to constrain and direct land-uses in specific areas of the city. Taking on average five and a half years to produce (Steel *et al.* 1995), and operating for ten years, they are one of the few proactive tools available to strategic planners. Accordingly, 'the most widely adopted environmental development policy was the use of the land use planning system' (Muir *et al.* 2000, p.373) in local authorities across the Midlands, and are vital to the successful implementation of the UHAP. In line with national (PPG 1) and regional (Regional Planning Guidance 11) planning policy, the strategic aim of the UDP for Birmingham is,

A commitment to securing positive environmental benefits from new development, as well as steps to avoid, or at least minimise, any adverse effects (Birmingham City Council 2001, Section 2.8).

The Birmingham NCS, adopted as SPG in 1998, details this commitment with respect to nature conservation in the city. The following discussion draws mainly upon the NCS, as this is the area of concern into which the BAP must fit.

The main strategic framework for nature conservation in Birmingham is a hierarchical system of site protection, mirroring the organisation of nature conservation at the national level described in Chapter Four. In Birmingham a four-fold site hierarchy of designation is employed: SSSIs, Local Nature Reserves (LNRs), Sites of Importance to Nature Conservation (SINCs), and Sites of Local Importance to Nature Conservation (SLINCs). SSSIs are notified by EN on grounds of outstanding scientific interest, and are nationally protected under the Wildlife and Countryside Act (1981). SINCS and SLINCs are sites of value for wildlife and people, and are identified by the City Council, EN and the WT in accordance with set criteria. LNRs are designated in a similar way, but are managed more intensively by the City Council's Leisure Services Committee.

SSSIs, SINCs and LNRs form the city's 'critical natural capital', and under this policy, the existing stock of these sites is not to be depleted by development. The total area of sites designated SLINCs comprise the city's 'constant natural assets'. Like the concept of critical natural capital, the concept of constant natural assets is designed to increase the total area of sites, but whereas critical natural capital demands the protection of all sites designated SSSIs, SINCs and LNR, constant natural assets allows a turnover of sites as long as no net loss occurs.

The turnover concept of constant natural assets and designation of SLINCs using ecological and social criteria make them vitally important tools for brownfield conservation. By allowing for turnover, it is possible to conserve the temporary ecological worth of a site in early stages of succession, while retaining the benefits to biodiversity of regular disturbance within the urban landscape as a whole, and respond to the changing demands for development sites across the city. Designation criteria include social factors, and recognise urban wasteland ecology as an important social resource.

One hundred and twenty SLINCs were identified between 1986 and 1990 by the WT, and are included in the UDP plan (compared to forty SINCs and two SSSIs). Before the adoption of the NCS, SLINCs had no legal standing within the local planning policy framework. As the concept of constant natural assets suggests, these sites are not protected from development, but where development occurs, the NCS states that 'the nature conservation value of the site

will be a material consideration in relation to planning applications' (Birmingham City Council 1997, 3.4.8).

In line with the U.K.'s second Strategy for Sustainable Development (DETR 1999b), any depletion of SLINC habitat or open space is to be replaced by the compensatory creation of new habitat or open space elsewhere, either through council projects or conditions imposed upon prospective developers. However,

When you get to SLINC conservation in general and design, they're much more open to interpretation [than other site designations]...at the moment we have something in the UDP which basically says nature conservation should be taken into consideration, and of course that's such a vague policy nothing can happen, and often didn't (Strategic Nature Conservation Officer, Black Country LPA, 9th May 2001).

A further grey area pertaining to SLINC is the lack of basic ecological data. There is no statutory requirement for Local Planning Authorities to keep up to date surveys of SLINC. In the Birmingham UDP SINC are marked simply with a tree symbol on maps and figures, rather than as discrete bounded areas, while SLINC have no specific designation. As a representative of Birmingham's strategic planning department stated, given the lack of knowledge of these spaces, the NCS aimed to,

...try and get some order out of chaos, or at least some chaos. If you deal with a capital or assets sort of thing... well you expect change but overall you expect a set level of resources across the city. One of the things everyone is consistently short of is information about these urban commons. It is a constant issue and will continue to be an issue (Strategic Nature Conservation Officer, Birmingham LPA, 8th November 2000).

As the last chapter discussed, multi-functional green corridors represent the major spatial tool used to manage the overall network of SINC and SLINC sites across the city. Section 8.3 explores how the corridor concept is manifested ecologically and politically in the Vincent Drive planning process.

While the NCS recognises the ecological value of brownfields through the SLINC concept, the UDP contains strategic policy concerning the desirability of development and

decontamination of these sites: construed as ‘environmental’ improvement. Sections on ‘urban regeneration strategy’ (Birmingham City Council 2001, para. 2.15) and ‘housing strategy’ (*ibid*, para. 5.25a) draw strongly upon the policy discourses of contamination and redevelopment identified in Chapter Five. In light of these policy tensions, the acquisition of baseline ecological information, and the articulation of ecological worth as a material consideration with respect to individual development proposals, have particularly important consequences for biodiversity conservation on SLINCs.

An unavoidable lag occurs between the creation of new forms of knowledge, such as the BAP initiative, and the incorporation of these knowledges into legally binding (i.e. strong) policy,

There was this idea that somehow it [the BAP] would become supplementary planning guidance, which when you think about it is a bit weird because this is an action plan, and action plans are to do with implementation and although a lot of the actions in here are to do with the UDP...it needs to be interpreted into SPG (Strategic Nature Conservation Planner, Black Country LPA, 9th May 2001).

As a cross-sectoral document, the BAP is not meant to constitute policy, but rather to ‘green’ existing policy. As a result, the Birmingham and Black Country Local Authorities are currently translating the BAP into specific supplementary guidance for the second draft of each separate LA UDP. This transition is generally constrained by the timeframes over which policy is formulated (in the case of SPG, two to three years), or reviewed (in the case of national and local planning policy, eight to twelve years). As a result, a number of strategic issues of open space, landscape and ecology that would be expected to articulate fundamental concerns of the UHAP are awaiting incorporation into the next round of local government legislation.

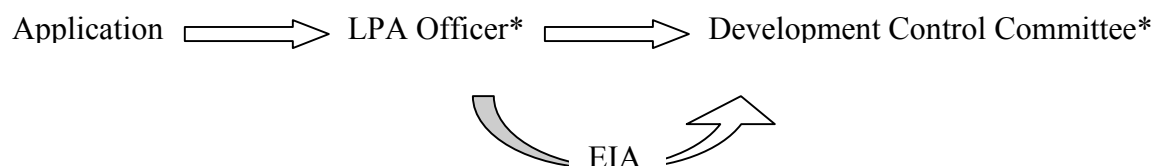
A further lag is caused by the staggered nature of policy formulation, which leads to certain mismatches between old and new policies. For example, a local action plan initiative for the case study area was put together over five years ago, before John Gummer had exacerbated the brownfield development debate by putting the brakes on greenfield development, and before the formulation of BAPs began. Many of the tensions highlighted below between the

UHAP and current practices are in part due to the need for policy to ‘catch up’ with new initiatives such as the BAP.

8.2.2 Development Control and the Environmental Impact Assessment Process

When development proposals are submitted in the form of a planning application, they are reconciled with the strategic planning framework through the development control process. Within this system, applications from developers are judged on merit by the LPA within the framework of the UDP and SPG. As part of this process, LPAs can request an EIA, in order to help decide whether the development should be permitted, refused or conditionally permitted (Figure 8.1). The material and discursive elements of this process are an integral part of ecological governance.

Figure 8.1: Environmental Impact Assessment and the development control process



* Indicates level of decision-making

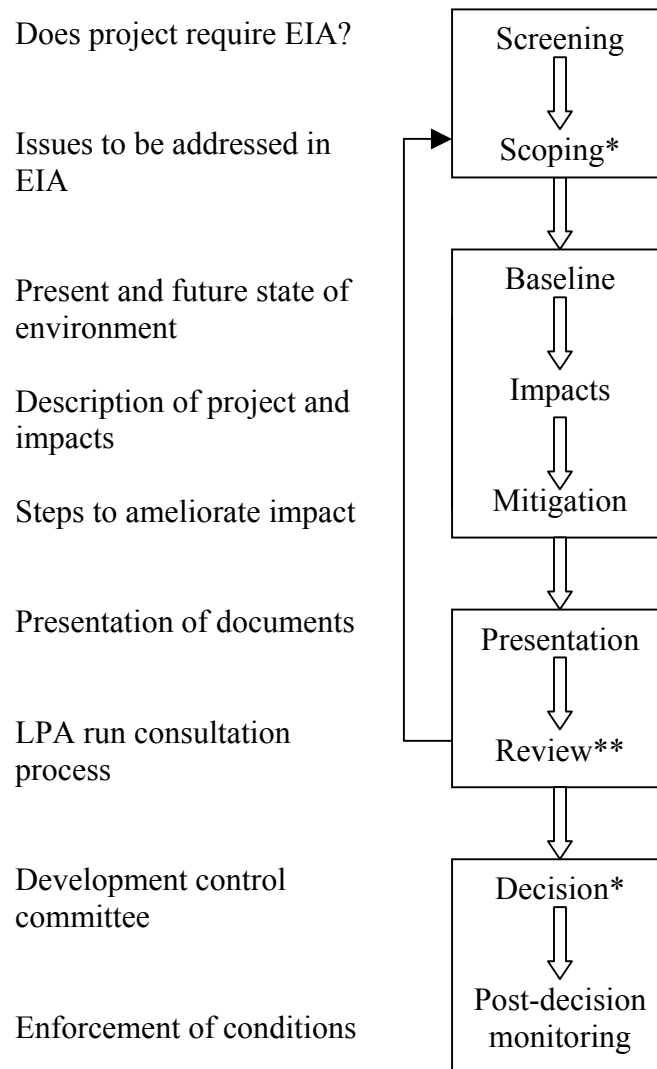
Source: Treweek 1999

The majority of planning decisions simply involve amendments to earlier permissions, and are dealt with by an LPA officer. However, decisions that involve large developments, or that contradict UDP policy, are referred to the development control committee, composed of city

councillors. When considering planning applications on environmentally sensitive sites, or for large development applications (such as is often the case on brownfield sites), the EIA process offers a further source of information upon which to base a planning decision. The EIA assesses the environmental impacts of development actions in advance, defining the specific status of a site and assessing the impact of development upon the surrounding environment. They are commissioned and paid for by prospective developers, and usually undertaken by private consultants, in dialogue with the LPA. The EIA process can be split into four stages: scoping; surveying; presentation, and decision-making.

The framework for assessment is set through a scoping exercise, in which the LPA lists the key issues that must be addressed by the EIA. Once the assessment is complete, the document is placed in the public domain, and is open to contestation by statutory consultees, councillors and the public (Figure 8.2). EIAs involve the coordination of a number of individual reports covering potential impacts, ranging from ground conditions and archaeology, to noise and light pollution. As such, they represent a major instrument of sustainable ecological governance within the development control system, embodying the precautionary principle, whereby environmental issues are addressed proactively. As part of an EIA, ecological assessments describe and evaluate the ecological worth of a site through surveying species and habitats, assess the impact of the proposed development, and suggest mitigation strategies (Treweek 1999).

Figure 8.2: The Environmental Impact Assessment process



* Indicates consultation with statutory consultees

** Indicates consultation with statutory consultees and public

Source: Treweek 1999

The way in which ecology is articulated within the development control system is vital to the implementation of the UHAP. These issues are explored conceptually in the case study, but first it is worth making some practical points concerning the place of ecology in the planning process. Antagonism between conservation and development priorities often underpins perceptions of ecological factors in the development process:

The ecologist is often at a disadvantage, because they are right down at the bottom of the chain, so they're brought in late in the day (Chair of Professional Affairs Committee, Institute for Environmental Management, 9th March 2001).

This contrasts sharply to the co-operational approach of the BAP (although the consultative aspect of the EIA process does introduce an important iterative element). Similarly,

When companies like x and y get involved with it they are not coming from an ecological background, and they may well employ ecologists or contract them, but ... it does not get given the same seriousness, it is not accepted in the same way that archaeological interests are, and I find that very curious (Director, Birmingham and Black Country Wildlife Trust, 7th November 2000).

Lack of recognition of natural heritage compared with cultural heritage was raised by town planning consultants, developers, and conservationists alike. Because Birmingham LPA has no ecologist, the interpretation of complicated ecological information is left exclusively to consultants. There seemed to be 'gatekeeper' figures in LPAs, controlling which ecological considerations are emphasised and which are not, and hence exerting a major influence over the ecological framework within which planning decisions are taken. Although much more could be said about the wider politics of the development control system, such as the council's often multiple position as planning authority and land owner, and the practical problems of enforcing conditions and policy, these issues are tangential to the task of this chapter.

Interested parties can contest an EIA, or any individual part of it. The Birmingham and Black Country WT have a service agreement with the local council to comment upon planning applications made to the Birmingham LPA, and they are active in promoting nature conservation interests at all stages of the development control planning process, including the formulation and satisfactory completion of EIAs. However, improving the profile of

biodiversity in development proposals represents a major task. As one consultee at the Birmingham and Black Country WT stated,

...only a handful of applications come across my desk referring to biodiversity- perhaps twenty to thirty out of 500 at a guess (Planning officer (voluntary), Birmingham and Black Country WT, 16th July 2001).

As part of the mitigation process, constraints and obligations can be placed upon a development to ameliorate and offset impacts. This practice, known as ‘planning gain’, is achieved through S106 agreements (Section 106 of the Town and Country Planning Act allows councils to enter into legally binding planning agreements with developers). These aspects of the EIA process are recognised under the ‘Policy and Legislation’ section of the UHAP (Action 5.1) as crucial to urban biodiversity. This chapter focuses upon the political ecology of the EIA process: specifically the actual methodologies and surveying practices used, and the assimilation of ecological assessments into wider prescriptions for mitigation.

A number of elements come into play when conducting an ecological assessment.

The process that we go through is first to establish the base-line position, and the consultant should be able to do that. They should be able to go to the site and do an investigation, and what you see isn’t exactly factual, but it is as near as dammit. If you go to the site you’ll see exactly the same as I see...There has to be an element of individual assumption I suppose, but that is based as much on standard practice and the information available as possible (Town planning consultant, Robert Turley Associates, 18th May 2001).

The establishment of a ‘base-line position’ is very difficult to achieve, and is mediated through standardised ecological surveying practices and the personal opinion and experience of the surveyor and subsequent authors (Glasson *et al.* 1998). The government does not provide standards for practice or information quality for EIAs, and time is often limited, precluding extensive surveying. The case study analysis engages with the politics of both personal and professional opinion, and what have been called the ‘black boxes’ of surveying methodology (Glasson 1994, p.44) that determine how the biodiversity of a site is represented and valued.

The integration of the ecological assessment into an overall development proposal involves selecting which aspects of the site's ecology should be emphasised, and how to balance them in relation to other factors; a process usually coordinated by town-planning consultants in negotiation with the LPA. The compilation and editing of an EIA within the planning system is an implicitly value-laden process of dialogue, articulating the ecological worth of urban wasteland sites in relation to other development pressures. The process of 'boiling down' technical reports into, for example, an executive summary is a highly political one. Analysis reveals a number of dominant strategic concepts and discourses of urban nature running through the entire planning process.

8.3 The Political Ecology of Vincent Drive

8.3.1 Context

In Selly Oak you've got contamination issues, you've got the issue of allotments, you've got nature conservation, you've got trees, you've got canals, you've got new roads and the wider objectives of what the council are trying to achieve... you've got a site of fifty acres, and it's all about a balancing act (Town planning consultant / author, Sainsbury's Selly Oak EIA, 18th May 2001).

Vincent Drive lies approximately two miles to the South of Birmingham city centre in the district of Selly Oak, about four miles from the city periphery (Figure 3.3, p.61). The site occupies approximately 15 Ha of the floodplain to the North of the Bourn Brook river, forming the Northern half of the Battery Park site. Together they are recognised as the largest remaining semi-natural green-space in South Birmingham. Both sites (highlighted in Figure 8.3, p.225) are bounded by Victorian terraced housing to the South and East, and post-war housing to the West. Vincent Drive is bordered along its Northern edge by the Queen Elizabeth Hospital and the University of Birmingham, while the Battery Park site is bordered to the South by retail developments. This area is approximately twenty metres above the floodplain grasslands. The site is framed to the east by a railway, built in 1822, and the Worcester- Birmingham canal, built in 1791, similarly raised about twenty metres above the floodplain, and to the west by the Harborne road. The division of the site along the Bourn Brook (indicated in Figure 8.3 by the line of trees running horizontally across the middle of the site) was drawn for development purposes at the UDP review of 1990, and thus the history and geography of the two sites are best considered together.

Up to the late Eighteenth and early Nineteenth centuries the floodplain was used as common grazing and hunting land, and the wooded northern part of the site extended across the site of the present day Queen Elizabeth Hospital. During the Nineteenth Century, the site hosted a number of small industrial ventures that left behind substantial waste tips. It was also used by travellers, with the local nick-name 'Black Patches' alluding to the large numbers of camp-fires that used to burn there (Upton 1993). The Vincent Drive site was acquired by the Cadbury's trust (the landholding / charity arm of local philanthropist George Cadbury's

chocolate empire) in the Nineteenth century, and let to Birmingham LA on a 999-year lease after the Second World War with a remit for medical development. By contrast, the Battery Park site has as many as thirteen landowning interests, including the garden centre and allotments that cover the western part of the site.

As one long-standing local resident recalls,

This was a little rural area, one of the few green-spots left in Birmingham...Paul's family, who lived on Harborne Lane [runs along the Western boundary of the site] for over 50 years, used to be able to see cows grazing in the meadow (Local Resident / Campaigner against development, 16th February 2001).

In the post-war period, the allotments were extended and subsequently a garden centre was established along Harborne Lane, and the Leasow Drive residential development to the North of the Bourn Brook was completed (Figure 8.4, p.226). Permission was granted for an industrial / warehouse development in 1981, and the site was considered as the possible location for a science park (1982) and bus depot (1985). However, these proposals never materialised, due to the depressed development market and the largely unknown problem posed by the Victorian waste tips on the southern part of the site.

Resultantly, in the mid-1980s the planning department surveyed the site with a view to preserving it for recreation and amenity. Three potential plans were drawn up: one based upon a policy of no interference; one outlining a minimally managed nature reserve; and one detailing a major educational/nature/public amenity management plan. This move was driven by the UWT survey of the site as part of the West Midlands NCS in 1984, local support for conservation of the site, and the green-mindedness of key actors in the LPA at that time. These factors were intimately related through the local network of urban conservation and activism that issued from the establishment of the UWT, the network that formed the basis for the formulation of the BAP discussed in the Chapter Six. The council landscape architect who drew up the plans was a member of the UWT and the Greenpeace group run by local residents in the area, while the nature conservation officer for the LPA had been heavily involved with the founding of the UWT and the initial West Midlands Nature Survey.

Although prefiguring the recognition of the site in the NCS as a nexus of corridors, none of these plans came to fruition.

The property boom of the late 1980s saw developments occur at the southern and northern edges of the site (Figure 8.4). To the North, a psychiatric hospital was attached to the existing Queen Elizabeth Hospital, along with the Vincent Drive road itself that now forms the northern boundary of the site. To the South, the Battery Retail Park was built as part of the remodelling of the road junction between the A38 and Harborne Lane. However, an application from Codev Homes, submitted in 1988, for a major residential development was refused upon ecological grounds. A report by the Birmingham LPA Chief Landscape Officer at the time considered the site to be of particular value to wildlife, and the loss of the Bourn Brook Valley totally unacceptable in ecological and landscape terms (Morton pers. comm.). As Codev's appeal against this decision bitterly noted, the attitude of Birmingham LPA to the site had seemingly reversed in just six years, from encouraging its development, to protecting it as an ecological resource.

The ecological importance of the site has been formally recognised as a major source of biodiversity in the city for twenty years. The heavily wooded Vincent Drive site was graded by the NCC for the West Midlands (now EN) as a Grade C SINC in 1982. Their citation stated that the variety of species and habitats, in addition to the position of the site within the Bourn Brook valley wildlife corridor, made this an important habitat within the urban context, possessing ecological worth at the regional and national level. The legacy of old gardens, grazing, allotments and varying drainage has created an array of habitats on the Vincent Drive site. Woodlands and grassland spread across the central part of the site, and the linear features of remnant hedges are still identifiable (in the background of Plate 8.1). The Bourn Brook is characterised by well-developed woodland, with wetland habitat along its eastern stretch (Plate 8.2). The Battery Site to the south of the Bourn Brook was recognised in 1997 by the LA as a SLINC, and a grassed floodplain stretches to the south of the Bourn Brook, running up to the steep slopes of the waste tips, that are identifiable as regenerating birch and willow habitat (Plate 8.3; the line of trees to the left of the picture mark the railway embankment, while the distant trees to the right of the picture mark the waste tips). A large derelict factory is located on the raised plateau to the south of the tips, surrounded by patches

of contaminated land and expanses of hard surfaces (Plate 8.4). The location and aspect of each plate is noted on Figure 8.4.

The area is linked to a number of other semi-natural green-spaces in the city, primarily by the Bourn Brook running horizontally across the site, but also by the canal and railway that bound its Eastern edge. As one Birmingham planner stated,

Trudging round a lot of sites over the years, it is quite often the sites which aren't being managed, or managed very well, that from a certain perspective in fact are ecologically very rich. Birmingham Battery is an example (Strategic Nature Conservation Planner, Birmingham City LPA, 8th November 2000).

The Birmingham NCS recognises the importance of the site as a major wildlife corridor nexus between four corridors in the Bourn Brook Valley, noting the existence of 'key' corridors, corridors, potential corridors and linear open space (Figure 8.5). Interestingly the site is only recognised as a SLINC on this map, and is coloured brown rather than the green used to indicate a SINC. The manipulation of designations through mapping practices is a major arena in which ecological factors are mediated against wider planning pressures, and is developed in the next section.

Figure 8.3: Aerial view of Vincent Drive and surrounding area



Figure 8.4: Plan of Vincent Drive showing locations and aspects of Plates 8.1-8.4

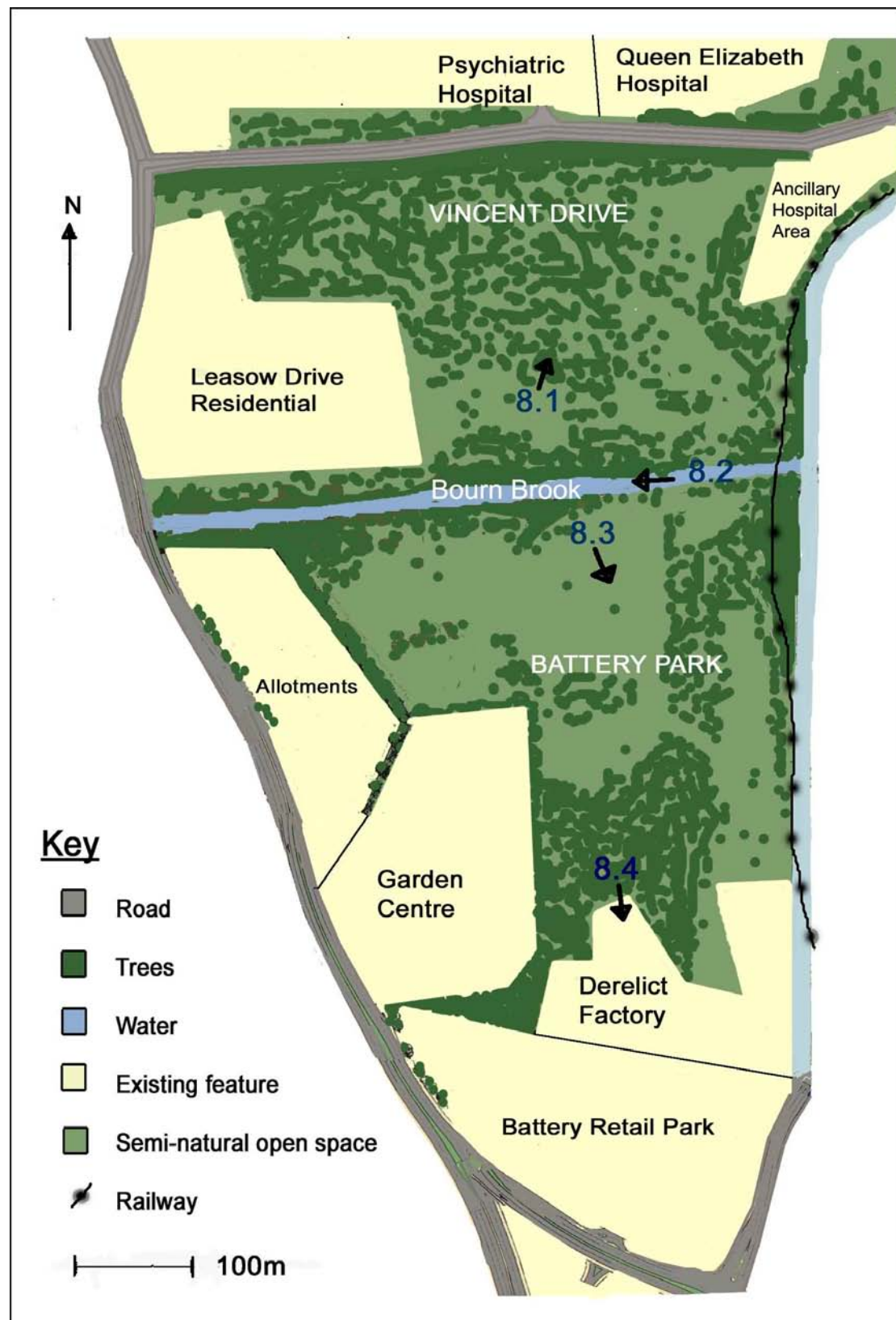


Plate 8.1: Woodland and grassland to North of Bourn Brook



Plate 8.2: Woodlands and wetlands along the Bourn Brook

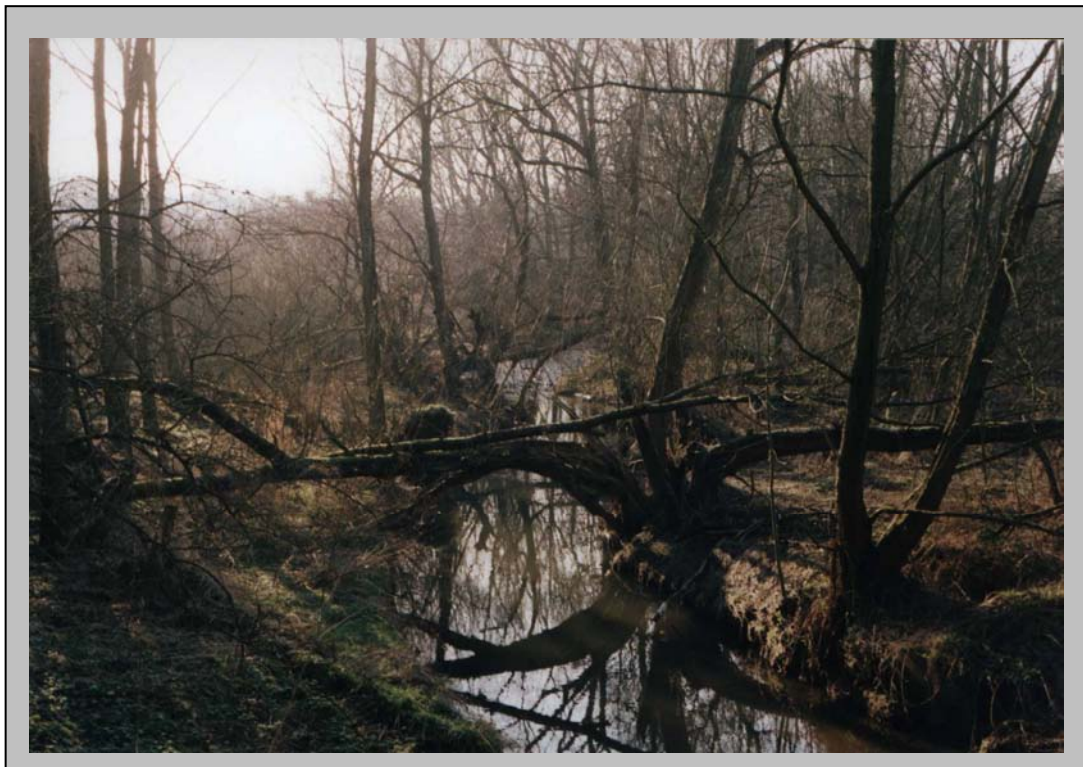


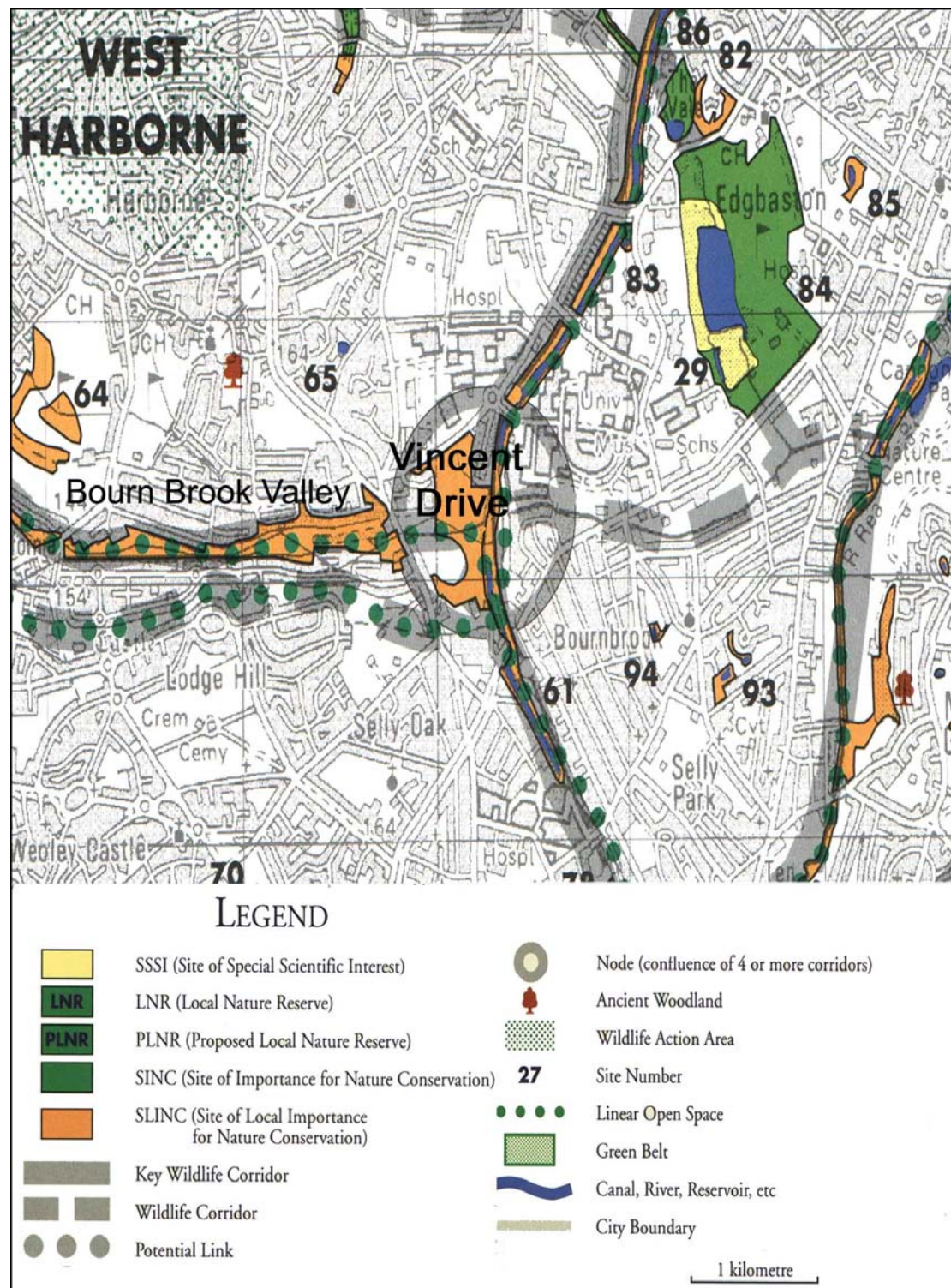
Plate 8.3: Grassed floodplain to South of Bourn Brook



Plate 8.4: Derelict factory and sealed surfaces at Southern end of Battery Site



Figure 8.5: Bourn Brook Valley and Vincent Drive as nexus of corridors in the Birmingham NCS



Source: Birmingham City Council 1997

8.3.2 Current Planning Proposals

At the time of the first UDP review in 1990, the West Midlands County Council and EN had designated the Vincent Drive site as a SINC. However, the situation of open space in the city had begun to change dramatically. The LA itself had become less ecologically sympathetic throughout the late 1980s, both due to the transformation of urban planners into ‘facilitators of development’, and, related to this, the waning influence and power of the original UWT network over LPA decision-making. At the same time, the metamorphosis of the NCC into EN prompted a shift of emphasis towards consultative functions, devolving the maintenance of sites to local authorities. With national emphasis shifting towards urban regeneration and brownfield development, a key task of the first UDP, drawn up in 1990, was to identify large sites for potential development within the city, and the Vincent Drive/ Battery Park site was earmarked for development.

Local conservationists and residents vigorously contested this designation for three weeks. The protest turned upon two concerns: the ecological worth of the site, and the justification for such a large development within the Selly Oak area. The founder of the Bournville Valley Conservation Group, and local resident, gives an insight into the aims of the inquiry:

I left Paul and Chris to give ecological evidence...my point was that if they’d already allowed the Band Q development and the Battery Retail Park then there was no unavoidable need for industrial development on the site...well, the inspector [from the then Department of the Environment] lost his temper with me and said ‘you don’t think I’m here to protect some piece of countryside, do you? The remit my department has given me is to find large pieces of land suitable for development in South Birmingham’ (Founder, Bournville Valley Conservation Trust, 16th July 2001).

The Inspector concluded that the need for development outweighed the need to retain the site for nature conservation purposes, perhaps due to direct pressure from the Home Secretary to secure a site for the proposed regional mega-hospital. As a member of the Development Control Committee stated,

It's very difficult with something like this ...because it [the Vincent Drive site] qualifies as brownfield, even though a lot of it has never been built on, because brownfield is defined as otherwise unused land within the city boundary, and there's all the pressure not to use the greenbelt (Councillor, Development Control Committee, 5th February 2001).

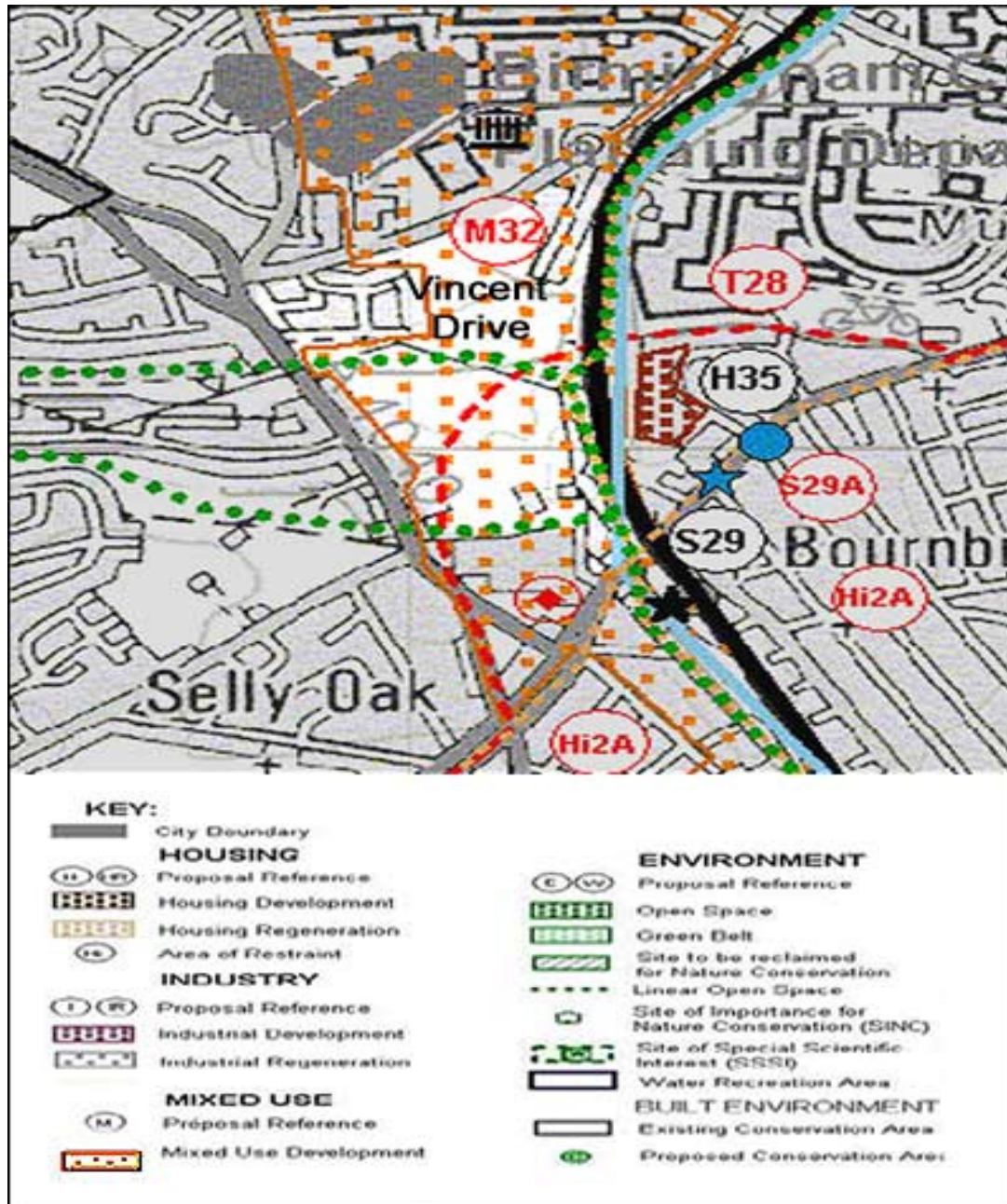
Because city policy precludes development upon SINC sites, the site was downgraded to SLINC status on the first UDP map, 'for reasons unconnected with its conservation value' (Birmingham and Black Country WT 2000a). The reason given at the time was that Birmingham City Council had no legal obligation to recognise West Midland County Council directives, although the West Midland County Council had been wound up a number of years previously to 1990. As a SLINC, the Selly Oak development plan and subsequent development proposals invoked the SPG guidance for SLINC's in the NCS, to argue that this was an example of 'exceptional circumstances when the need for development outweighs the need to retain a conservation resource' (Babtie 1999, p.118).

Interestingly, this change in status was achieved cartographically: the tree symbol designating the site as a SINC was merely left off the draft UDP map. It was designated instead by brown dots indicating proposed mixed development (site is highlighted in Figure 8.6). The cartographic transformation of the site from ecological resource to brownfield site was reinforced through a series of reports produced in the late 1990s by the LPA and town planning consultants concerning the possibility of regenerating the entire Selly Oak area. For example, the Selly Oak Development Study (Urban Initiatives / Birmingham City Council 1999) marks the Vincent Drive site 'vacant' and the Battery site as a 'former tip' (despite the majority of the tips lying considerably to the south of this point), while marking the Bourn Brook as an ecological corridor (Figure 8.7). The Selly Oak Local Action Plan (Birmingham City Council 2000) confuses matters by marking the area as a 'key development opportunity' (again using the colour brown, this time in lines), but using green tree symbols to designate areas of 'natural value' (without any indication of the criteria used to ascertain natural value) on either side of the Bourn Brook (Figure 8.8).

These maps represent a visual manifestation of the binaries that structure planning and nature conservation in the U.K. *A priori* designations of the vacancy of the site itself, and the repeated emphasis of the Bourn Brook ecological corridor pre-empt actual assessment of the

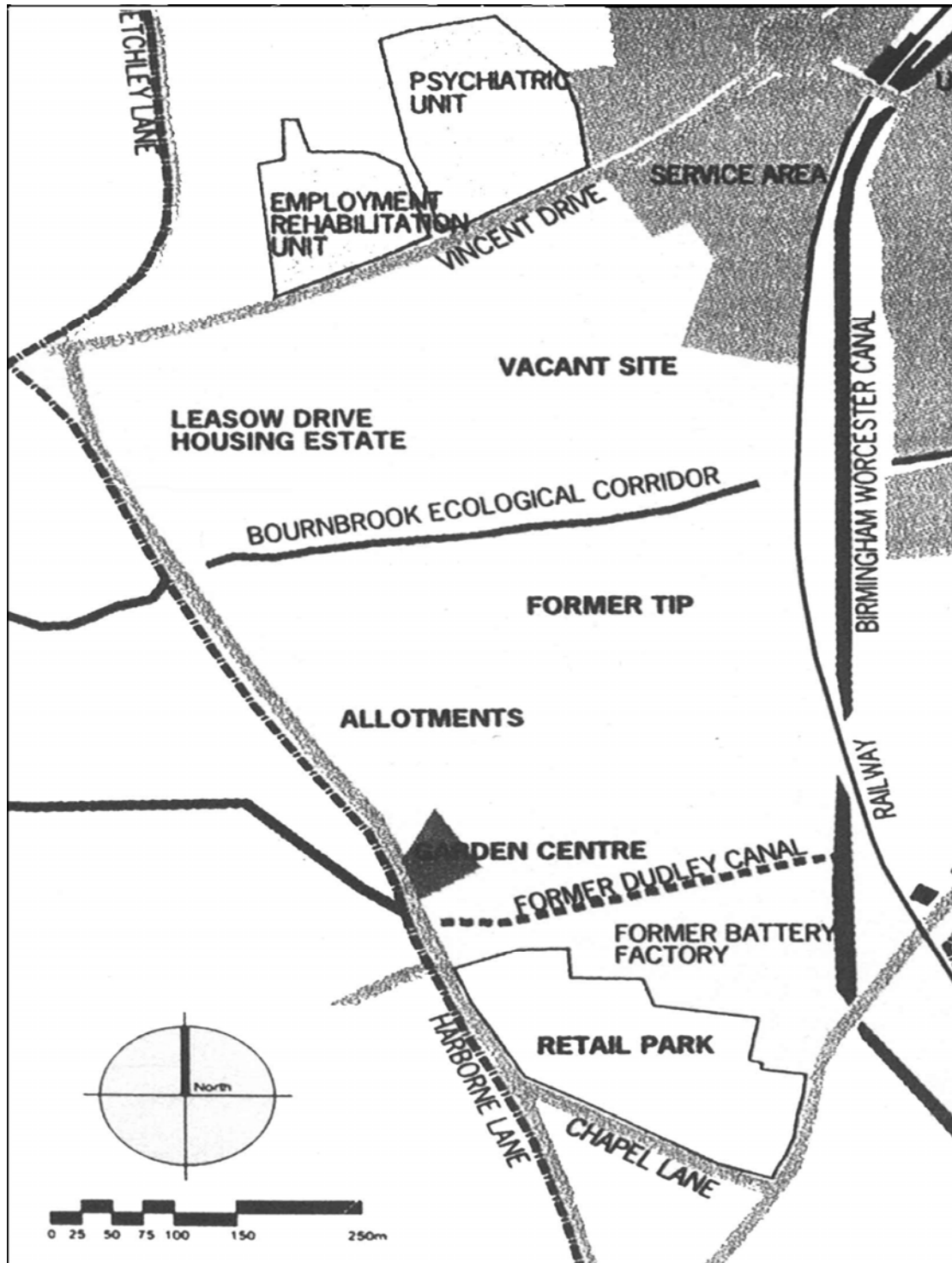
site, drawing upon the dominant discourses of urban space and nature to establish a perception of the site as requiring development. It is interesting that the pejoratively negative discourse associated with brownfields is drawn upon extensively using a range of textual devices in the public consultation documents, drawing on and reinforcing the popular power of this discourse. The importance of maps as tools of ecological governance is returned to in the analysis of the assessment itself.

Figure 8.6: UDP designation of Vincent Drive



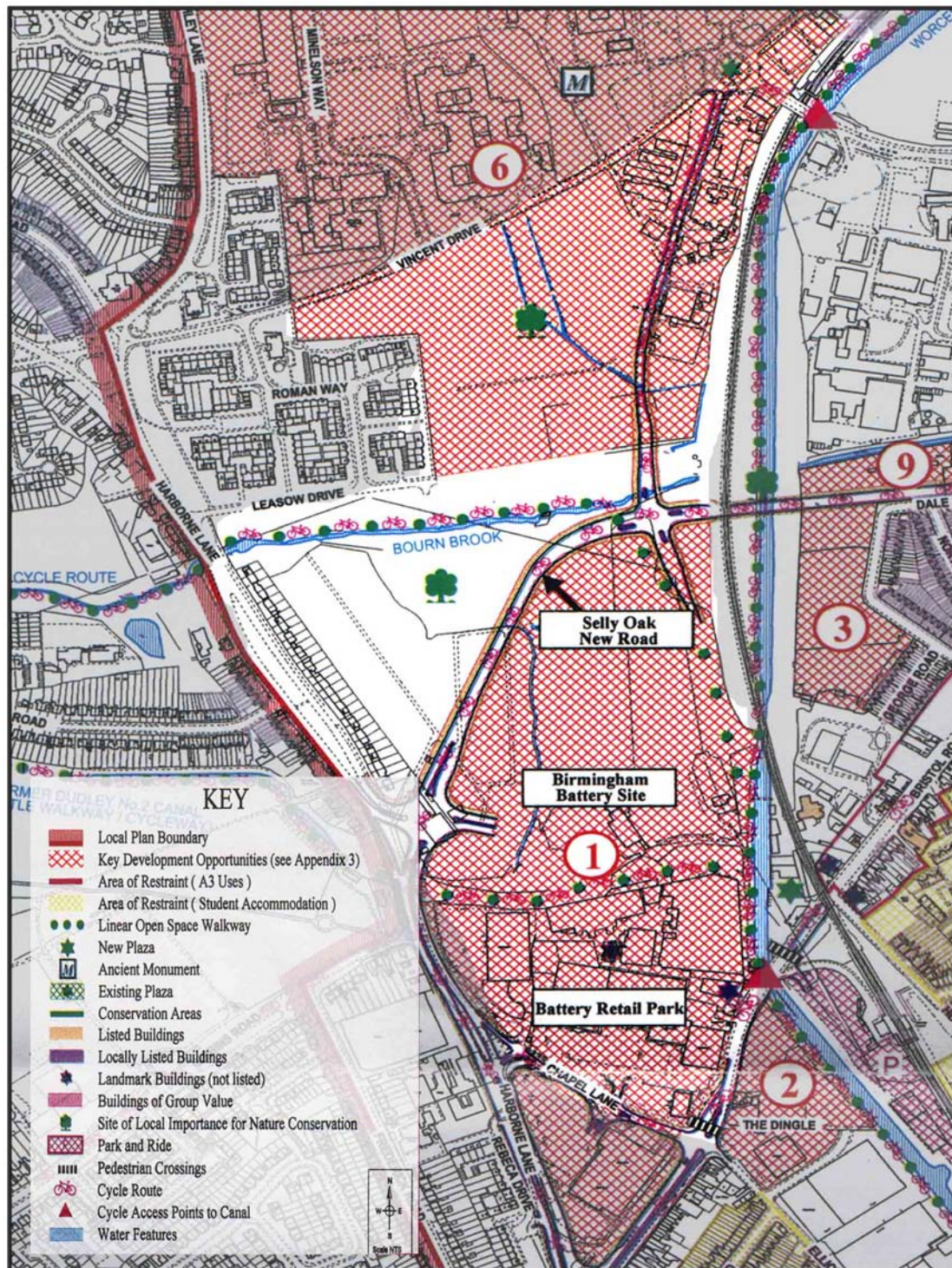
Source: Birmingham City Council 2001

Figure 8.7: Context map of the Selly Oak area appended to the Selly Oak development study public consultation document



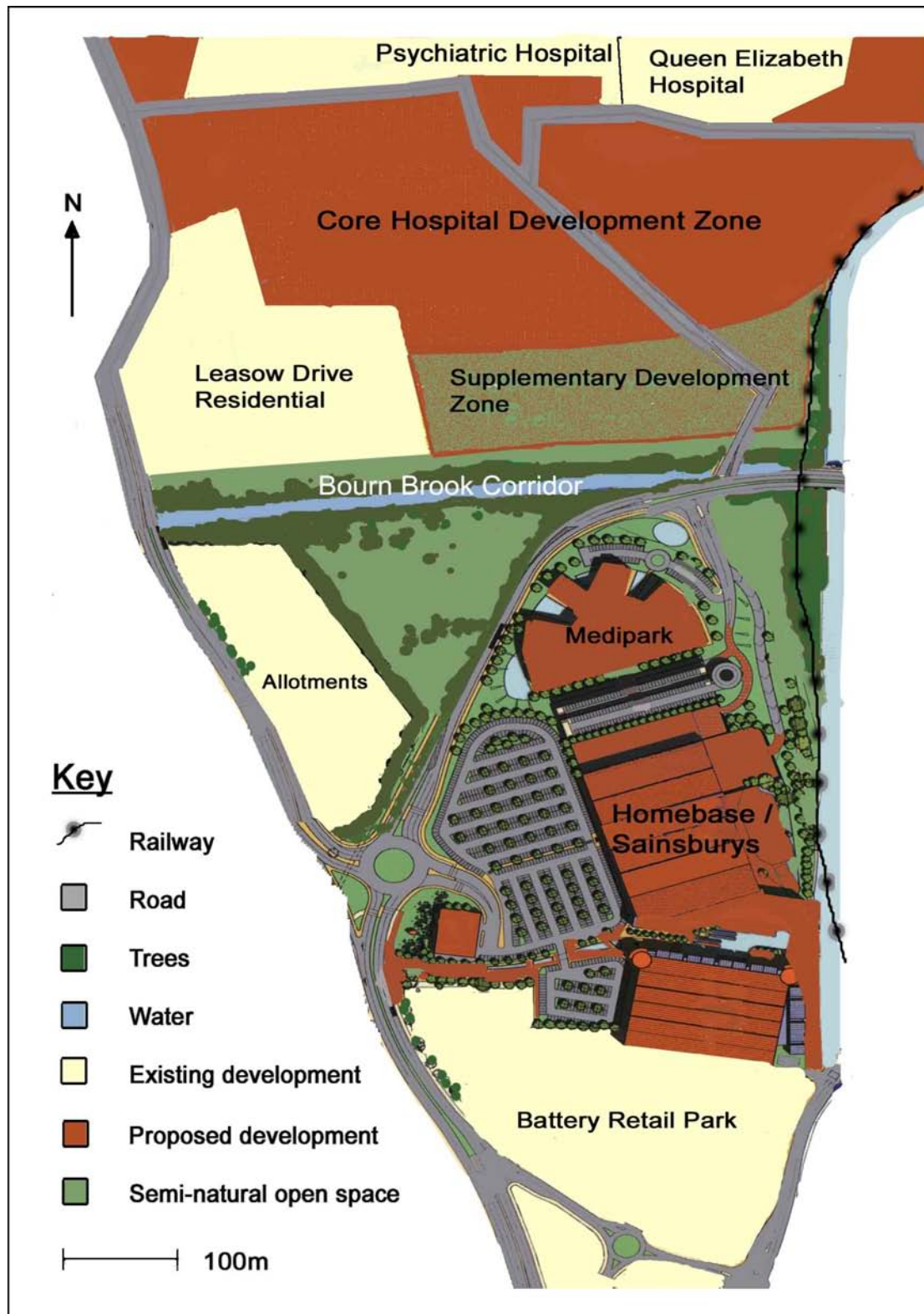
Source: Urban Initiatives / Birmingham City Council 1999

Figure 8.8: Proposals map appended to Selly Oak local action plan



Source: Birmingham City Council 2000

Figure 8.9: Plan showing proposed development of Vincent Drive



Source: BABTIE 2000c; Birmingham City Council, 2000; Sainsbury's Supermarkets Ltd 2000

Current development proposals from the Birmingham NHS Trust involve building a three hundred million pound hospital to the North of the Bourn Brook, that will cover approximately four fifths of the site (100 000m), providing 1009 beds (Figure 8.9). Although the planning proposal was only officially submitted in 1999, the regional health authority adopted a major hospital building programme for the city ten years earlier outlining the closure of about twenty hospitals and the centralisation of hospital services on about four mega-hospital sites, as part of a regional health strategy. The development is split into a core development zone, which will redevelop and extend the existing Queen Elizabeth Hospital, and a supplementary development zone, which is proposed for low-density research units, parking and future medical development. The Bourn Brook is to be preserved as a corridor feature, and proposals are made for a convalescence landscape along the river (Babtie 1999).

The hospital development requires a new link road traversing the floodplain, canal, raised railway, and University playing fields to the east of the site, with alterations to major road junctions at either end. Sainsbury's supermarket chain has agreed to finance these major infrastructural alterations in return for development rights over the southern site. They are keen to redevelop their current Selly Oak stores, some of the busiest in the country, that exist on the retail parks to the south of the Battery Park site. Sainsbury's proposals for a mega-Homebase DIY store and supermarket involve the complete reclamation of the Southern site, including decontamination of waste tips and soil patches, the removal of the derelict buildings, and the levelling of the site. Both proposals draw upon the dominant developmental discourse of brownfield sites to argue that the schemes represent environmental improvement, 'the proposals are a positive move towards sustainability in that the new hospital would be provided on a brownfield site (Babtie 2000a, Preface).

Contrasting Figure 8.4 (p.226) and Figure 8.9 (p.236) demonstrates the ecological impact of these proposals: notably, the overall reduction in natural green-space, the destruction of SINC and SLINC habitat, the exact location the link road along the Bourn Brook floodplain will take, and the ecological issues associated with building in a floodplain. The proposals form part of a larger Local Action Plan to regenerate the Selly Oak area, in particular to link the main retail functions of the Bristol Road that runs through Selly Oak to the proposed developments. The project is couched in the language and principles of sustainable

development, and ecological questions concerning the site are bound up with a gamut of other issues: from contamination and archaeology, to transport and employment.

This brief history charts the transition of Vincent Drive from unregulated local space, to ecological concern, to prime brownfield development site, reflecting shifts in the wider political climate of planning. These three stages in the history of the site also typify the positions taken up by contemporary protagonists, and the current dialogue between positions can be viewed as a continuation of this history. The ecological arguments made at the UDP review are largely being recapitulated, albeit in an extended fashion, in the current process of contestation. This history also shows that ecological designations are neither discrete, nor fixed, and are best seen as part of the broader, shifting tapestry of planning practice. The following section interrogates the surveying and mitigation proposals for Vincent Drive in the ecological assessment appended to the EIA, and contrasts them with the principles contained in the UHAP.

8.3.3 Surveying

At the outset, it is worth noting that ecological assessment occurs within the spatial and temporal scales of planning and development. At its most basic level, this involves splitting the area along the Bourn Brook into two sites for the purposes of development. Floodplains constitute one of the most coherent ecological and landscape units (Ward 1999). While the physicality of the river constitutes an easy demarcation for planners and developers, it flies in the face of the integrationist tenets of sustainable development (raising interesting parallels with classic geographical debates concerning the delimitation of borders along physical or political lines).

In terms of surveying, such a division undermines the natural integrity of the site, and its overall worth as a major habitat patch in the urban landscape. Indeed, local conservation groups claims that the splitting of the site constitutes an on-going tactic by the council to devalue the ecological and recreational worth of the site. Simple discrepancies also arise.

The ecological survey conducted on behalf of Sainsbury's recorded mature Native Black Poplars along the Bourn Brook (Robert Turley Associates 2000), which were not noted by the ecological survey conducted on behalf of the NHS Trust. Archaeological digging for the psychiatric hospital development to the north of the Bourn Brook re-routed springs, partially draining the wetlands around the Bourn Brook and degrading habitat quality.

As part of the scoping exercise, the LA requested baseline species surveys in order to determine whether legally protected species were present at that time. Faunal surveys were undertaken for badgers and birds, and it was determined that no species of conservation importance were present, although badgers may make use of the railway embankment to reach other sites (Babtie 2000b). However, as one local ecologist stated, 'absence of evidence is not evidence of absence'. The Birmingham and Black Country WT presented counter-evidence using their own database (EcoRecord) and the records of local conservation groups (such as the local badger recorder group) to highlight the importance of the habitat patch, arguing that many rare species use the site to feed and breed at certain times of year (Birmingham and Black Country WT 2000a).

For example, the bird survey was undertaken in April, hence missing summer migrants, and the badger report emphasises the use of corridors to access other feeding sites, but not the importance of the habitat itself. The findings of a local ecologist showing badger activity across the site are 'in direct conflict with the findings of the report' (*ibid*). The importance of the habitat to bird biodiversity within an urban context is also not considered in either report. The 'snap-shot' approach that recorded the presence of species on the site at a particular time failed to represent the importance of the site to species at longer temporal and spatial scales.

Following an initial botanical survey confirming the presence of valuable habitat in the area of the SINC, a phase two botanical survey was commissioned (Babtie 2000c). Phase two botanical surveys are designed to produce compartmentalised records, allowing the assessment of each compartment. This is achieved in the survey by sub-dividing the site into areas of very high, high, moderately high and low botanical interest. With respect to this sub-division, the report states that the standard evaluation tool, the National Vegetation Criteria, has limited use in urban habitats due to the lack of homogenous vegetation stands. Instead,

evaluation is “based upon naturalness of habitat and the range of species present” (Babtie 2000c). This approach seems bizarre, as a highly modified site such as Vincent Drive will not be ‘natural’, even given an unsceptical interpretation of what the word ‘natural’ might entail.

The basis for these criteria (and the subsequent division of the site) is not explained. For example, the survey states that evaluation was based on ‘personal experience of urban wildlife areas’ (*ibid*), without any indication of who conducted the survey, or what this experience might be. As with the faunal surveys, work was carried out on one day in May, but considerably fewer species were recorded than are present upon the site, ‘indicating a lack of experience of urban sites on the part of the surveyor’ (Birmingham and Black Country WT 2000b). The criteria of ‘diversity within a habitat patch’ militates against urban sites that tend to comprise atypical vegetation assemblages, and are characterised by a patchwork of habitat types rather than species diversity within a recognised habitat type (Barker 2000). The criteria of ‘naturalness’ derives from Ratcliffe’s criteria for ecological worth based upon his 1977 survey of the rural and wilderness ecosystems of the U.K.: systems which are defined by long-term equilibrium (Barbour 1996). The Ratcliffe criteria itself represents,

...a set of criteria for evaluating sites and populations...it doesn’t take account of any social, economic or education factors, so it’s purely for semi-natural or natural sites, and of course it falls down once you come to urban areas, because unless it’s a piece of enclosed countryside its typicalness is suspect (Urban Advisor EN, 17th January 2001).

As a result, compartmentalisation of the site is based upon no objective measure of species richness, leading to an arbitrary spatial division of the site.

However, it is the arbitrariness of this classification scheme that allows a number of pejorative discourses of nature to be established. The report pejoratively claims urban habitats are ‘transitory and degraded nature’ (Babtie 2000c), in spite of the fact that the Vincent Drive has been subject to unmanaged natural succession for many decades. An area of unimproved grassland that runs through the SINC is classified as being of low botanical interest despite being ‘a scarce habitat through out Birmingham and the Black Country [that] is of recognised importance throughout the U.K.’ (Birmingham and Black Country WT 2000b). Similarly, the

report recognises that the wetland areas in the centre of the site are the rarest habitats in the West Midlands area, but they are classified as ‘moderate high botanical interest’.

By contrast, the Northern bank of the Bourn Brook is recognised as a zone of ‘very high ecological interest’, because of its perceived ‘naturalness’. These biases come to the fore where ecological assessment occurs within other reports. For example, the botanical survey conducted as part of the archaeological report concerning preliminary excavations of Roman remains on part of the SINC claimed that the area was of ‘no ecological value’ (Babtie 2000d).

As outlined in Section 8.2, the strategic site designation system recognises that urban wasteland sites should be designated according to social and ecological criteria. Given this,

How they [ecological consultants] value them is important. Whether a site is public or not, people get on to these sites whether they are supposed to be there or not. You can’t ignore them- they affect the site (Principal Ecologist, Birmingham and Black Country WT, 16th July 2001).

However, the remit of ecological assessment seems to preclude an appreciation of social uses. When asked to clarify whether ‘valuable site’ meant ecological or social value, one of the ecological consultants involved with surveying the site replied,

Everything I say is ecological. Recreation and so on is an issue, but it’s not something I get involved in (Principal Ecologist, Landscape Science Consultancy, 9th March 2001).

Glasson (1994) attributes this to the hijacking of environmental concerns by the ‘biophysical’ sciences (p.43)- what should be an interdisciplinary report is often written exclusively by biologists (Phipps pers. comm.). However, it can be argued that this bias is not merely disciplinary, but inhabits the black boxes of ecological surveying models more generally. The purely ecological criteria that militate against the atypical and artificial vegetation assemblages found on urban wasteland sites also imply an ecological valuing of habitats that display a lack of human interference, or in this case, urban influence.

The absence of a generally accepted urban typology, and the tendency of existing surveying methodologies and habitat typologies to under-value urban habitats and their importance in the urban context is compounded by the backgrounds of many ecological consultants themselves,

...some consultancies are more countryside focused. They see work only in terms of saving rural areas. They are not comparing like with like...[which] is a can of worms because the sites and habitats are treated differently by different consultancies (Principal Ecologist, Birmingham and Black Country WT, 16th July 2001).

Ecological consultants tend to live and work in rural areas, few specialise in urban consultancy, and in the absence of any suitable evaluation criteria will be unaware of their consistent under-valuing of urban habitats. Because human use is seen as disruptive of 'natural equilibrium', the assessment emphasises disruptive activities such as dirt biking and littering, while making no mention of less intrusive recreational uses of the site such as walking (although the opening up of soil habitats caused by 'disruptive' activities such as dirt-biking benefit some species, such as solitary Hymenoptera, which require tracts of bare earth).

Correspondence from the Birmingham and Black Country WT has mobilised the Birmingham and Black Country BAP in a number of ways, to make a more positive case for Vincent Drive. The loss of the SINC and SLINC habitat directly contradict the UHAP aims to protect such areas, and the need to take account of current residents usage of the site. However, neither the correspondence between Birmingham LPA and Babbie, or the development proposals and environmental statement themselves mention the Birmingham and Black Country BAP, or the UHAP itself at any point. This creates a situation in which the BAP is placed in direct opposition to the development process, in contrast to its intended purpose as a cross-sectoral document.

It would be disingenuous to put this entirely down to the LPA and developer wanting to 'ignore' the BAP because they favour development of the site. Equally justly, it can be seen as a result of the BAP process failing to include developers and regeneration personnel in the formulation process. Networks linking conservationists directly to developers beyond the development control appeal process simply do not exist (Harrison and Davies 2002). The

aims and types of knowledge within the BAP have not been legitimised by national policy, or professional bodies, such as the Institute for Ecology and Environmental Management, making them of little relevance to professional surveyors and town planners constructing an EIA. Within the legalistic development control system, legally binding policy is necessary. As a result, rather than invoke the BAP, which emphasises social use of brownfields, a local residents action group have filed to have the area designated a 'village green', on the grounds that the site has been used by walkers, conservationists, mountain bikers and motor bikers communally for over fifty years (Birmingham and Black Country WT 2000c).

8.3.4 Mitigation (or the Politics of Mapping)

The debate over mitigation is currently ongoing: as one planner involved with the site stated,

...you have this interesting matrix of habitats, lots and lots of 'edge', attractive to a whole variety of things as well, which is always a test of richness and variety. If you put buildings onto that site, you are going to have an impact, there is no doubt about it. It will impact upon it. But the whole issue is about the degree of impact, with that, it is how you mitigate that impact ...that's really where we are at (Strategic Nature Conservation Planner, Birmingham LPA, 8th November 2000).

This stage of the assessment reconciles survey data with the development plans within the parameters set by national and local policy, to suggest mitigation actions. The NHS Trust proposal tackled this task by producing an environmental statement for the proposed development on Vincent Drive, outlining key priorities and actions. The summary version produced for public consultation (Babtie 2000e) and the full version (Babtie 2000a) are referred to here. Analysis focuses on the use of corridors, constant natural assets and multi-functionality within the mitigation and design plans.

The site itself is recognised in accordance with supplementary planning guidance as lying at the nexus of two wildlife corridors, and mitigation proposals involve the retention of a fifty metre wide corridor running along the Bourn Brook, and the corridor features of the railway embankment. The main body of the site is designated a supplementary development zone, in

which ‘sustainable management of ecosystems and landscape assets’ are to be practiced (Babtie 2000e). Indeed, the Environmental Statement implicitly legitimises the proposed loss of edge habitat, stating under the ‘ecology and the natural environment’ section that, ‘a large proportion of this site [the SINC] has already been lost to hospital building since 1989’ (Babtie 2000a, p.5).

This thesis has argued that the concept of green corridors is a strongly developed urban conservation tool in Birmingham planning policy, underpinning the articulation of ecology in the city. Accordingly, as an ecological consultant with experience of the site stated,

There’s always a recognition that you’ve got an element in a wildlife corridor, which is so important in the urban situation, and in this case you’ve got a node, and that in my mind...is absolutely vital (Principal Ecologist, Landscape Science Consultancy, 9th March 2001).

This dominance is reflected in the mitigation proposals, but is achieved through a variety of surveying and mapping practices at the site level. It is these processes that articulate the material discourse of urban ecological governance, and which establish certain scales of ecological governance over others.

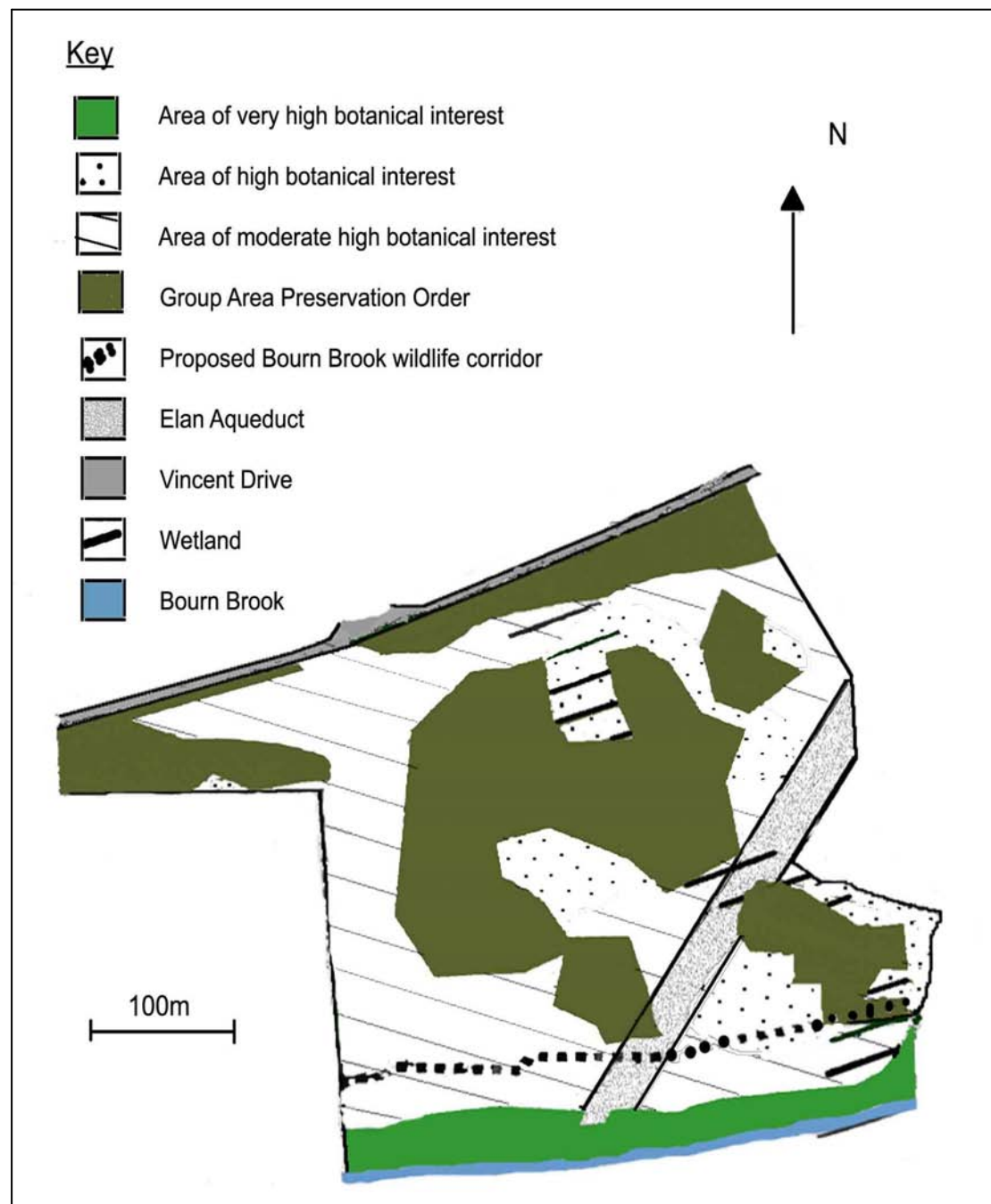
This section explores how the arbitrary compartmentalisation of the SLINC into areas of very high to moderate high botanical interest through surveying is used to undermine the integrity of the overall habitat patch through the mapping practices of the Phase Two botanical survey (Figure 8.10, p.246). By breaking down what is a continuous ecological landscape into the discrete data of compartments, the map serves to visualise selected features of the landscape. For example, the map of SINC ecology given in the statement of principles marks areas of very high interest in block colour (a small strip along the Northern bank of the Bourn Brook), while areas of high interest, represented by light dots, and moderately high interest, represented by diagonal lines, are almost invisible. This difference is hard to justify, given the small semantic difference between very high and moderately high. Similarly, the wetland areas, which constitute the rarest habitat in the West Midlands, are indicated by diagonal lines on the surveying map that cut across the ‘botanical’ compartmentalisation.

The botanical worth of the central area of the site, which is of SINC quality, is concealed by a block colour designating group tree preservation orders. Tree preservation orders merely require designated trees to be preserved- the area around them can be completely developed, making the use of block colour somewhat misleading in terms of the degree to which ecological features are being conserved. The resulting map, included in both the full and consultation documents, highlights the areas of ecological worth as linear features, transforming the corridor concept into an ecological fact upon which to base mitigation proposals.

The relative importance of corridors in the mitigation proposals increases as the content of reports is filtered, assimilated and pared down into non-technical summaries for public consultation and eventually decision-makers. The summary report, presented to the development control committee and at public consultation, has a six-bullet point ecological strategy (Babtie 2000e), in which the only definite feature is the ecological corridor to the North of the Bourn Brook. Such is the level of acceptance of the corridor concept that it dominates the executive summary, and appears as the major feature to be retained on maps of the site. The dominance of the corridor, which largely determines the resulting conservation element of the development, is carefully achieved through the practices of surveying, classification, and mapping, revealing a discursive complicity between mapping practices and scientific assessment procedures.

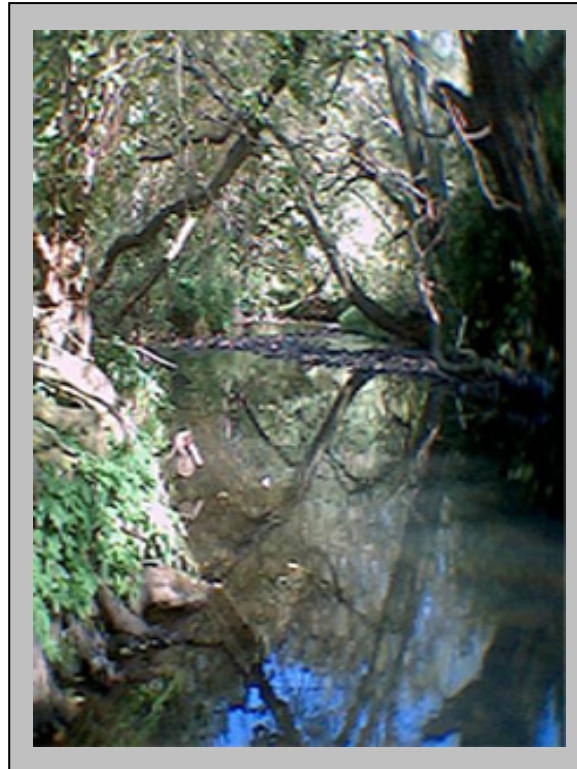
Chapter Seven argued that patches and corridors are scale dependent entities, and that scale articulates power and uncertainty in the realm of conservation planning (Duane 2000). Vincent Drive demonstrates this point well. When viewed at the city level the site represents part of a corridor, while when viewed within the local landscape the site plainly represents a patch. At the level of the site itself, the core of the site represents a patch, and the railway and roads bounding it the edge. However, the mitigation proposals do not consider the site as a patch, and reduce the core of the site to the Bourn Brook corridor, and the edge habitats of the railway and canal to corridors. As scales are shifted, the representations of patch, edge and corridor change, with huge effects for the resulting landscape.

Figure 8.10: Vincent Drive phase two botanical survey- map of botanical interest



Source: modelled on BAPTIE 2000d

Plate 8.5: Section of Bourn Brook proposed for conservation



Source: modelled on BAPTIE 2000d

Plate 8.6: Section of Bourn Brook proposed for enhancement



Source: modelled on BAPTIE 2000d

Shifting scale changes the implicit valuations of urban space. The reduction of Vincent Drive to a corridor feature is achieved by viewing it at the level of the city, and within the site itself: the actual size of the corridors at these two scales are different, but are collapsed onto one another within mitigation proposals. The form of the Bourn Brook corridor is determined by the anthropogenic needs of a convalescent landscape, and hence can be accommodated within the developmental logic of the site. The practices of surveying and compartmentalisation conceal the subjectivity of maps that are produced on an *ad hoc* basis in the planning process. These almost informal cartographies of ecological governance are fundamental to the political ecology of urban space, translating local planning policy into ecological representation, and back again into mitigation proposals.

While evidence of past human interference is un-problematically used to devalue the aesthetic worth of the site, mitigation proposals are awash with plans to ‘enhance’ the retained habitats for human enjoyment. This involves lower density development across the southern part of the SINC in order to retain particularly valuable areas of habitat, and plans for generic recreational paths and bridges along the Bourn Brook corridor (Babtie 2000a). The assessment states that the Bourn Brook ‘could be an important ecological feature if the dumped cars and rubbish were removed’ (*ibid*). It is difficult to see what the removal of car shells will do to enhance the ecological worth of the river, and possible that they enhance the biodiversity of the river by breaking up flow, and providing micro-habitats.

The elision between ecological worth and cultural aesthetics within the assessment is reinforced by the extensive use of pictures. Plate 8.5 shows pictures of the section of the Bourn Brook being conserved, and Plate 8.6 the section being proposed for ‘enhancement’. Notice how the first is taken in portrait with the river flowing away from the viewing position. This maximises the river’s apparent size, the prominence of bank vegetation, and the agreeable sunlight pouring onto the landscape. By contrast, the second photo is taken in landscape format, angling downwards across the river. This has the effect of making the river look like little more than a ditch, focusing on the muddy grassland bordering the river and showing no sky. It also foregrounds one of the rusted car wrecks that line the river. The

‘example of sensitively landscaped watercourse’ juxtaposed in the report resembles a park landscape, with mown grass, very little vegetative cover and lollipop trees, or ‘tamed nature’.

Elsewhere in the report, pictures of rats and foxes, species associated with ‘spoiled’ urban environments, decorate the margins of the assessment, despite not being mentioned in the species survey. Equilibrium ecological models and implicit rural aesthetics are mutually reinforced (Worster 1977) within the document through a range of textual devices. This manipulation of images operates to conceal the actual importance to biodiversity of the landscapes shown, but no clear line can be drawn between such textual effects and the ecological surveying practices that underpin them.

Scientific and aesthetic aspects of anti-urban ecological discourse come together again in the case of ‘alien species’: so-called ‘exotics’ that tend to make up a higher percentage of the urban flora. The picture used on the page that describes the diverse habitats of the site is of a stand of Giant Hogweed (*Heracleum mantagazzianum*)- one of the most actively discouraged ‘alien’ species in the U.K. While ecologists are starting to work on typologies of urban habitats that recognise not only the difference in proportion of non-indigenous species from typical rural assemblages, but actually evaluate these assemblages of vegetation in their own right (Barker 2000), their presence is still taken to indicate a degraded environment (Soulé 1990; Cronk and Fuller 1995), and they are considered undesirable to the extent that the assessment budgets for the eradication of non-indigenous species.

The ecological bias against alien species draws on a discourse of purity (Peretti 1998) closely related to the cultural proclivity towards unspoiled nature that lies at the heart of the urban - rural dichotomy (Nicholson-Lord 1987). It is possible to detect an ‘ecology of fear’ (Davis 1998) in these psychological discourses of purity (identified in Chapters Four and Five with reference to the origins of nature conservation and town planning, and pseudo-religious basis of ecology), reflected in practical concerns over the safety of brownfield spaces, and residing in the shadows cast by the anti-urban discourse of nature.

In line with the policy framework, it is suggested that the effects of reducing the overall area of the site are offset by creating new habitats elsewhere, utilising the concept of constant

natural assets, which aims to maintain the total area of semi-natural green-space across the city. However, the 'strong' guidance contained in the U.K.'s second Strategy for Sustainable Development (DETR 1999b) and NCS, demanding the replacement of SLINC habitat or open space by equal amounts of new habitat or open space, is discarded in favour of the weaker first U.K. Strategy for Sustainable Development (DoE 1994b); a strategy that is out of date (Birmingham and Black Country WT 1999). The exact amount of habitat retention away from the Bourn Brook is unknown, as the plans for the psychiatric hospital are still being negotiated.

Beyond this, the simple equivalence of area overlooks the implications of reducing patch size for diversity both within the site and amongst networks of sites, and for the uniqueness of the site. As the Nature Conservation Officer for Birmingham City Council states, the development represents 'a massive loss of public amenity...you can't replace the scale of that site' (11th January 2002). The splitting of the floodplain into two sites has caused problems regarding the provision of compensatory habitat,

...both [developers] came along and said, 'there's our development, it works, and by the way you've got a load of public open space over there'...if you put those two plans together you've just taken out all the public space (*ibid*).

The Vincent Drive assessment includes mitigation plans to create compensatory habitat on the site of the proposed Sainsbury's superstore car park to the South of the Bourn Brook. A second compensatory measure involves the creation of habitat around the edge of Selly Park, which lies approximately two kilometres to the South of Vincent Drive. Even discounting concerns over the lack of details of design and implementation of this plan, it does not represent the creation of green-space. Failure to replace habitat in the environs of the site is justifiable when the concept of critical natural capital is applied at the city scale, with the result that the geography of where these spaces are lost and gained is ignored.

8.4 Towards a Scalar Political Ecology of Brownfield Planning

8.4.1 Scale and the Representation of Vincent Drive

Three key issues emerge from the analysis of ecological knowledge in the planning process. Firstly, a developmental discourse of urban space is reproduced through a diversity of practices associated with ecological governance. A strong continuity of concepts runs from policy into practice, indicating the power that tools such as corridors exert over the articulation of urban ecology. Secondly, there is no distinguishable line between ecological representation and value judgements made in assessments and mitigation. Thirdly, scale underpins power and contestation in the planning process, in the classic Brennerian sense of a relational scalar politics.

Scale has been implicit in the concepts, methods and value judgements utilised in the ecology of the assessment, and this section argues that scale itself grounds the reproduction of coherent discourses across levels of governance. Scale determines what becomes visible, and what remains invisible; put another way by a national expert on ecological assessment, ‘scale is very important, as it influences the types of decisions that can be made’ (Treweek 1999, p.272). The spatio-temporal scales at which the faunal and floral surveys were undertaken give rise to a very specific representation of the site. The concentration of surveying upon particular species, and the atomistic ‘snap-shot’ surveying scales preclude any measure of the overall biodiversity of a number of habitat patches (sites) within a fragmented landscape.

As counter-evidence presented mainly by the Birmingham and Black Country WT shows, different scales make different scientific evaluations possible. The Phase Two botanical survey operated at the intra-site scale to identify discrete equilibrium habitats, undervaluing the importance of the overall size of the habitat patch both in its own right, and as part of a wider landscape. The logic of sub-division fails to recognise that valuable habitat is often sustained by the less valuable edge habitat surrounding it, which as a result is often deemed expendable. In the case of Vincent Drive, the corridor concept supports this logic of sub-dividing and eroding habitat patches.

The scale at which assessment is conducted vitally legitimises the dominant ecological governance. The equilibrium ideal that equates human influence with low ecological worth is derived from closed system equilibrium models of ecology. These models yield a decent approximation of rural or wilderness ecosystems (upon which assessment methods are based) that are essentially static entities, but are less appropriate in the urban context, which is typified by the dynamic flow of energy and materials into and out of ecosystems. Indeed, given the critique of the systems model given in Chapter Four, it is possible to question the suitability of the term 'ecosystem' at all in urban environments.

By conducting a short-term assessment within the spatial scale of the proposed development, the site is treated as a closed equilibrium system. As a result, social and landscape aspects of urban sites are neglected, and the rural aesthetic underpinning mitigation proposals simultaneously decries the existing ecology for its unnaturalness, while permitting its replacement by an even more artificial 'enhanced' environment. Evidence of former human use by very definition devalues brownfield sites, and the rural bias of both the assessment and mitigation reinforces the pro-development / waste discourses associated with brownfields. This discourse is manifested through the scales of assessment that it prioritises (housed within the black boxes of surveying), as these produce scientific knowledge that legitimises the subsequent proposals. In this way, detailed ecological assessments operate to support the strategic claims to 'environmental improvement' made by developers reclaiming brownfield sites.

This scalar bias becomes ironic in its wider planning context: while development of the site is politically justified as part of a broader local sustainability action plan for the Selly Oak area, the ecological assessment serves to isolate the site from its local context. Residents groups and politicians have protested that the establishment of a mega-hospital to serve the region cannot be justified in terms of local sustainability (Commons Hansard 1992; Urban Initiatives / Birmingham City Council 1999b), while the destruction of the area's largest natural resource is not offset by plans for similarly sized or equivalent replacement space in the locality. The concept of constant natural assets operates at the city scale. By ignoring the geography of where these spaces are lost and gained, ecological resources across the city tend to reflect the

logic of capitalist development, becoming increasingly uneven. Ecological representations of the site in terms of the presence of rare species or habitats strictly within the scale of the site are discursively symmetrical to planning tools at the city-wide scale that reduce local landscapes to city-wide stocks of natural capital.

Scale can thus be seen to support the separation of nature from society, through the atomistic measurement of 'natural' things (Latour 1999) on the site, and the objective quantification of natural resources at the city scale. The purification (Latour 1993) of natural and social at these two scales is complicit with the reactive site-by-site mode of governance that planners and developers are familiar with, and strategic planning at the city scale. Scale is thus a vital circulating reference within these networks, underpinning the dualism of society and nature and its subsequent binaries. As Swyngedouw and Kaika state, this separation

...permits a discursive reading of what nature is to serve specific social ends, while ignoring the inevitable mediations between nature and society (1999, p.574).

An alliance of scales (Swyngedouw 1997b) can be identified between the scale of the site and the city, which functions to marginalize the local, whether through the lack of formal regard for local uses of the site, or through the operation of the concept of constant natural assets. This hegemonic scalar logic of 'site and citywide' supports the wider national political ecology of urban-rural division, which precludes viewing the city as part of a wider region, and hence of comparing the need for natural resources beyond the scale of the city, in relation to rural areas (a point that is assuming ever greater importance in the face of urban growth and greenbelt policies).

The ecological and planning scales advocated by the Birmingham and Black Country WT and the LBAP conflict with the dominant scalar political ecology of brownfield planning. In advocating the use of ecological models based upon patch dynamics across sites within a landscape, and recognising the importance of wasteland ecology in its own right, they are implicitly operating at new spatio-temporal scales; scales that are simultaneously political and scientific. Arguments of ecological worth based upon local dwelling experience and synergies between humans and ecology fall outside of the dominant scalar logic of 'site and

city' that underpins the ecological assessment framework. This can be seen as a conflict between the spatial logic of capitalist urban development, and the territory and resources of local residents, with each side mobilising radically different scalar political ecologies.

An antagonistic relation between society and nature underpins the hegemonic urban political ecology, and the spheres of nature and society are purified by the focus on the site scale. The dominance of corridors across levels of the planning process (from ecological assessment to development plans to planning policy) is one way in which this purification is achieved. This atomistic approach is complicit with the reactive legalistic mode of governance represented by the development control system, and the national political ecology that segregates cities from their wider context in order to impose a developmental spatial logic.

In opposition, a nascent urban political ecology can be identified, associated with sustainability and biodiversity conservation that views the urban landscape at the local level, emphasising the role spaces play in relation to one another, both ecologically and socially. Many of the tenets of the UHAP, and biodiversity more generally as part of the broader philosophy of sustainable development, operate at the local scale. In taking a more synergistic view of society's relations to nature, this holistic approach directly conflicts with the dominant scales of assessment that are legitimised legally, practically and ideologically (Table 8.1).

Table 8.1: The scalar politics of urban planning

<i>Urban Political Ecology</i>	<i>Dominant (EIA)</i>	<i>Nascent (LBAP)</i>
Society-nature relation	Antagonistic / purified	Synergistic / hybrid
Approach	Conservation (rarity) atomistic, reactive	Biogeography (diversity) holistic, strategic
Scalar logic	Site + City-wide	Local + Regional

8.4.2 Scale, Power and Socio-Ecological Transformation

In January 2000, the University Hospital Birmingham NHS Trust was granted outline planning permission to build the new hospital, subject to the signing of a legally binding agreement to ‘improve public ...access to the site; deal with archaeological remains; and improve the adjoining wildlife corridor’ (Birmingham City Council 2002). This decision undoubtedly reflects the wider politics of national and regional health service rationalisation, but more importantly here, shows how key scalar concepts, such as the corridor tool, are faithfully replicated as part of the resulting development.

The dominant relational scalar logic (Brenner 2001) of ‘site and city’ reaches all the way down to the everyday concepts and performance of ecological assessments and development control, as well as sustaining the wider ideological and material binaries of urban and rural, nature and culture. Complicity between the site and city scales underpins the translation of the national political ecology into practice. It links the physical and social modes of understanding that comprise ecological governance by framing the purification of the two spheres. The grey area between ecology and aesthetics is manifested in many ways, from the complexities of the multi-stage EIA process and methodological ‘black boxes’ of ecological assessment, to a range of visual textual devices. These processes explain how Vincent Drive is both produced by and reproduces wider discourses of nature and society, through the scalar manipulation of concepts such as the corridor that are made amenable to the dominant political ecology through its application at the human scale.

In terms of the capitalist political ecology of urban development, the planning history of Vincent Drive can be viewed as a gradual taming of its unruly geography, eventually reconciling it to the dominant logic of urban development through a series of socio-ecological scalar transformations, in which the recent subjugation of the site’s space to a corridor represents the final stage. The scalar alliance of ‘site and city’ is well suited to the changing demands of the urban space economy, as developmental pressures wax and wane, sites can be transformed from ecological space to development space. These processes constitute a form of scalar fix (Smith 1995), analogous to Harvey’s (1982) spatial fix, which set geographical

structures framing political, economic and cultural activity. The manipulation of scale thus carries great power, as this scalar fix is simultaneously an ecological and a political fix.

This scalar critique has been extended in two major ways. Firstly, the state is fundamentally implicated with the reproduction of the dominant capitalist scalar relations and hierarchies (Macleod and Goodwin 1999) at every level considered in this thesis: from the origins of conservation, ecology and planning within the birth of the modern industrial state to national planning policies and the everyday practices of planners and ecologists. Secondly, the scalar fix itself is 'ontologically promiscuous' (Castree 2002a, p.357): political, economic and cultural framings of the world are inextricable from environmental transformations.

Focusing on scale to transcend conventional analyses that separate science from politics once again prompts return to questions raised in Chapter Two, concerning the partially conflicting status of physical and social conceptions of scale. Vincent Drive amply demonstrates the impossibility of separating scientific scales from political scales: ecology is inherently part of the political terrain of contestation. But as argued in Chapter Two, the manipulation of scales within ecological assessments is methodological, selecting which features of an area to assess rather than constructing a completely arbitrary measure. This does not differ substantially from development proposals, which select features of an area to develop, in that both combine the physical landscape and political process in some way.

A landscape will bear the material imprint of the processes of ecological governance, and the form of ecological governance will be constrained by the subsequent landscape that evolves. While this resonates with traditional Marxist approaches, Vidalian concepts of the region and the German 'landschaft' school, the focus of discussion here is scale. Scale can be conceived of as an emergent property of the socio-natural systems of a landscape: as a material discourse, it is both a methodology and an axiomatic construct. Scale thus provides both an integrative and transformative way to conceive of our relations to the environment: ecological scales are transformed as socio-ecological processes change (Swyngedouw 1999). Scientific scales support political scales conceptually, but also materially through the formation of physical reality. As Brenner (2001) contends, 'scalar fixes... constrain the subsequent evolution of scalar configurations' (p.605). Scalar path-dependency in the overall structure of

the modern capitalist state helps to explain why initiatives such as sustainable development and urban biodiversity conservation have had little immediate impact.

8.5 Conclusions

This chapter focused analysis upon the individual site, to explore how the Birmingham LPA articulates the ecological worth of brownfields against development pressures in practice, in order to contextualise the failure of the LBAP and BUHP. The designation of brownfield sites in strategic planning and the use of ecological assessment in the development control process were explored in terms of the national and local policy framework, and through a case study of development proposals for an ecologically sensitive brownfield site in Birmingham, known as Vincent Drive. Ecology was shown to be central to the production of urban space, and the analysis of this chapter showed how the dominant mode of ecological governance connects the city with ecology in very different ways to reformist positions such as biodiversity conservation (Kipfer *et al.* 1996).

A form of scalar politics emerged from the analysis of strategic site planning, and the surveying, mapping and planning practices of development control, and was developed to show how the dominant capitalist political ecology of urban planning conflicts with the transformative elements implied by more sustainable forms of ecological governance such as biodiversity. The dominance of the corridor concept in articulating the ecology of Vincent Drive occurs because it is manifested in the day-to day practices of planners, developers, surveyors and town planners alike. In contrast, resistance to this scalar political ecology are at best nascent in comparison to the dominant logic of 'site and city'. These modes of resistance are generally unsuccessful because the scalar fix of capitalism is supported by the wider cultural discourses of urban space and nature outlined in Chapters Four and Five.

Making the biodiversity of brownfields matter thus involves more than the provision of new knowledges and planning tools, and it requires more than the solidification of new relations and networks between developers, planners, conservationists and ecologists. It requires a

shift in the aims of urban planning, and the national political ecology of the U.K. that prioritises urban development. As an emergent property of the socio-natural systems of a landscape, scale provides an integrative and potentially transformative way to conceive of our relations to the environment that can inform this challenge.

Chapter 9 Conclusions

9.1 Assessing the Thesis

9.1.1 A Multi-Scalar Political Ecology?

The central achievement of this thesis has been to trace key discourses between levels, to generate a multi-scalar political ecology of biodiversity conservation on brownfield sites. This synthesis has contributed to literatures in geography, and the social sciences more widely, concerned with all aspects of socio-ecological transformation. More specifically, the arguments of the thesis have added to contemporary debates surrounding urban natures, and the fast-moving scale debate. By way of conclusion, it is necessary to revisit the aims of the thesis that were identified in the introduction, and situate them within their wider theoretical and substantive context.

The three substantive aims allowed themes to be traced from the international to the local levels, generating a powerful analysis of urban space that connected traditionally discrete concerns at different levels. The concept of material discourse outlined in Chapter Two provided the basis for this project, bringing abstraction and practice into one framework to show how ‘networks are not just constructed around power relations...[but] are practiced in and through them’ (O’Neill and Whatmore 2000, p.125). This facilitated a genealogical interrogation of the structures of power that mediate between society and the environment, such as the equilibrium and limits-to-growth discourses. Similarly, the extension of material discourse to delimit ecological governance as an object of study emphasised the need to focus analysis upon the point at which the world is enrolled and transformed, rather than merely identifying the ecological effects of political actions.

Approaching biodiversity as a nested phenomenon revealed a coherent ideology of society’s relations to the environment, which was transmitted coherently between levels by a particular scalar hierarchy, conflicting and reinforcing the discourse of biodiversity at various instances. Scale provided the key to understanding how this specific ideology became spatialised under the capitalist nation state system, and was unproblematically articulated ecologically and politically through systems of ecological governance.

The dualistic relation of nature and society spawned a series of scaled binaries, between urban and rural at the national level, and between greenfield and brownfield at the local level: each spatialising a similar conception of society and nature. The scalar alliance of ‘site and city’ described in Chapter Eight, which served to de-socialise, de-ecologise and disembody urban space from its local context, is ideologically symmetrical with the national scalar logic, which separates urban areas from their regional context. This logic inheres in the ‘global’ articulation of biodiversity, which, as an abstraction from national discourse, retains an emphasis upon nature as resource, and the associated discourse of equilibrium. The axiom of nature as resource is thus spatialised at a series of levels through a scalar hierarchy at the national, city and site levels. Analysis has not only revealed how discourses of urban space and nature are materially reproduced at the local level, but also how discursive coherence is achieved across a number of levels by the establishment of a particular scalar hierarchy.

Material and discursive analysis highlighted the specifically capitalist character of this scalar hierarchy, which was typified as a scalar fix. The historical geography of socio-natural environments (Boyle 2002) grounds the dynamic interactions between the material transformations of nature, and the social transformation of humans (Lipietz 2000) that occur through the everyday activities of ecological governance. The theoretical and methodological tools used in this thesis have thus developed a highly geographical political ecology of biodiversity and sustainable development, that marries practical analysis at the local scale to the bigger picture (Eden 2000), by incorporating ecology into a powerful and coherent analysis of global, national and urban capital processes (Harvey 1996).

9.1.2 The International and National Frameworks for Biodiversity Conservation

Transplanting the global diktats of biodiversity conservation to the urban context in Britain involved mediation through pre-existing ideas and institutions at the international and national levels. Chapter Four explored environmentalism and conservation biology as the precursors of biodiversity, and the potential fit between the UKBAP and nature conservation tradition. Chapter Five addressed the historical and cultural bases of urban and brownfield planning in the U.K. as key arenas of ecological governance through which biodiversity conservation in urban areas is articulated. It was argued that notions of equilibrium underpin international and national discourses of nature, giving rise to a series of nested binaries between society and nature, urban and rural, brownfield and greenfield, which not only serve to dissociate nature from urban areas, but provide a major source of convergence between the international and national frameworks for biodiversity conservation.

The idea of equilibrium became culturally and institutionally dominant during the Victorian period of industrialisation, which was characterised by the transformation of the national landscape, and the birth of the modern managerial state apparatus. Scientifically, viewing society's relation to the environment as one of resource use allowed the needs of a modern national population to be tended. The ensuing emergence of science and scientific communities secured the governmental authority of the modern liberal state. Culturally, the visage of urban industrial squalor led to the birth of the (largely invented) rural idyll, implicitly dissociating nature from society. The equilibrium paradigm of society and environment was incorporated into ecology through the promise of systemic control over stable natural phenomena (Cronon 1995).

The stability-diversity equation provided the justification for biodiversity conservation, while systems ecology paved the way (conceptually and practically) for the application of ecological principles at the global scale. Culturally and politically, the Neo-Malthusian idea of 'limits-to growth', that informed the popular environmental movement, generated the concept of 'sustainability' into which biodiversity fitted. Biodiversity thus houses a decidedly

capitalistic conception of the environment as a resource, which was critiqued in the context of the CBD itself (McAffee 1999).

In Britain, both the modern planning system and nature conservation movement were born as reactions to the increasing industrialisation and urbanisation of the U.K. (Nicholson-Lord 1987). The separation of scientific and aesthetic concerns in nature conservation over the course of the Twentieth Century weakened early attempts to apply conservation principles to the entire British landscape, resulting in an emphasis upon the site based system of conservation, and the preservation of key species and habitats that is associated with it (Adams 1997). The UKBAP largely incorporated the CBD into this pre-existing framework, adding new lists of protected species and habitats, and emphasising the importance of a scientific technical-rationalist approach to nature conservation.

The preservationist agenda has been imprinted upon the national geography of the U.K. through the modern planning system, which is both derived from and constitutive of the scientific and cultural dissociation of nature from society. At the national level, this resulted in the vigorous segregation of urban and rural issues, and the associated physical delimitation of space, with spatial planning tools such as greenbelts, along these lines. Brownfields and greenfields were explored as a microcosm of this geography, and it was argued that the negative discourse of brownfields became increasingly synonymous with cities. This discourse has infused the articulation of urban and brownfield space in sustainable policy, as environmental improvement has become equated with the remediation and subsequent development of brownfield spaces.

The actual ecology of brownfield spaces, and the popular conservation movements that have coalesced around them, highlight the dual scientific and aesthetic bias against urban, and particularly brownfield ecologies. As for the stability-diversity model, classic ecological habitat typologies are derived from work conducted on rural and wilderness ecosystems that are characterised by very little apparent human disturbance. Because brownfield space is defined by human interference and disturbance, it does not fit the equilibrium criteria of these ecological models and categories (Barker 2000), resulting in the under-representation of their ecological worth. The dynamic character of brownfields highlights the inherent equilibrium

discourse of nature that inhabits both planning and nature conservation, which de-ecologise the city in order to create suitable conditions for development.

The analysis of Chapter Four and Five emphasised the hybrid character of biodiversity (Escobar 1998), and explored particular aspects of this hybridity to reveal underlying continuities between national planning and nature conservation traditions and the international discourse of biodiversity. Indeed, the global claims of sustainability and biodiversity to reconnect social, economic and environmental considerations are undermined by its origins within nationalistic disciplinary discourses, which frame the relation of society and the environment in a specific resource-based way.

In many ways then, the international discourses of biodiversity and sustainability are the product of distinctively national reactions to industrialisation and urbanisation, and the continuities between the international discourse of biodiversity and national conservation and planning traditions can be said to be greater than the discontinuities. However, the ambiguous status of scale within the concept of biodiversity, and the emerging grass-roots urban nature movements constitute a potential break with these traditional scales of conservation and dominant discourses of urban space.

9.1.3 The Local Biodiversity Action Plan Process

Chapter Six examined the LBAP process in Birmingham and the Black Country as a case study of how these discourses were mediated, contested and re-formulated through collaborative networks of actors at the local level (Healey 1997). It became apparent that the formulation of new environmental knowledges is a highly place-specific process, both in terms of the influence of pre-existing networks in a specific locality, and in terms of capturing local ecologies. This was a double-edged sword. In line with the emphasis of sustainability upon local action, full use was made of pre-existing networks, institutional capacity, and local knowledge bases, but in doing so, the LBAP process tended to reproduce pre-existing networks and power relations. In contrast to Selman and Wragg's' (1999) analysis of LBAPs as 'super-networks', this analysis contended that the LBAP process failed to enrol actors from outside the 'normal' conservation circuit, tending instead to reproduce existing knowledges and actions.

Given the legacy of innovative and cross-cutting nature conservation initiatives in the area, this was not fatal to the LBAP process in Birmingham and the Black Country. However, in terms of content, the LBAP process was not granted adequate authority or support to successfully transcend the conceptual division between ecological habitat categories, based upon rural and wilderness systems, and urban land use typologies, based upon the political spatial units of urban planning. This division was explored by comparing the UHAP, which attempted to marry urban land use issues with brownfield ecology, and the DHAP, which operated within a more traditional preservationist paradigm of applied nature conservation. This dichotomy ran through every aspect of the BAP, and retarded it from making a radical break with the dominant equilibrium discourse of society's relation to nature and the wider national political ecology of the U.K.

Recognising that more sustained engagement between ecologists, conservationists and planners was required to produce models of urban conservation that transcend the division between ecological and urban knowledges, Chapter Seven explored the BUHP project. This project compared the ecological efficacy of the corridor model, which dominates nature

conservation in Birmingham, with the idea of brownfield sites as habitat patches. It concluded that corridors are not necessary conduits for organisms, because the urban landscape matrix is more ecologically porous than is commonly thought, and supported the contention of the UHAP that it is actually habitat patch size and quality that contributes to the maintenance of urban biodiversity.

However, translating these results into end-user products for Birmingham LPA was problematic, as planners remained wedded to a practical and legal outlook upon ecological issues, requesting knowledge concerning the existence of protected species on particular brownfield sites, and which sites lay on corridors. The knowledge produced was used to reinforce existing conservation planning practices, which focus upon the site scale and are based exclusively around the idea of corridors, rather than to reform ecological planning practices, and conceptualise urban biodiversity at the landscape scale.

The failure of the BUHP project and UHAP in political terms was related to a number of structural barriers, including the poor capacity of LPAs to adapt to the environmental imperatives created by sustainable development policy. However, at root, this incapacity belies the foundation of the planning system upon discourses that operate to de-ecologise and promote the development of urban space. Corridors are popular urban conservation tools because they are predicated upon the (incorrect) assumption that urban areas are uninhabitable for many animals, an assumption that resonates with the de-naturing of cities that characterises the national political ecology. The landscape view required by the habitat patch model contradicts the spatial logic of urban development, by refusing to segregate nature from society, and instead viewing the city as both a dynamic ecological landscape and cityscape simultaneously. As such, the BAP process was doomed to fail in cities because it contradicts the capitalist logic of urban development, which, predicated upon the idea of equilibrium, is manifested through a series of scaled binary geographies.

9.1.4 Biodiversity and Urban Brownfield Planning

Chapter Eight developed this scalar critique by applying a political ecology analysis to urban brownfield planning in Birmingham, focusing analysis upon the articulation of brownfield sites in strategic planning and the development control process. These two arenas were contextualised in terms of the national and local policy framework, and through a case study of development proposals for an ecologically sensitive site known as Vincent Drive.

Planning was revealed as crucial to the spatial articulation of nature (Whatmore and Boucher 1993). Analysis of strategic site planning, and the surveying, mapping and planning practices of development control and ecological assessment highlighted the dominance of particular scales, which framed the political and ecological consideration of brownfield sites. A scalar alliance (Brenner 2001) between the site and city levels underpinned the dominant articulation of brownfield space in the city. This relational scalar logic was manifested in the practices of ecological planning, from mapping and surveying practices to aesthetic and design principles, operating to alienate the site, within the framework of the city, from its landscape context. Concepts such as corridors were dominant in articulating urban ecologies because they are complicit with this dominant scalar hierarchy, and implicit in the day-to day practices of planners, developers, ecological surveyors and developers alike.

Resistance to this dominant scalar logic of urban planning from conservationists and residents, and indeed the LBAP itself, was generally unsuccessful. The consideration of urban space at the local and landscape levels advocated by the UHAP and local resident protests was not supported by policy, legal requirements, or the taken-for-granted practices of actors involved with the planning process. Analysis revealed how discourses of urban space and nature, which are sustained at a number of levels, are reproduced through material scalar practices at the site level.

The manipulation of scale within the development control process was key to integrating ecological and political knowledges, and hence articulating power (Duane 2000). Patches, corridors and edge features were shown to be entirely scale dependent, and scale was

developed as an analytical concept to understand how ecologies act politically, and equally importantly, how politics act ecologically. As an emergent property of the socio-natural systems of a landscape (Swyngedouw 1999), scale provides both an integrative and a potentially transformative way to conceive of our relations to the environment.

9.2 Final Reflections

9.2.1 Biodiversity and Brownfields- the Bigger Picture

The hegemonic developmental logic of urban space is reinforced at a number of levels: by the focus upon discrete sites within the ecological governance system; by the separation of urban and rural issues at the national scale, and by the incorporation of this national separation into the ‘abstract’ models of ecology and ‘taken-for-granted’ aesthetic predilections of modern societies. Because the issue of urban brownfield biodiversity conservation cuts across these ideological power-lines, it has highlighted how the political ecology of capitalism is achieved through the manipulation and fixing of scalar hierarchies, which reproduce the binary geographies of a society divorced from nature at a series of levels.

However, it has also highlighted how the local biodiversity process has been largely doomed to fail from the start, both in terms of the dominant practices of urban planning, and in terms of the national and global discourses that underpin ecological governance. To return to the question of whether nature is articulated differently in the post-Fordist, post-Rio city, it is clear that,

Despite attempts at reinserting nature into the urban, we continue to inhabit a symbolic world in which city and countryside, core and suburb, humans and animals are clearly separated (Keil and Graham 1998, p.121).

Qualifying this rather negative assessment, the arguments of this thesis that ideological continuities run across a range of activities and traditions are not intended to demonstrate some form of capitalist conspiracy theory, whereby coordinated conscious effort has been and is still being made to establish certain discourses, scales and geographies to the detriment of

others. Rather, the critique of this thesis shows how socio-ecological transformation is achieved through binary discourses that, although on the surface have little in common, stem from underlying geometries of power and material processes of reproduction associated with the modern state. The political ecology approach has explored the challenges facing different forms of urban governance that intend to produce qualitatively different relations between humans, non-humans and their urban environments (Huston 1997) in depth.

The networks of institutions and actors, such as ecologists and urban planners, who articulate resources and territory so effectively in the context of first-world cities, are deeply implicated in this scalar hegemony. The performance of these networks, through mapping, surveying, policy-making, designing and so forth, sustains boundaries between urban and rural, nature and culture, providing complementary organisational forms to the dominant scalar fix of capitalism (Smith 1995). The conceptual barriers to urban biodiversity conservation are thus simultaneously sociological constraints, and any change must be achieved through gradual intercourse with these path dependent structures.

Making the biodiversity of brownfields matter thus involves more than the provision of new knowledges and planning tools, and it requires more than the solidification of new relations and networks between developers, planners, conservationists and ecologists. It requires a shift in urban and national planning, ecological models and values, and cultural attitudes. It requires recognition that the current national political ecology is dialogically realised through a succession of binaries: that the urban has been forged in opposition to the rural, and that reform to one arena requires reform to the other (Shirley and Box 1998).

Meaningful reconfiguration of our relations to the environment will only be achieved by engaging with scales of accountability, representation and action over a sustained period. Formally, through a sea change in the emphasis of national policies and the formulation of professional ecological standards for planners, surveyors and developers, and informally through grass-roots struggles against the dominant capitalist scalar hierarchy. These struggles are inherently scalar, aiming both to establish new scales, and new relations between scales. In the case of Vincent Drive, this involves moderating the scalar logic of site and city, which deterritorialises space from its social and ecological context, with a landscape sensibility that

articulates different relations to the environment and alternate values of urban space. The politics of scale is key to the production of more socially and ecologically amenable spaces that is, in spirit at least, at the heart of the biodiversity initiative, and indeed the critical geographical enterprise.

However, on-going reluctance by the U.K. government to give the BAP process a statutory underpinning, adherence to an oppositional and largely reactive local planning process, and the continuing structural division of urban and rural affairs supports the contention that the state is complicit in the reproduction of suitable conditions for capitalist development. Echoing long-standing concerns of Marxist geographers concerning social justice (Harvey 1973), and the spatial dynamics of capitalist accumulation (Smith 1984), the eco-utopian goals of biodiversity and sustainable development prompt us to address bigger issues; of what our landscape should look like, how best to organise development across it, and for whom.

9.2.2 Power, Scale and Socio-Ecological Transformation

The concept of scale has been developed throughout this thesis to occupy an increasingly central role. Scale articulates the fundamental aim of political ecology to link political economy to ecology, revealing the co-constitution of ecological, cultural and economic dimensions. Scale is the invisible conjunction in material discourse, linking the abstract to the practical. The separation of urban from rural that makes the country the exclusive preserve of the rich, and confines development and workers to urban areas is simultaneously an ecological division. The scalar approach used in this thesis has not only accommodated the ‘ontological promiscuity’ (Castree 2002a, p.357) of this particular environmental issue, but also furnished a critique that has brought the contingent character of conventional categories such as economy, culture, science, society and nature into analysis.

As environmental imperatives become increasingly assimilated into formal systems of governance, the question of how they are articulated and for whom is synonymous with struggles over the scale at which they are articulated. Because scalar hierarchies connect

people to their environment in different ways, geographical struggles reside at the core of debates concerning possible modes of existence. Scale is both the condition and the stake of socio-ecological struggles. It is worth returning to Brenner once more:

In an epoch in which new, highly disempowering and increasingly authoritarian scalar arrangements are being forged and aggressively entrenched by the agents of transnational capital [the politics of scale]...would appear to be one of the more urgently important political contributions that could be made by progressive theorists (2001, p.608).

The analysis of biodiversity in this thesis has contributed a politics of scale that has shown how ecologies and natures are incorporated into, and inextricable from, the scalar fix of capital processes.

The examination of biodiversity as a reformative project raises questions of scale and political legitimacy. The formulation of biodiversity in the CBD as an abstract global discourse is dependent upon its articulation as a genetic resource. However, the lack of complementary structures of political governance at either the genetic or the global levels has resulted in the continuing dominance of a distinctly national form of political legitimacy (one which, given its unspoken character, is doubly insidious). Similarly, part of the failure of the LBAP and BUHP to articulate biodiversity at the landscape scale can be attributed to the lack of political legitimacy at this scale.

The seeming reluctance of the U.K. government to reform the current planning system has largely stifled the already limited powers of the recently formed regional assemblies and LA 21 initiatives to reshuffle the dominant scalar hierarchy of environmental governance. Although the most recent planning green paper (DTLR 2001b) promises to make effective regional governance a reality, its success will depend more upon the political will to dismantle the existing dominant scales of governance, than the will to empower a new one.

These issues are being grappled with at a number of levels, and across a variety of academic fields, from environmental policy studies and environmental science to geography and political and economic science. A scale-based critique offers the opportunity to identify common ground and achieve dialogue between positions that are all too often over-

simplistically characterised as ‘scientific’ and ‘political’. This critique has shown that reducing socio-environmental issues to the perceived panacea of the local level, or more dangerously still, claiming that they can be articulated at an apolitical scale, conceals rather than clarifies the relations between governance and environment. By refuting these categories at the outset, political ecology has offered a powerful and coherent analysis of how the environment inheres in systems of governance, and systems of governance inhere in the environment. Tempering the bias of current political action towards rationalist-scientific environmental solutions, by insisting upon more, not less, political engagement with the dominant scalar fix of Neoliberal capitalist processes represents a worthy challenge to theorists of contemporary environmental transformation in the Twenty First Century.

Appendices

Appendix 1 Interviewing Schedule

Preliminary interviewing was conducted between February and April 2000, in order to develop the research framework. Research interviews were carried out from October 2000 until May 2001. Three 'follow-up' interviews were conducted between July and September 2001. The interviews are listed in temporal order.

Key

Job: given by the interviewee

Employer: given by the interviewee

Research element: contribution to policy analysis, and LBAP, BUHP or planning case studies

Interview: date / duration (mins.) / recording method (TR= tape recorded, N= noted, P=noted after) / style of interview (F=formal, IF=informal) / * from transcript provided by Mike Hopkins and Nick Morton

<i>Job</i>	<i>Employer</i>	<i>Research Element</i>	<i>Interview</i>
Ecologist	University of Birmingham	BUHP	03/00 30 / N / F
Ecologist	Birmingham and Black Country Wildlife Trust, Consultant to Councils	Policy LBAP Planning	3/3/00 120 / TR / F
Strategic Conservation Planner	Birmingham City Council	LBAP BUHP Planning	8/11/00 60 / TR / F
LA 21 Coordinator	Government Office West Midlands	Policy LBAP	14/11/00 90 / TR / F
Local BAP Advisor	English Nature	Policy	20/11/00 60 / TR / F
Biodiversity Policy Coordinator	U.K. Biodiversity Group	Policy	29 /11/00 70 / TR / F
Director	West Midlands Environment Network	Policy	6/12/00 70 / TR / IF

Director	Birmingham and Black Country Wildlife Trust	LBAP	7/12/00
		BUHP	80 / TR / F
		Planning	
Strategic Economist	Birmingham City Council	Planning	11/12/00
			60 / TR / F
Planning Executive	Advantage West Midlands	Planning	11/12/00
			60 / TR / F
Director and Chief Executive	Environment and Business Communications	Planning	5/1/01
			90 / TR / F
Derelict Land Specialist	Advantage West Midlands	Planning	10/1/01
			75 / TR / F
Regional Director for West Midlands	Wildlife Trust	Policy	11/1/01
		BUHP	70 / TR / F
		Planning	
Biodiversity Information System Manager	Joint Nature Conservancy Council	Policy	17/1/01
			80 / TR / F
Urban Advisor	English Nature	Policy	17/1/01
			150 / TR / F
MP for Selly Oak	Government	Planning	27/1/01
			30 / TR / F
Councillor	Birmingham City Council	Planning	5/2/01
			60 / TR / F
Local Conservationist	N/A	Planning	16/2/01
			150 / N / IF
Planning Consultant	ECOTEC	Planning	20/2/01
			70 / TR / F
Director	Robert Turley Associates	Planning	21/2/01
	Town Planning Consultants, Birmingham		120 / TR / F
Ecologist	WT, Staffordshire County Council	LBAP	22/2/01
			80 / TR / F
Environmental Biologist	Chris Betts Ecological Consultancy	Planning	23/2/01
			20 / P / IF
Ecological Consultant	Landscape Science Consultancy	Planning	9/3/01
			120 / TR / F
Freelance Ecologist	Government Office West Midlands	LBAP	12/3/01
			90 / TR / F
Ecologist	University of Wolverhampton	LBAP	13/3/01
		BUHP	90 / TR / F
		Planning	
Ecologist	University of Birmingham	LBAP	27/3/01
		BUHP	30 / TR / F
Ecologist	CEH	BUHP	5/4/01
			30 / P / IF
President	Urban Wildlife Partnership	BUHP	5/4/01
			20 / P / IF
URGENT West	CEH	BUHP	6/4/01

Midlands Coordinator Ecologist	CEH	BUHP	10 / P / IF 6/4/01 10 / P / IF
Local Authorities Advisor	DETR	Planning	6/4/01 10 / P / IF
Environmental Manager	Babtie	BUHP	1/5/01 15 / N / F
Local Entomologist	N/A	LBAP	2/5/01 120 / TR / F
Strategic Conservation Planner	Dudley MBC	LBAP Planning	9/5/01 120 / TR / F
Nature Conservation Officer	Walsall MBC	LBAP Planning	10/5/01 90 / TR / F
Parks and Reserves Manager	Wolverhampton City Council	LBAP	15/5/01 30 / N / IF
Strategic Conservation Planner	Wolverhampton City Council	LBAP Planning	16/5/01 120 / TR / F
Town Planning Consultant	Robert Turley Associates Town Planning Consultants	Planning	18/5/01 60 / TR / F
Planning Specialist	Birmingham and Black Country WT	Planning	12/6/01 150 / TR / F
Planning Specialist	Birmingham and Black Country WT	Planning	14/6/01 30 / N / IF
Countryside Ranger	Sandwell MBC	Planning	22/6/01 70 / TR / F
Ecologist	University of Birmingham	Planning	29/6/01 20 / P / IF
Principal Ecologist	Birmingham and Black Country WT	Planning	16/7/01 105 / TR / F
Nature Conservation Officer	Birmingham LA	LBAP Planning	11/1/02 TR / F*
Planning Officer	Birmingham LPA	LBAP Planning	2/02 TR/F*

Appendix 2 Linguistic Analysis Tools

1. Macro-linguistic analysis

<i>Feature</i>	<i>Description</i>
Interdiscursivity	Genre, activity type, style, discourse
Layout	N/A
Narration	Central (motivational/authoritative/substantive warrants), peripheral (style/persuasion/rhetoricism)
Presentation	Staging, perspectivisation, assumed reader knowledge
Derivation	Presupposition or inference

Source: Fairclough 1992; 1995; 1997

2. Micro-linguistic analysis

<i>Feature</i>	<i>Description</i>
Cohesion	Functional relations, surface markers, reference, conjunction, ellipsis, lexical substitution, coordination/subordination.
Grammar	Transitivity (active/passive, positive/negative), theme, agency (nominalization, pronouns, anaphora), process representation (SVOCA structure)
Modality	Declarative, imperative, grammatical
Vocabulary	Classification schemes, contested words, relational value, expressive value, rewording/overwording, deixis (person/place/time), specialist lexical items
Metaphor	N/A

Source: Van Dijk 1985; Renkema 1993

Appendix 3 Edward Wilson: Biodiversity and the Limits-to-Growth Revisited

The conservation biologist Edward Wilson is best known for establishing and developing the term BioDiversity on the global stage. In 1996, Wilson was included in Time magazine's list of the twenty-five most influential people in America. Wilson has published regularly at the highest profile, and his corpus acts as a compass for the wider conceptual concerns of ecologists and biologists in the 1970s, which ultimately fed through conservation biology into the concept of biodiversity. By tracing continuities through his work, it is possible to clarify the axiomatic scaffolding that was used to build the discourse of biodiversity. In particular, this discussion clarifies the relations between the scientific notions of equilibrium, and the cultural bias towards rural or wilderness landscapes that structures the political ecology of urban biodiversity, by considering how Wilson translated the Neo-Malthusian limits-to-growth discourse from specific biological studies into an ethical basis for our relations to the world.

Wilson's conception of biodiversity can be seen as a microcosm of his life's work trying to conceptualise society's relation to nature. The seeds of his views of society can be traced to a research background studying insect societies, receiving his Ph.D. on the behaviour of social insects from Harvard in 1961, and writing *The Insect Societies* in 1971. This work led Wilson to hypothesise that biology could provide clues as to how human societies should behave. Wilson used the term socio-biology to describe a project that could derive ethics from science, defined as, 'the systematic study of the biological basis of all social behaviour' (1975, p.4). Socio-biology claims that all social phenomena can be explained by the range of thoughts and emotions that are physiologically possible within the hypothalamic-limbic complexes of the brain; a set of possibilities directly determined by natural evolution. The majority of the book is concerned with explanations of human behavioural traits in terms of apparently analogous examples taken from other social species. The conclusion of this line of reasoning is that,

The transition from purely phenomenological to fundamental theory in sociology must await a full neural explanation of the human brain (1975, p.574).

Wilson argues that the fruits of the search for natural laws governing human behaviour will allow us to decide,

Which of the censors and motivators should be obeyed and which ones might better be curtailed or sublimated...Only hard-won empirical knowledge of our biological nature will allow us to make optimum choices among the competing criteria of progress (1978a, p.6-7).

The problem of positing science as the ultimate guide to behaviour is soon demonstrated by the reversal that appears in the preface to *Life on Earth*,

The goal of a good liberal education is...to know what science is, to understand how active scientists think and how discoveries are made, and then to be able to separate the sound and useful from the shoddy and untrue (1978b, Preface).

Wilson's conceptual schema fails to avoid the impasse between realism (the false promise of scientific objectivity) and constructionism (drifting social values) discussed in Chapter Two. Consider the penultimate chapter of *Life on Earth*,

Restoring the equilibrium of the Earth is a worldwide problem. Mankind [*sic*] as a whole will be required to act with a degree of co-operation and altruism hereto fore more characteristic of insect than of human societies (1978a, p.770).

Wilson uses conclusions from insect sociology to prescribe human action. The prediction in the final chapter, based on Hardin's (1968) famed zero-sum lifeboat hypothesis, that there will be a social shift in attitudes to save the Earth is inset with a photo of a graffitied wall bearing the caption, 'children's reaction to the squalid anonymity of life in urban slums'. A mechanistic view of nature comes through strongly in the book's mixture of reductionistic scientific measurement, Neo-Malthusian comment, and emphasis upon the management of productivity. But the Malthusian discourse, implying a whole cosmology based upon resources, limits, and equilibrium, undergoes a key conceptual transformation. Wilson places environmental limits in our brains when he claims the 'limits-to-growth' idea is part of our physiology, an inbuilt behavioural limit (Wilson and Bosser 1971).

Even in its weakest form, the doctrine of socio-biology depends upon the evolutionary process to justify its prescriptions. However, the evolutionary process is itself random, multiple and dependent upon the gene pool itself. There is thus no reason to believe that optimum adaptation occurs. Furthermore, socio-biology conflates the physical objects of evolution (organisms), with their resultant individual and social behavioural traits (Lewontin 1979). This blunt biological determinism caused anti-racist protesters to tip a bucket of water over him at a conference in the aftermath of the release of *Sociobiology*. However, the highly publicised politics of Wilson's project (Crusio 1995; Lewontin 1995) are secondary to the aims of this discussion. The important point is the conceptual continuity: despite having changed tack to the 'more acceptable domain of species conservation' (Lewontin and Levins 1999, p.128), the idea of natural limits inhered in his work.

Biophilia (Wilson 1984) was written at the time when conservation biology was becoming widely recognised within the academy (Ehrlich and Ehrlich 1981; Myers 1983), and represents the transformation of Wilson's biological determinism into a paradigm of global environmental conservation. Despite switching discursive registers, Wilson's ethic of biophilia is built upon the same extension of biological mechanism to social mechanism as was his broader concept of socio-biology. As Takacs states,

Wilson's biophilia hypothesis presents love of nature as a universal biological adaptation of humans, selected during the course of evolution...by ignoring our own biophilia, we simultaneously endanger our psyches and imperil the Earth (1996, p.218).

Wilson argues that the widespread adoption of a bioethic called biophilia is necessary for our continued existence, claiming that the affiliation between humans and all life is, 'a deep and complicated process in mental development...our existence depends on this prosperity' (Wilson 1984, Prologue). The book is written in a decidedly emotive fashion, conjuring up pictures of Amazonian sunsets over pristine rainforests, replete with tribal women carrying out their simple duties in the foreground. The wilderness ideal represents the discursive flipside of Wilson's survivalist argument. Both discourses rest upon an assumption that modern human interaction, in extending beyond environment limits, is harmful, but are

polarised into the utopia of wilderness and the dystopia of overpopulation (Oeschlager 1991; Cronon 1995).

Four years later Wilson (1992) wrote *The Diversity of Life*, an emotive tome informed by scientific anecdotes advocating the intrinsic worth of biodiversity. Wilson explicitly separates life from nature in the book's first section titled 'Violent Nature/ Resilient Life', suggesting solidarity between all forms of life in the face of nature, and this split underpins the ideology of the entire book. It also implies that biodiversity as we now encounter it has 'progressed', distinguishable from the blind forces of nature by some the internal telos of evolution that Wilson invokes but never clarifies. The identification of evolution as the wellspring of biodiversity, and the basis for the physiological appreciation of the inherent value of diverse life forms, fails to fully constitute this telos, as the criticism remains that evolution is a random, blind force and so cannot constitute a valid guide to social behaviour (Lewontin 1979).

Wilson's subscription to the evolutionary determinism of the New Synthesis between Darwinian theory and Mendelian genetics (Dawkins 1978; Descola and Palsson 1996), emphasised in *The Diversity of Life* by his separation of nature from life, increasingly contradicts the facts of biology (Lewontin 1983). Newtonian notions of mechanistic evolution are being rejected for more interactive paradigms of co-evolution, in which the organism plays the subject rather than object of evolution (Ho and Fox 1988). The split between the dynamic uncontrollable forces of nature and static natural communities that this mechanistic version of evolution entails brings Wilson's belief in biological stability to the centre of his argument, as the privileging of stability allows Wilson to ground his conservation ethic in the preservation of diversity.

Wilson's ethic of conservation owes more to an underlying discourse of natural limits to growth than any real biological mechanism. His latest book, *The Consilience of Knowledge* (Wilson 1997), revisits the motivation behind socio-biology twenty-five years on, claiming that the functions of the arts and sciences will be one day better performed by genetics. The reductionism of this argument is thinly veiled by a rhetoric of unification, but does provides clues as to the real source of his desire for limits,

Preferring a search for objective reality over revelation is another way of satisfying religious hunger...When we have unified enough certain knowledge, we will understand who we are and why we are here (1997, p.2-3).

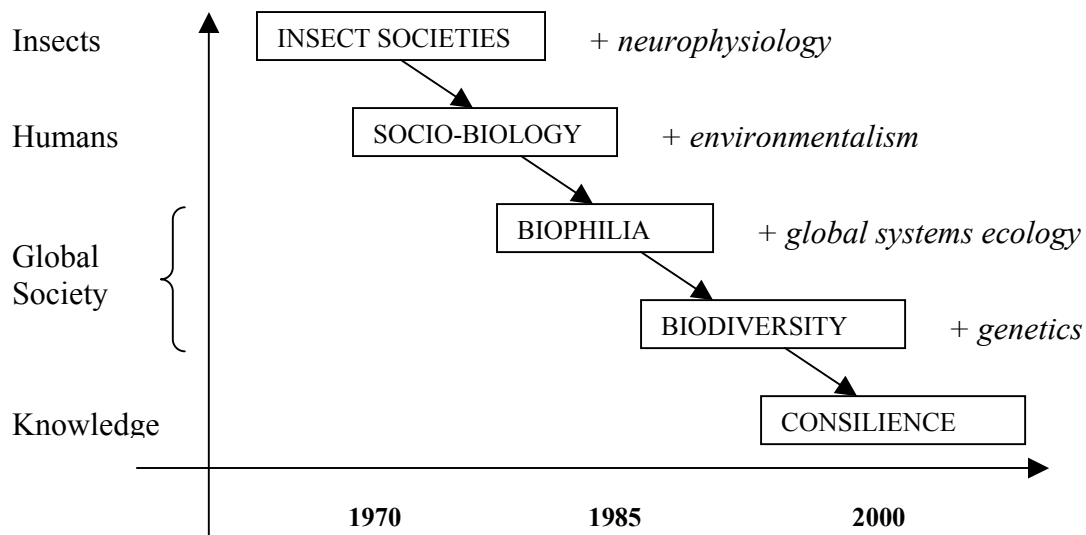
Wilson's own Enlightenment beliefs lead him to posit science as an objective and progressive guide to our actions, and biophilia as an inherent ethic flowing from this. The taken-for-granted inherent value of biodiversity can be construed in terms of a Lacanian lack (Molino 1998), residing at the heart of the scientific impetus to recover pure objectivity, with the pseudo-religious / paradise lost overtones paralleling the environment-as-resource-as-scarcity argument (Takacs 1996). The inherent appeal of biophilia as a pseudo-spiritual ethic, nourished by Wilson's own Baptist up-bringing (Gates 2001), secures the sacredness of biodiversity precisely because it derives from the same longing.

The 'limits-to-growth' metaphor is thus continually extended through Wilson's work, initially from descriptions of insect societies into the basis for individual behaviour with the neurophysiological concept of socio-biology, and then into the global ethical basis for our relations to nature of biophilia and biodiversity through engagement with environmental and ecological sensibilities, and most recently through a renewed genetic reductionism into a psycho-spiritual discourse of revelation and self-completion (Figure I).

It must remain a moot point whether this historical passage is best interpreted as a progression, re-presentation, manipulation or transformation. What can be said is that Wilson's work provides a neat progression through the central concepts of biology and ecology that gestated in the womb of wider environmental cultural consciousness since the 1960s. This genealogical analysis of biodiversity thus indicates a fundamental continuity with traditional dualistic conceptions of society's relationship to nature, both in terms of its scientific underpinning and its ethic (aesthetic) of biophilia. The dual cultural and scientific basis of biodiversity explains how the term's emotive appeal can be used to generate public awareness and funding for conservation, while simultaneously being incorporated into the political juggernaut of sustainable development, and the global economic status quo.

Figure I: Wilson's *telos* as the limits to growth

Limits to...



Resonating with Marxist critiques of evolutionary determinism, this factor militates against biodiversity being capable of providing the basis for the radical reformulation of a more sustainable form of conservation. Drawing on the idea of scale and legitimacy outlined in Chapter Nine, the reduction of our relations to the environment to the genetic level removes any meaningful political consideration at the human scale. As the CBD shows, this does not result in an apolitical biodiversity, but rather permits the dominant underlying scale of power to become dominant- in this case the interests of trans-national corporate interests, and national capitalist reproduction. Any meaningful relation to our global environment requires more, not less, political engagement and legitimisation: a spectre that is ever-receding as global bodies such as the UN and WTO increasingly become the mouth-pieces for a small set of nations with relatively coherent capitalistic interests.

Appendix 4 Sections of the CBD Classified by Principal Concern

Article	Content
Article 1. Objectives	Protocol
Article 2. Use of Terms	Protocol
Article 3. Principle	Sustainable Development
Article 4. Jurisdictional Scope	Legal
Article 5. Cooperation	Sustainable Development
Article 6. General Measures for Conservation and Sustainable Use	Conservation
Article 7. Identification and Monitoring	Conservation
Article 8. In-situ Conservation	Conservation
Article 9. Ex-situ Conservation	Conservation
Article 10. Sustainable Use of Components of Biological Diversity	Sustainable Development
Article 11. Incentive Measures	Politico-economic
Article 12. Research and Training	Politico-economic
Article 13. Public Education and Awareness	Sustainable Development
Article 14. Impact Assessment and Minimizing Adverse Impacts	Politico-economic
Article 15. Access to Genetic Resources	Politico-economic
Article 16. Access to and Transfer of technology	Politico-economic
Article 17. Exchange of Information	Politico-economic
Article 18. Technical and Scientific Cooperation	Politico-economic
Article 19. Handling of Biotechnology and Distribution of its Benefits	Politico-economic
Article 20. Financial Resources	Politico-economic
Article	Classification
Article 21. Financial Mechanism	Legal
Article 22. Relationship with Other International Conventions	Conservation / Politico-economic
Article 23. Conference of the Parties	Protocol
Article 24. Secretariat	Protocol
Article 25. Subsidiary Body on Scientific, Technical and Technological Advice	Conservation
Article 26. Reports	Protocol
Article 27. Settlement of Disputes	Legal
Article 28. Adoption of Protocols	Protocol
Article 29. Amendment of the Convention or Protocols	Protocol
Article 30. Adoption and Amendment of Annexes	Protocol
Article 31. Right to Vote	Protocol
Article 32. Relationship between this Convention and Its Protocols	Protocol
Article 33. Signature	Legal

Article 34. Ratification, Acceptance or Approval	Legal
Article 35. Accession	Legal
Article 36. Entry Into Force	Legal
Article 37. Reservations	Legal
Article 38. Withdrawals	Legal
Article 39. Financial Interim Arrangements	Politico-economic
Article 40. Secretariat Interim Arrangements	Conservation
Article 41. Depositary	Protocol
Article 42. Authentic texts	Protocol
Annex I. Identification and Monitoring	Conservation
Annex II - Part 1. Arbitration	Legal
Annex II - Part 2. Conciliation	Legal

Source: CBD Secretariat 2002

Appendix 5 The Birmingham and Black Country BAP Deadwood HAP

Deadwood Habitats

1. Current Status of the Habitat

All trees, including ornamental trees, are potential sources of dead wood, whether they be in recognised woodlands, or as single specimens in parks, gardens, hedgerows, and avenues in towns. Occasionally, rare invertebrate species are found associated with individual trees well isolated from large woodlands. Nevertheless, from the biodiversity point of view, it is areas of woodland that offer the most important targets for conservation.

In the Birmingham and Black Country area, such areas can be found in:

Nature Reserves (all under the control of local authorities)

Parks (also under the control of local authorities)

Private Estates

Plantations

There are a number of groups of species associated with the deadwood habitat, some are nationally and/or locally rare.

Fungi

Fungus spores, carried in the air, are deposited on the wood. If they land on a suitable spot they will germinate and send hyphae into the wood, gradually softening it and breaking it down. Under suitable conditions, as yet not fully understood, fruiting bodies are produced which spread spores to new substrates. The fruiting bodies are the visible signs of fungal activity, but the mycelium, in the form of fine thread like strands through the deadwood, is always there, carrying out the decomposition of the wood.

As the wood is broken down, suitable habitats are provided for invertebrates and their larvae. The fruiting bodies of the fungi themselves also provide habitats for some specialised invertebrates, which may lay their eggs on or in the fungus, or "graze" on the spore-bearing surface. The fruiting bodies of the majority of deadwood inhabiting fungi are rather small or insignificant (microfungi), but many are much larger and appear in the form of toadstools or brackets (macrofungi).

Invertebrates

Invertebrates dependent on dead wood at some stage of their life cycle include species of worms, snails, copepods, millipedes, centipedes, pseudoscorpions, spiders, mites and numerous insects. Many other groups of invertebrates, such as woodlice (Isopoda), are common inhabitants of deadwood, but also thrive in other habitats.

Many of the flying insects involved (e.g. hoverflies) spend their immature stages (egg, larva, pupa) in deadwood, but their adult stages (those familiar to non-naturalists) are found in a wide variety of habitats (e.g. at flowers).

This document addresses primarily invertebrates and fungi, which are relatively well known - even if poorly recorded, but it must be recognised that there are numerous representatives of other groups which are dependent on the dead or dying wood environment and which contribute to the overall biodiversity of the habitat. These include viruses, bacteria, mosses & liverworts (Bryophytes), algae, ferns & horsetails (Pteridophytes) and others.

Some vertebrates are also dependent or largely dependent on the presence of dead wood for survival. These include woodpeckers, which are predaceous on insect dead wood insect larvae, willow tits, tawny owls, nuthatches and several species of bats (particularly the noctule bat) which rely on cavities in tree trunks for nesting or roosting.

Table 1.1 in the [Technical Appendix](#), derived from the data sources listed in Appeddix C, shows the approximate numbers of species of invertebrates and fungi recorded in Birmingham and the Black Country (B&BC). A total of over 1,100 species believed to be associated with dead wood have so far been recorded, but this is likely to be a significant underestimate of the true total, since many groups are poorly known and under-recorded. Appendix C contains a table summarising the conservation status of the dead wood invertebrates.

[Technical Appendix](#) for an in depth discussion of deadwood habitats and species numbers

1.2 Associated action plans

[Woodland](#), [Gardens / allotments / parks and open spaces](#), [Hedgerow Species & Habitat Management](#)

2.1 Environmental Factors and Threats

2.1 The primary factor affecting the dead wood habitat is lack of appreciation of its importance by decision makers, woodland managers/workers and the general public. Mature and ageing trees are often felled and removed, and fallen/cut dead wood cleared away, without understanding of the magnitude of the impact that this has on the wildlife in the area. The increasing use of chainsaws, chippers and particularly stump-grinders has greatly impoverished the habitat.

2.2 A great deal has been written about the value of dead wood habitat and its management and many excellent references are available, but the existence of these is very poorly known. The information and advice contained in them is largely ignored.

2.3 Traditional woodland management strategies which have historically helped to maintain a wide range of tree maturity, such as pollarding, have largely fallen into disuse.

2.4 Obligations relating to ensuring public safety/security are often translated into felling whole mature trees containing dead wood or clearing away fallen/cut wood while more appropriate alternative strategies, avoiding such radical destruction, are not considered. Typical perceived sources of risk given include:

Danger from falling branches/trunks,

Log piles and dead wood are seen as an arson risk or as potential tools of crime,

Log piles and undergrowth/bushes growing around them are seen as shelter for undesirable loiterers.

Fallen or felled wood, particularly in public places and parkland is constantly being cleared away in the name of 'tidiness' instead of the being left lying/stacked on site. Options of stacking it nearby or neighbouring sites are often not considered.

Dead trees or those containing dead wood are viewed as diseased and (in most cases totally incorrectly) as a risk by infection to the adjacent woodland and are often unnecessarily removed.

2.5 Vandalism in the form of arson or unauthorised removal of wood (e.g. gathering of firewood) can also seriously reduce the supply of dead wood in some urban areas.

Existing woodland, with its complement of dead wood habitat is constantly under pressure. Any woodland clearance, whether for building, agriculture or recreation has a corresponding impact on the fragile dead wood habitat.

2.6 Fragmentation of habitat arising from factors described above ultimately leads to splitting of colonies of dead wood species into smaller and smaller units which ultimately cease to be viable and die out, reducing overall biodiversity.

3.1 Legal status

Dead wood as such is not subject to any specific legal protection, although woodland and individual trees are protected by a number of statutes. The latter are fully described in the [Woodland BAP](#) and will not be repeated here.

Some species of birds and bats which utilise trees as roosts or nesting places are protected under the Wildlife & Countryside Act. This act also gives some protection to their place of shelter.

SLINCs, SINCS and SSSIs. LNRs

3.2 Management, research and guidance

3.2.1 There is currently no co-ordinated action in relation to preservation and creation of deadwood habitat in the area, although there are some significant ongoing efforts in individual Nature Reserves.

3.2.2 The **EcoRecord** database, maintained by the Wildlife Trust for Birmingham & the Black Country, provides an account of the number deadwood invertebrate species present and is helpful in providing statistics like those given above, but many groups remain relatively poorly recorded in the B&BC area.

3.3.3 A survey of the flora and fauna of Sutton Park has recently been completed and its results will shortly be published. Preliminary data for that survey have been taken into account in the tables presented above.

3.3.4 The Warwickshire Recording scheme also maintains records pertinent to the Birmingham & Black Country area. It has a particularly strong record of fungi. This BAP seeks to maintain and expand the biodiversity of existing dead wood community, particularly the invertebrates and fungi, within the Birmingham and Black Country area by conserving the deadwood resource present.

3.3.5 Although some changes in management practice may result, requiring retraining of staff and modification of contracts, it is not expected that these will lead to substantially higher operating costs. Indeed, it may even be possible to achieve cost savings in some areas by discontinuing certain practices considered detrimental to deadwood wildlife. These savings could be used to offset additional costs in other areas.

3.3.6 The conservation of more dead wood in-situ will have spin-off environmental advantages (e.g. reduction in transport fuel usage, reduction in landfill requirement, reduction in burning).

3.3.7 Trees located in private gardens represent another significant dead wood resource. The public awareness campaign will also encourage conservation and development of that resource.

4. Objectives

OBJECTIVE	TARGET
1. To prevent further reduction in diversity of current deadwood further erosion of the habitat, particularly unnecessary felling of trees or removal of dead wood.	Ongoing
2. To promote management of woodland in such a way as to achieve a steady increase in the short and long term quantity and quality of the deadwood habitat.	Ongoing
3. To ensure that dead wood habitat value is fully taken into account with other wildlife conservation aspects when planning proposals are under consideration	Ongoing
4. To accord special recognition/protection to specific areas or individual trees known to harbour colonies of particular rare or endangered species	2002
5. The production of guidance/management strategies and the dissemination of information to woodland managers, their employees and contractors.	2006
6. A public awareness campaign to ensure public understanding of, and co-operation with, the implementation of the BAP objectives.	2002

5. Actions

ACTION	Potential deliverers		YEARS (from 2000)								Meets objective no.
	Lead	Partner	01	02	03	04	05	06	11		
5.1 Policy and legislation											
Seek the inclusion of effective measures for protection of veteran trees and ancient woodland in LA Unitary Development Plans	LAs	EN, WT	X	X						3	
Develop a Policy/Guideline document for management of deadwood on all LA owned/managed land, particularly the recognition and handling of potentially hazardous trees/timber (see Appendix A for suggestions as to content).	LAs, Local experts	EN, NT, FC, WT	X	X						1,2,5	
Set up a framework for protection of 'special' trees and small sites harbouring rare/endangered species on both public land - similar to tree protection orders in relation to private land. Establish a consultation and approval procedure for adding trees to protected list or performing any work which might effect the integrity of the habitat/welfare of the species involved (see item 5.2).	LA	WT	X	X						4	

Review content of all documents relating to woodland management current utilised by local authorities or issued to the public to ensure that they properly take into the account the important wildlife conservation value of dead wood	FC, LAs		X	X						2,5,6
5.2 Site safeguard and management										
Set up register of particularly important individual trees or groups of trees (e.g. trees harbouring particular rare species, veteran trees, trees representing remnants of particularly rare habitat), preferably in conjunction with register of ancient/veteran trees proposed in Woodland BAP	WT	FC, Site managers Specialists, EN, LAs, LO	X	X	X	X				4
Make an inventory of existing pollards on each site and prepare/execute a program for pollard maintenance for those trees, encouraging pollarding in private woodland taking advantage of any currently available or future grant aid schemes.	EN, FC	LA, LO, WT, ER, BTCV	X	X	X	X				1,2
Establish a program of information and education to include seminars on the importance of the deadwood habitat for public employees/contractors involved in woodland,	LAs, WT	EN, FC	X	X	X	X	X	X	X	1,2

parks and nature reserve mamagement/operations.										
No individual species protection plans are considered appropriate at this stage, but may be considered at a later date as more information about the local fungi and invertebrate populations becomes available.			As appropriate in the future							
5.3 Advice										
A recommended reference list should be prepared covering the more important publications relating to the deadwood environment and its wildlife/conservation. The most important and relevant references should be made available to LA departments involved with woodland management. Local libraries should be encouraged to keep copies for public use.	BAP Committee	WT, National experts	X							1,2,5,6
Preparation of a leaflet about the deadwood habitat BAP, for private landowners, who should be encouraged to co-operate with implementation of its recommendations, and for the public.	LAs, WT	LO	X	X	X	X	X	X	X	1,2,5,6
5.4 Future research and monitoring										
Encourage recording in mature woodland, so that a more complete picture of the true fauna and flora can be	WT, ER	Land managers, LCG	X	X	X	X	X	X	X	1,2,4

established. It is likely that many species present have yet to be recorded, and these may include a number of species currently considered endangered at a national level. When such species are encountered, special plans should be made to safeguard the particular habitat where they are found.											
5.5 Communications and publicity											
Raise public awareness by means of a major publicity initiative, carried out on a national scale. Lobby national TV station to show a program or series.	EN	Media	X	X	X	X	X	X	X	X	6
Encourage schools and local wildlife centres to include the habitat in their Natural History training/ education.	LAs	WT	X	X	X	X	X	X	X	X	6
Locally, prepare a leaflet on the deadwood habitat. Encourage the relevant national organisations to produce similar leaflets which could be and distributed on a wider (e.g. national) level as well as within the B&BC area.	WT, EN, FC, NT, WT	ALL	X	X							6
5.6 Links to other action plans											
Woodland , particularly conservation of Ancient & Veteran trees, gardens, allotments, parks and open space , hedgerows											

This Biodiversity Action Plan will be implemented over 10 years with a first review after 5 years. A group will be set up to co-ordinate implementation and to report to the Biodiversity Steering Group. This group will meet at a minimum on a yearly basis.

Review will be carried out in conjunction with related Habitat and Species Action Plans as appropriate.

Review will consist of measuring achievement of targets. The group will, with the support of the Steering Group, develop and implement appropriate monitoring methods which will inform the review process.

The Action Plan will be revised and updated in the light of review results and any relevant changes in circumstances and/or additional information which becomes available during the review period.

In line with national guidance, the Steering Group will report to the UK Steering Group.

Biodiversity Action Plan for Birmingham and the Black Country © 2000

Printing of this publication for educational purposes is permitted, provided that copies are not made or distributed for commercial gain, and the title of the publication and its date appear.

Source: Birmingham and Black Country BAP Steering Group 2000

Appendix 6 The Birmingham and Black Country BAP Urban Wasteland HAP

Urban "Wasteland"

1. Current Status

1.1 Wasteland habitat is unmanaged land characterised by vegetation in the early stages of succession, from a thin covering of pioneer plant species through to dense swards of tall herbs with the occasional shrub or small tree. The term 'wasteland' has many negative connotations, implying land of no intrinsic ecological, environmental, social or economic value; land which is expendable; and land which may represent a visual intrusion into an ordered landscape. It is often associated with dereliction, dumping and danger. In terms of actual biodiversity, however, and with regard to its potential as a 'social positive', these are areas of importance in the urban landscape.

1.2 Wasteland is particularly associated with inner city areas, though it is found in all but the most affluent parts of a town, and includes unused or vacant land such as areas of former industrial or mining land; abandoned factories and other large building areas such as demolished houses; and former railway land such as sidings and disused trackways. These are areas generally ranging from 0.1 to 10 ha in size that have essentially been left to nature.

1.3 This kind of wasteland often represents a temporary land use since many such areas are scheduled to be re-developed for other uses. Where there is no change in land use wasteland will often develop through succession into other habitat types, e.g. grassland, scrub and woodland.

1.4 Wasteland can also include corridor habitat such as cuttings and embankments associated with railway tracks and some urban roadsides.

1.5 With the abandonment of a former land-use, some urban sites are given a minimum topsoil treatment and sown as amenity grassland but then neglected. Plant succession may then lead to a habitat similar to spontaneously-colonised sites.

1.6 Wasteland is found on such a wide range of substrates and soils (see Section 2) that it is impossible to characterise the vegetation except in the most general of terms. Plants may colonise newly-created wasteland by dispersing from similar sites elsewhere; they not infrequently arrive as propagules in dumped soil; and they may germinate from the seed bank associated with previous land uses. Bare substrate is not uncommon, and there tends to be an abundance of pioneer lichens and mosses, annual and biennial plants (often of an ephemeral nature), and garden escapes.

1.7 Invertebrate life can be abundant and species-rich. Common invertebrates in the early stages of succession include ground predators such as spiders, harvestmen and beetles, as well as lepidopteran visitors to nectar-producing flowers. As the site ages, earthworms and other soil-dwelling invertebrates become commoner, the former in particular enhancing soil

development. A few vertebrates may use these areas for breeding, especially where size and isolation permit. It is for feeding, however, that wasteland habitats are perhaps most important for birds and mammals.

1.8 Because wasteland may be found on post-industrial sites with substrates providing environments that are uncharacteristic for towns, biodiversity is often quantitatively increased and qualitatively enhanced by the addition of rare and unusual floral and faunal elements.

1.9 Many wasteland sites are eyesores that attract public abuse such as fly-tipping and bonfires. Nevertheless they have an intrinsic value to local and regional biodiversity and conservation, and with low levels of care many could be turned into sites of importance for local communities.

1.10 To avoid the pejorative term 'wasteland', Oliver Gilbert has proposed that such areas be termed 'urban commons'.

2. Current Factors Affecting Habitat

2.1 Environmental factors

2.1.1 Air pollution. Urban areas are subjected to various forms of atmospheric pollution, including particulate pollution, but this is of little consequence to the wasteland flora or fauna, even on sites adjacent to busy highways.

2.1.2 Previous and adjacent land use. Previous land use is particularly important in determining the substrate. Soil already present will contain a seed bank and will facilitate colonisation from outside. If an available flora is adjacent or close to a newly-available site the speed of colonisation and the range of potential colonisers becomes greater. Inhospitable adjacent habitat, including highways, may prevent or reduce the opportunities for colonisation by non-flying animals.

2.1.3 Substrate, topography and drainage. After demolition of buildings, sites are typically graded as a slightly domed area of rubble set into a matrix of fine material which is dominated by lime-based mortar which leads to circumneutral to alkaline soils, pH values typically being 6.5-8.0. Such sites are generally free-draining, well-aerated and low in organic matter. Fertility will vary. Substrates are often high in phosphorus but low in available nitrogen. Substrates based on previously industrial land can also be alkaline, for example over slag, but acid conditions are also common, and these differences will be reflected in the flora and vegetation. Post-industrial sites may also be heavily polluted, especially by heavy metals, and the flora will be limited to pre-adapted pollution-tolerant species and varieties. Many post-industrial sites have a varied microtopography which in turn varies in permeability. A common result is of a patchwork of different plant communities on mounds, in permeable depressions, and in impermeable dips in the surface.

2.1.4 Available flora. This is extremely variable and depends among other things on the presence of any seed bank, the proximity of similar sites, and habitat corridor effects. Earliest colonisers tend to be wind-pollinated, but plants whose propagules are spread by animals, especially transported internally by birds, soon become common.

2.1.5 Available fauna. Three key factors interact to explain the early stages of colonisation of wasteland habitats: the dispersal ability of particular animal species, the proximity of similar habitats (and any corridor functions), and the habitat-specificity of species. Even mobile taxa such as butterflies and moths move relatively small distances, and ground-dwelling invertebrates such as carabid beetles have even greater problems in colonising new sites, especially when they are habitat specialists. A number of rare and endangered invertebrates require dry (xeric) habitats, and these conditions are often found in wasteland sites. The isolation of these sites, however, poses a problem in species with low dispersal abilities.

2.1.6 Area. Island biogeography theory suggests the importance of area (increasing area by an order of magnitude very approximately doubles the number of species of any particular group found within that site). Larger sites are important species reservoirs and play an important part in enhancing biodiversity in the urban environment. Linear wasteland sites are also important both because they are common in the built environment, especially along transport routes, and because of potential habitat corridor functions.

2.1.7 Time. Many wasteland sites are ephemeral, and redevelopment of some sort takes place within a few years. If succession is allowed to take place, a series of stages can often be discerned:

An initial annual/biennial/short-lived perennial stage, the plants colonising an often bare inorganic substrate containing at best a few small patches where organic detritus or a thin soil is found. Nitrogen-fixing plants increase the amount of available nitrogen. Wind-blown species are characteristic.

After perhaps 3-6 years, as the soil cover becomes greater in extent and depth, and with an increase in organic matter and available nutrients, the vegetation often becomes dominated by tall perennial herbs. Woody species begin to colonise, whether scrambling species such as bramble or small trees, but numbers and cover at this stage remain low.

With time the proportion of grass in the vegetation increases, and after 8-10 years or so tall herb communities may give way to grassland, though a grassland in which some perennial, especially rhizomatous plants may persist, as well as woody species, and as more and more woody plants enter the tall herb or grassland community, these may eventually be replaced by scrub woodland.

2.2 Threats.

2.2.1 Changes in land use. Many wasteland sites are subject to a change of land use within a few years of their creation. As former wasteland is developed, however, so - generally speaking - new wasteland sites are being created elsewhere. As long as the rate of habitat creation more or less equals the rate of habitat destruction, and as long as the habitat characteristics of such sites remains more or less equivalent this may pose no problem. Indeed it may be a fortuitous means of retaining a series of habitat patches in early stages of succession within the region as a whole.

2.2.2 Brownfield site development. Nevertheless brownfield site development poses a threat to wasteland habitats, especially in the light of current government policy for urban regeneration through which the rate of destruction of wasteland will probably not be offset by the provision of new equivalents. Brownfield sites are often of equivalent or greater wildlife value than intensively-managed greenfield sites.

2.2.3 Habitat fragmentation and isolation. Development not only destroys wasteland sites but further isolates other such sites (as well as other habitats beneficial to biodiversity) and reduces the connectivity of habitat corridors.

2.2.4 Inappropriate regeneration and reclamation. As a tidying process, a number of wasteland sites are landscaped and otherwise managed to 'enhance' their amenity value, but this is often done at the expense of wildlife value. Opportunities to enhance sites for both people and nature are ignored.

2.2.5 Changes in industrial processes. The laissez-faire approach to dumping industrial waste has been halted, and some former waste disposal sites have been decontaminated, but this has led to fewer spoil tips of varying kinds which in the past have been colonised by a suite of often rare and interesting plants and animals. Such sites should be retained where they already exist provided there are no risks of contamination to humans.

2.2.6 Increased fly tipping and vandalism. With the introduction of landfill taxes and other constraints on 'free' domestic, commercial and industrial waste disposal, there has been an increase in the amount of fly tipping on wasteland habitat. Vandalism of many kinds has also affected the habitat quality of such sites.

2.2.7 Public use. The public has free and legal access to many wasteland sites, and many larger areas have become important areas for informal recreation. Sometimes this recreation is damaging to the habitat, for example the use of mountain and motor bikes, but in other cases, for example dog walking, these habitats are important accessible green space. Other sites are not legally accessible but are nevertheless used. They may pose risks to the users, for example on railway-owned land, and they are sometimes refuges for those participating in illegal or antisocial activities. Such uses also pose some threat to the habitats, for instance through the setting of fires.

3. Current Action

3.1 Legal status

3.1.1 Wasteland tends to be owned by the LA, by a national institutional organisation such as Railtrack or British Waterways, or by a private individual or organisation. In all such areas there is generally no right of access, and in some cases access is expressly prohibited. Some LA wasteland is available under statutory provision for travellers.

3.1.2 All sites are subject to national laws on wilful and criminal damage, and to civil law pertaining to trespass, though these are rarely evoked in most urban sites perceived as being derelict.

3.1.3 By their nature, wasteland sites tend not to be included in any SLINC, SINC, LNR, SSSI or other designation, nor are any large trees normally subject to Tree Preservation Orders (TPOs). Some post-industrial sites are exceptions, having been designated LNRs (e.g. Doulton's Claypit in Dudley) or SSSIs (e.g. Clayhanger in Walsall).

3.2 Management, research and guidance

3.2 Management, Research and Guidance

3.2.1 By their nature, wasteland sites are not normally subject to management, though line-of-sight may be maintained for safety on rail track, roadside verges and some canal-side stretches.

3.2.2 Little research has been undertaken on the biota of wasteland sites. A general review is provided in a study of accessible public green space in urban areas by Harrison et al. (1995), and a context for the incorporation of wasteland habitat in planning for nature in Birmingham is given in Jarvis (1996). The Black Country Nature Conservation Strategy (1994) and the Birmingham Nature Conservation Strategy (1997) contain information on the extent of wasteland in the region (in particular using data on habitats characterised by tall herbs) and places this habitat type into a strategic planning context. Work continues on data collection for the Birmingham and Black Country Flora (ed I.C. Trueman), with spatial records accumulating for species that might be used as indicators of wasteland. Part of the URGENT programme being undertaken at the University of Birmingham and University of Wolverhampton includes the examination of the use of urban sites, including wasteland sites, by ground beetles, and the implications of the characteristics of such sites for beetle dispersal, habitat specificity and species richness. Cognate work is being undertaken on butterfly metapopulations and on aspects of the urban flora.

3.2.3 No guidance is currently associated with the provision of accessible public space regarding wasteland habitat. Indeed there is a great deal of pressure being imposed on wasteland habitat as part of the government's proposed development of brownfield sites.

4. Objectives

OBJECTIVE	TARGET
1. Identify wasteland (including brownfield) sites of particular significance or importance to biodiversity by virtue of their biotic content and to ensure as far as practicable their survival.	Ongoing
2. Identify wasteland (including brownfield) sites of particular significance or importance to biodiversity by virtue of their geographical location and therefore their contribution to an appropriate spatial network of green sites, and to ensure as far as practicable their survival.	Ongoing
3. Raise awareness of the importance of wasteland sites to biodiversity via the media, involvement of local schools and community groups, and representation to local councillors.	Ongoing
4. Where appropriate, increase the accessibility of wasteland sites on LA land for public usage, and to seek ways which might formalise such arrangements, including basic maintenance (e.g. mowing of edges), wooden bollards or trip fencing to prevent vehicular access, and provision of litter bins.	Ongoing
5. Provide for and encourage community use, sense of ownership and involvement in appropriate sites in their local area, and instil a sense of ownership	5 such sites by 2010

5. Proposed Actions

ACTION	Potential Deliverers		YEARS							Meets Objective No.
	Lead	Partner	2001	2002	2003	2004	2005	2006	2011	
5.1 Policy and legislation										
Seek the inclusion of appropriate habitat measures in Unitary Development Plans and other policy documents to ensure, where appropriate, that development proposals on 'urban waste land' incorporate features which will enhance a site for wildlife	LAs	WT	X	X	X	X	X	X	X	1, 2
Encourage the proper consideration of present and future potential for wildlife and community use on 'urban waste land' when determining planning applications.	LAs	WT	X	X	X	X	X	X	X	1, 2
5.2 Site and species safeguard and management										
Identification of sites of especial value to biodiversity and/or for which conservation management might be important, e.g. sites on which succession is taking place.	WT	LAs, LO		X	X	X	X	X	X	1, 2
Identification of sites for which basic maintenance might be appropriate	WT	LAs, NNP, NCP		X	X	X	X	X	X	4
Introduction of appropriate maintenance	LAs	NNP, NCP		X	X	X	X	X	X	4
Improve the connecting network between green spaces, and between green spaces and residential areas, paying particular	LA	NCP, WT		X	X	X	X	X	X	4

attention to accessibility.										
5.3 Species management and protection										
Safeguard and manage sites for the protection of any locally, regionally or nationally rare species	LAs	EN, WT		X	X	X	X	X	X	1
Use of EcoRecord to maintain and update records of plants and animals on wasteland sites	ER WT		X	X	X	X	X	X	X	1
5.4 Advisory input to UDPs and other policy documents	1, 2									
Responses to planning applications as appropriate As UDPs and other policy documents are prepared and reviewed	WT,		X	X	X	X	X	X	X	1, 2
5.5 Future research and monitoring										
Continued survey and collation of data	LAs	WT	X	X	X	X	X	X	X	1, 2
Production of GIS material as appropriate	ER	WT, LAs		X	X	X	X	X	X	1,2
5.6 Communications and Publicity										
Raise awareness of the importance of 'waste' sites to wildlife and the community	LAs (LA 21)/ NNP	WT		X	X	X	X	X	X	3
Encourage local communities to identify suitable nearby wasteland sites as community resources by fostering a sense of 'ownership', e.g. by giving the site a name and erecting appropriate signage. Target: one such sites per authority by 2010	LAs, (LA 21)	NNP, NCP		X	X	X	X	X	X	3, 4, 5
Involve schools in appropriate local areas	NNP, NCP	WT, LAs		X	X	X	X	X	X	3
5.7 Links to other action plans										
Ensure coordination with	LAs	WT		X	X	X	X	X	X	1-5

all other habitat and appropriate species action plans										
--	--	--	--	--	--	--	--	--	--	--

This Biodiversity Action Plan will be implemented over 10 years with a first review after 5 years. A group will be set up to co-ordinate implementation and to report to the Biodiversity Steering Group. This group will meet at a minimum on a yearly basis.

Review will be carried out in conjunction with related Habitat and Species Action Plans as appropriate.

Review will consist of measuring achievement of targets. The group will, with the support of the Steering Group, develop and implement appropriate monitoring methods which will inform the review process.

The Action Plan will be revised and updated in the light of review results and any relevant changes in circumstances and/or additional information which becomes available during the review period.

In line with national guidance, the Steering Group will report to the UK Steering Group.

References

Birmingham Nature Conservation Strategy (1997)

Black Country Nature Conservation Strategy (1994)

HARRISON, C. et al. (1995) **Accessible natural greenspace in towns and cities**. English Nature Research Reports, 153

JARVIS, P.J. (1996) **Planning for a green environment in Birmingham**. In: Gerrard, A.J. & Slater, T.R. (ed), *Managing a conurbation: Birmingham and its region* (Brewin, Studley): 90-100

Biodiversity Action Plan for Birmingham and the Black Country © 2000

Printing of this publication for educational purposes is permitted, provided that copies are not made or distributed for commercial gain, and the title of the publication and its date appear.

Source: Birmingham and Black Country BAP Steering Group 2000

Appendix 7 Birmingham and Black Country LBAP HAPs and SAPs Categorised by National / Local Priority

<i>HAP</i>	<i>UKBAP priority habitat status</i>
Arable fields	No
Arable field margins	No
Buildings	No
Canals	No
Deadwood	No
Eutrophic urban ponds	Yes
Gardens, allotments and open space	No
Garden ponds	No
Hedgerows	No
Lowland dry acid grassland	Yes
Lowland neutral and base-rich grassland	Yes
Lowland wet grassland	No
Lowland heathland	No
Rivers and streams	No
Urban wasteland	No
Woodland	No
<i>SAP</i>	<i>SoCC list status</i>
Amphibians	Yes
Badgers	Yes
Bats	Yes
Black redstart	Yes
Bluebell	Yes
Brown hare	Yes
Dingy skipper	Yes
Floating water plantain	Yes
Great crested newt	Yes
Green hairstreak	No
Grey partridge	Yes
Kestrel	Yes
Little ringed plover	Yes
Orchids	Yes
Skylark	Yes
Snipe	Yes
Song thrush	Yes
Tree sparrow	Yes
<i>Vaccinium</i> species	No
Wall brown	No
Water vole	Yes
White-clawed crayfish	Yes

Source: Birmingham and Black Country BAP Steering Group 2000

References

- Abercrombie P and Forshaw J** 1943 *The county of London plan* Macmillan, London
- Adams D and Hutchison N** 2000 The Urban Task Force report: reviewing land ownership constraints to brownfield redevelopment *Regional Studies* 34(8) 777-782
- Adams L and Dove L** 1989 *Wildlife reserves and corridors in the urban environment: a guide to ecological landscape planning and resource conservation* National Institute for Urban Wildlife, Columbia
- Adams W** 1986 *Nature's place: conservation sites and countryside change* Allen and Unwin, London
- 1997 Rationalisation and conservation: ecology and the management of nature in the U.K. *Transactions of the Institute of British Geographers* 22 277-291
- Alker S Joy V Roberts P and Smith N** 2000 The definition of brownfield *Journal of Environmental Planning and Management* 43(1) 49-69
- Allen D** 1976 *The naturalist in Britain: a social history* Allen Lane, Harmondsworth
- Anderson A** 1997 *Media, culture and the environment* UCL Press, London
- Anderson K Armitage S Jack D and Wittner J** 1990 Beginning where we are: feminist methodology in oral history in **McCarl-Nielsen J** ed *Feminist research methods: exemplary readings in the social sciences* Westview Press, London 94-112
- ARUP Economics and Planning Unit** 1995 *Derelict land prevention and the planning system* HMSO, London
- Ashton P** 1989 Conservation of biological diversity in botanical gardens in **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 269-278
- Ashworth W** 1968 *The genesis of modern British town planning* Routledge, London
- Austin K** 2002 Botanical processes in urban derelict spaces Unpublished PhD. Thesis submitted to the University of Birmingham
- Babtie** 1999 *University Hospital Birmingham NHS Trust new hospital proposal environmental impact statement* Urban Initiatives / Babtie, Birmingham
- 2000a *Statement of principles* University Hospital Birmingham NHS Trust, Birmingham
- 2000b Badger survey appended to **Babtie** *Statement of principles* University Hospital Birmingham NHS Trust, Birmingham
- 2000c Botanical survey: phase 2 appended to **Babtie** *Statement of principles* University Hospital Birmingham NHS Trust, Birmingham
- 2000d *Initial site assessment: archaeological dig* University Hospital Birmingham NHS Trust, Birmingham
- 2000e Public consultation outcomes appended to **Babtie** *Statement of principles* University Hospital Birmingham NHS Trust, Birmingham
- Bacon E** 1967 *Design of cities* Thames and Hudson
- Baines C** 2001 VIP speaker address given at *URGENT annual meeting* 4/4/01
- Barbour M** 1996 Ecological fragmentation in the fifties in **Cronon W** ed *Uncommon ground: rethinking the human place in nature* Norton, New York 233-255
- Barker G** 1997 A framework for the future: green networks with multiple uses in and around towns and cities *Research Report No. 256* English Nature, Peterborough
- 2000 *Ecological recombination in urban areas: implications for nature conservation* in proceedings of workshop held at CEH Monkswood, available from Man and Biosphere Forum <http://www.nmw.ac.uk/mab/UrbanForum/Publications/> accessed 10/4/01

- Barnes T and Duncan J** eds 1992 *Writing worlds: discourse, text and metaphor in the representation of landscape* Routledge, London
- Barr J** 1969 *Derelict Britain* Penguin Books, Harmondsworth
- Barrett S, Stewart M and Underwood J** 1978 The land market and the development process *University of Bristol SAUS Occasional Paper No.2*
- Barton M** 1999 Changing places: a new approach to derelict land reclamation available at <http://www.groundwork.org.uk/public/reports/990131-changing-places.htm>, accessed 3/11/00
- Bastin L and Thomas C** 1999 The distribution of plant species in urban vegetation fragments *Landscape Ecology* 14 493-507
- Bauer B, Veblen T, and Winkler J** 1999 Old methodological sneakers: fashion and function in a cross-training era *Annals of the Association of American Geographers* 89(4) 679-687
- Bebbington A** 1995 Rural development: policies, programmes and actors in **Preston D** ed *Latin American development: geographical perspectives* Harlow, Longman 116-145
- 2000 Reencountering development *Annals of the Association of American Geographers* 90 495-520
- Becher T** 1989 *Academic tribes and territories: intellectual enquiry and the cultures of disciplines* Society for Research into Higher Education, Stony Stratford
- Beck U** 1992a *Risk society: towards a new modernity* Sage, London
- 1992b From industrial society to the risk society- questions of survival, social-structure and ecological enlightenment *Theory, Culture, Society* 9(1) 97-123
- 1999 *World risk society* Oxford, Blackwells
- Beier P and Noss R** 1998 Do habitat corridors provide connectivity? *Conservation Biology* 12 1241-1252
- Bennett M and Teague D** 1999 *The nature of cities: ecocriticism and urban environments* Arizona University Press, Arizona
- Bennett P** 1997 The planning system is a positive force for nature conservation: myth or reality? Unpublished BSc thesis Department of Planning University of Central England
- Berg M** 1996 The fruitful a-modernism of a lingering modernist: commentary on Bruno Latour's "on interobjectivity" *Mind, Culture and Activity* 3(4) 252-8
- Birks H** 1997 Environmental change in Britain- a long-term paleoecological perspective in **Mackay A and Murlis J** eds *Britain's natural environment: a state of the nation review* Ensis, London 23-28
- Birmingham and Black Country BAP Steering Group** 2000 *Birmingham and Black Country biodiversity action plan* Birmingham and Black Country BAP Steering Group, Birmingham
- Birmingham and Black Country Wildlife Trust** 1999 Planning application S/04553/99OUT *Re: redevelopment of healthcare facilities at Vincent Drive and associated works* sent to Birmingham LPA 1st December
- 2000a Planning application S/04553/99OUT *Re: redevelopment of healthcare facilities at Vincent Drive and associated works* sent to Birmingham LPA 17th February
- 2000b Planning application S/04553/99OUT *Re: redevelopment of healthcare facilities at Vincent Drive and associated works* sent to Birmingham LPA 10th August
- 2000c *Re: Village green application on land to south of Vincent Drive* sent to Birmingham LPA 18th August
- Birmingham City Council** 1997 *Nature conservation strategy for Birmingham* Department of Planning and Architecture, Birmingham.

- 2000 *Selly Oak local action plan: draft for public consultation* Department of Planning and Architecture, Birmingham
- 2001 *Unitary development plan: deposit draft* Department of Planning and Architecture, Birmingham
- 2002 *Selly Oak hospital* available at http://www.birmingham.gov.uk/GenerateContent?CONTENT_ITEM_ID=3117&CONTENT_ITEM_TYPE=0, accessed 20/9/02
- Bishop K Flynn A and Marsden T** 2000 Editorial *Journal of Environmental Planning and Management* 2(1) 1-4
- Blackler F** 1995 Knowledge, work and organisations: an overview and interpretation *Organisation Studies* 16(6) 1021-1046
- Blair A** 1998 *The Third Way: new politics for the new century* Fabian Society Pamphlet 588 Fabian Society, London
- Blair R and Launer A** 1997 Butterfly diversity and human landuse: species assemblages along an urban gradient *Biological Conservation* 80 113-125
- Blowers A** ed 1993 *Planning for a sustainable environment* Earthscan, London
- 1997 Environmental policy: ecological modernisation or the risk society? *Urban Studies* 34(5/6) 845-71
- **and Pain K** 1999 The unsustainable city? In **Pile S, Brook C and Mooney G** eds *Unruly cities?* Routledge, London 247-298
- Boden D** 1994 *The business of talk: organisations in action* Polity Press, London
- Boothby J** 2000 An ecological focus for landscape planning *Landscape Research* 25(3) 281-289
- Botkin D** 1990 *Discordant harmonies: a new ecology for the twenty-first century* Oxford University Press, New York
- Bowker G and Starr S** 1999 *Sorting things out: classification and its consequences* MIT Press, Cambridge, Mas.
- Box J and Harrison C** 1993 Natural spaces in urban places *Town and Country Planning* 62 231-235
- Boyle M** 2002 Cleaning up after the Celtic tiger: scalar fixes in the political ecology of tiger economies *Transactions of the Institute of British Geographers* 27(2) 172-194
- Bradshaw A** 1984 Ecological principles and land reclamation practices *Landscape Planning* 11 35-48
- Breheny M and Hall P** eds 1996 *The people, where will they go?* Town and Country Planning Authority, London
- Brenner M Brown J and Canter D** eds 1985 *The research interview: uses and approaches* Academic press, London
- Brenner N** 2000 The urban question as a scale question: reflections on Henri Lefebvre, urban theory and the politics of scale *International Journal of Urban and Regional Research* 24(2) 361-378
- 2001 The limits to scale: methodological reflections on scalar structuration *Progress in Human Geography* 25(4) 591-614
- Bridge G** 1998 Excavating nature: environmental narratives and discursive regulation in the mining industry in **Harrod A O'Tuathail G and Roberts S** eds *Unruly world? Globalisation, governance and geography* Routledge, London 219-243
- **and McManus P** 2000 Sticks and stones: environmental narratives and discursive regulation in the forestry and mining sectors *Antipode* 32(1) 10-47

- Brown J and Purcell M** 2002 Rescaling political ecology: the scalar politics of development in the Brazilian Amazon *paper delivered at the Association of American Geographers Conference* 22/3/02
- Brown S Pujol J and Curt B** 1993 As one in a web? Discourse, materiality and the place of ethics in **Parker I** ed *Social construction, discourse and realism* Sage, London 75-89
- Browne D and Keil R** (Forthcoming) Planning ecology: discourse and power in environmental policy-making in Los Angeles *Capitalism, Nature, Socialism*
- Bruff G and Wood A** 1995 Sustainable development in English Metropolitan District Authorities: an investigation using UDPs *Sustainable Development* 3(1) 9-19
- **and Wood A** 2000 Local sustainable development: land-use planning's contribution to modern local government *Journal of Environmental Planning and Management* 43(4) 519-539
- Bryson J** 1997 Obsolescence and the process of creative reconstruction *Urban Studies* 34(9) 1439-1458
- **and Lowe P** 1996 The factory in the garden: Bournville and a hundred years of social housing in **Gerrard A. and Slater T** eds *Managing a conurbation: Birmingham and its region* Brewin Books 262-275
- **Daniels P Henry N and Pollard J** eds 1999 *Knowledge, space, economy* Routledge, London
- **McGuinness M and Ford R** (Forthcoming) Chasing a 'loose and baggy monster': almshouses and the geography of charity *Area*
- Buckminster-Fuller R** 1969 *Operating manual for space-ship Earth* Southern Illinois University Press, Carbondale
- Bullock P and Gregory P** eds 1991 *Soils in the urban environment* Blackwells, Oxford
- Bunce M** 1994 *The countryside ideal* Routledge, London
- Burgess J** 1990 The production and consumption of environmental meanings in the mass media: a research agenda for the '90s *Transactions of the Institute of British Geographers* 15(2) 139-61
- **Clark J and Harrison C** 2000 Knowledges in action: an actor network analysis of a wetland agri-environmental scheme *Ecological Economics* 35 119-132
- Burgess R** 1981 *United States* in **Kormondy J and McCormick J** eds *Handbook of contemporary developments in world ecology* Greenwood Press, Westport 67-101
- Burr V** 1995 *An introduction to social constructionism* Routledge, London
- Butler J** 1993 *Bodies that matter* Routledge, New York
- Buttel F and Taylor P** 1994 Environmental sociology and global environmental change: a critical assessment in **Redclift M and Benton T** eds *Social theory and the global environment* Routledge, London 58-70
- Buttimer A** 1982 Musing on helicon *Geografisker Annaler* 64B 89-96
- Calon M** 1986 The sociology of an actor-network: the case of the electric vehicle in **Callon M Law J and Rip A** eds *Mapping the dynamics of science and technology: sociology of science in the real world* Macmillan, London 19-34
- 1991 Techno-economic networks and irreversibility in **Law J** ed *A sociology of monsters* Routledge, London 132-161
- **and Latour B** 1992 Don't throw the baby out with the bath school! A reply to Collins and Yearley in **Pickering A** ed *Science as practice and culture* University of Chicago Press, Chicago 343-368
- Cameron G Monk S and Pearce B** 1988 *Vacant urban land: a literature review* DoE, London

- Campbell H and Marshall R** 1998 Acting on principle: dilemmas in planning practice *Planning Practice and Research* 13(2) 117-128
- Canada Biodiversity Information Network** 2001 *Timeline of global biodiversity events* available at <http://www.cbin.ec.gc.ca/cbin/HTML/en/Events/Riotext.cfm> accessed 16/6/2001
- Carson R** 1962 *Silent Spring* Houghton Mifflin, Boston
- Cassel C and Symon G** 1994 *Qualitative methods in organisational research* Sage, London
- Castree N** 1995 The nature of produced nature: materiality and knowledge construction in Marxism *Antipode* 27 12-48
- 2002a Environmental issues: from policy to political economy *Progress in Human Geography* 26(3) 357-365
- 2002b False antitheses? Marxism, nature and actor networks *Antipode* 34 111-146
- **and Braun N** 1998 *Remaking reality: nature at the millenium* Routledge, London
- CBD Secretariat** 1995 *Information newsletter: June* CBD Secretariat, Geneva
- 2002 *Convention on biological diversity* available at <http://www.biodiv.org/convention/articles.asp> accessed 2/8/2002
- CEH** 2001 *Outputs from the NERC URGENT programme: a review* available from CEH Monks Wood, Abbots Ripton, Huntingdon, Cambs.
- Centre for the Study of Environmental Change** 1994 *Science, culture and the environment: phase 1 end-of-year report to ESRC* available at <http://www.lancs.ac.uk/users/csec> accessed 22/11/99
- Chesson P and Huntley N** 1997 The roles of harsh and fluctuating conditions in the dynamics of ecological communities *American Naturalist* 150 519-553
- Chisholm M and Kivell P** 1987 *Inner city wasteland: an assessment of government and market failure in land development* Institute of Economic Affairs, London
- Clark J** 2001 Contributions to the critique of political ecology *Capitalism, Nature, Socialism* 12(3) 29-36
- Clegg S** 1997 *Frameworks of power* Sage, London
- Clements F** 1916 *Plant Succession: an analysis of the development of vegetation* Carnegie Institute, Washington D.C.
- Cloke P Philo C and Sadler D** 1991 *Approaching human geography: an introduction to contemporary theoretical debates* Chapman, London
- Collinge C** 1999 Self-organisation of society by scale: a spatial reworking of regulation theory *Environment and Planning D: Society and Space* 17(5) 557-574
- Collinge S** 1996 Ecological consequences of habitat fragmentation: implications for landscape architecture and planning *Landscape and Urban Planning* 36 59-77
- Collins H and Yearley S** 1992 Epistemological chicken in **Pickering A** ed *Science as culture and practice* University of Chicago Press, Chicago 301-326
- Collins T and Savage K** 1998 Brownfields as places *Public Works Management and Policy* 2(3) 217-219
- Commoner B** 1971 *The closing circle* Alfred Knopf, New York
- Commons Hansard** 1992 10 Jul Mr. Richard Burden
- Cooke R** 1992 Common ground, shared inheritance; research imperatives for environmental geography *Transactions of the Institute of British Geographers* 17(2) 131-151
- Cotgrove S and Duff A** 1980 Environmentalism, middle-class radicalism and politics *Sociological Review* 28 333-51
- Counsell D** 1998 Sustainable development and structure plans in England and Wales: a review of current practice *Journal of Environmental Planning and Management* 41(2) 177-194

- 1999 Attitudes to sustainable development in planning: policy integration, participation, and LA 21, a case study of the Hertfordshire structure plan *Local Environment* 4(1) 21-32
- Cox K** 2002 “Globalisation”, the “regulation approach”, and the politics of scale in **Herod A and Wright M** eds *Geographies of power: placing scale* Blackwells, Oxford 85-114
- Crampton J** 2001 Maps as social constructions: power, communication and visualisation *Progress in Human Geography* 25(2) 235-252
- Cronk Q and Fuller J** 1995 *Plant invaders* Cambridge University Press, Cambridge
- Cronon W** 1992 *Nature's metropolis: Chicago and the Great West* Norton, New York
- ed 1995 *Uncommon ground: toward reinventing nature* Norton, New York
- Crouch D and Matless D** 1996 Refiguring geography: parish maps of common ground *Transactions of the Institute of British Geographers* 21 236-255
- Crusio W** 1995 The sociopathy of sociobiology *Behavioral and Brain Sciences* 18(3) 552-552
- Cullingworth J and Nadin V** 1997 *Town and country planning in the U.K.* Routledge, London
- Daniels P and Bobe M** 1993 Extending the boundary of the City of London? The development of Canary Wharf *Environment and Planning A* 25 539-552
- Daniels S** 1999 *Humphrey Repton: landscape gardening and the geography of Georgian England* Yale University Press, New Haven
- Darier E** ed 1999 *Discourses of the environment* Blackwells, Oxford
- David M and Zeitlyn D** 1996 What are they doing? Dilemmas in analyzing bibliographic searching: cultural and technical networks in academic life *Sociological Research Online* 1(4) available at <http://www.socresonline.org.uk/socresonline/1/4/2.html> accessed 14/4/2001
- Davidoff P** 1965 Advocacy and pluralism in planning *Journal of the American Institute of Planning* 31 331-8
- Davies G** 1999 Exploiting the archive: and the animals came in two by two, 16mm, CD-ROM, and BetaSP *Area* 31(1) 49-58
- 2000 Narrating the natural history unit *Geoforum* 31 539-551
- Davis B** 1978 Urbanisation and the diversity of insects in **Mound L and Waloff N** eds *Diversity of insect faunas* Symposia of the Royal Entomological Society Number 9 Blackwell Scientific Publications, Oxford 126-138
- Davis M** 1998 *The ecology of fear: Los Angeles and the imagination of disaster* Vintage Books, New York
- Dawkins R** 1978 *The selfish gene* Oxford University Press, Oxford
- Dawson D** 1994 Are habitat corridors conduits for animals and plants in a fragmented landscape? A review of the scientific evidence *English Nature Research Report No. 94* English Nature, Peterborough
- De Man P** 1986 *The resistance to theory* Manchester, Manchester University Press
- De Sousa C** 2002 Turning brownfields into green spaces in the city of Toronto *paper presented at the Association of American Geographers Annual Meeting 2002* 21/3/02
- Deetz S** 1982 Critical interpretive research in organisational communication *Western Journal of Speech Communication* 46 131-49
- Demeritt D** 1994a Ecology, objectivity and critique in writings on nature and human society *Journal of Historical Geography* 20(1) 22-37
- 1994b The nature of metaphors in cultural geography and environmental history *Progress in Human Geography* 18(2) 163-185

- 1998 Science, social constructivism and nature in **Castree N and Braun N** eds 1998 *Remaking reality: nature at the millenium* Routledge, London 173-193
- Derrida J** 1974 *Of grammatology* John Hopkins University Press, Baltimore
- Descola P and Pálsson G** 1996 Introduction in **Descola P and Pálsson G** eds *Nature and society: anthropological perspectives* Routledge, London 1-21
- DETR** 1998 *Planning for the communities of the future* HMSO, London
- 1999a *Urban Task Force prospectus: our towns and cities: the future-delivering an urban renaissance* HMSO, London
- 1999b *A better quality of life: a strategy for sustainable development for the U.K.* HMSO, London
- 2000a *Towards a language of sustainable development* HMSO, London
- 2000b *Our towns and cities: the future* HMSO, London
- 2001a Regenerating brownfield land- Euro all-clear *News release* 246 1/5/2001
- 2001b *National land-use database: previously developed land* HMSO, London
- DoE** 1990 *This common inheritance. Britain's environmental strategy* HMSO, London
- 1991 *Derelict land grant advice note no. 1: derelict land policy* HMSO, London
- 1994a *Biodiversity: the U.K. action plan* HMSO, London
- 1994b *Sustainable development: the U.K. strategy* HMSO, London
- 1995 *Our future homes: opportunity, choice, responsibility* HMSO, London
- 1996 *Household growth: where shall we live?* HMSO, London
- Douglas I** 1981 The city as an ecosystem *Progress in Physical Geography* 5(3) 315-367
- Douglas M** 1992 *Risk and blame* London, Routledge
- Drew P and Heritage J** 1992 *Talk at work: interaction in institutional settings* Cambridge University Press, Cambridge
- Dreyfus H and Rabinow P** 1982 *Michel Foucault : beyond structuralism and hermeneutics* Harvester, Brighton
- DTLR** 2001a *The single regeneration budget* HMSO, London
- 2001b *Planning: delivering fundamental change* HMSO, London
- Duane T** 2000 *Shaping the sierra: nature, culture and conflict in the changing west* University of California Press, London
- Dunning J Danielson J and Pulliam H** 1992 Ecological processes that affect populations in complex landscapes *Oikos* 65 159-175
- Eden S** 1999 Business claims of legitimacy in the environmental debate *Environment and Planning A* 31 1295-1310
- 2000 Environmental issues: sustainable progress *Progress in Human Geography* 24(1) 111-8
- **Tunstall S and Tapsell M** 2000 Translating nature: river restoration as nature-culture *Environment and Planning D: Society and Space* 18 257-273
- Eder K** 1996a *The social construction of nature* Sage, London
- 1996b The institutionalisation of environmentalism: ecological discourse and the second transformation of the public sphere in **Lash S Szerszynski B and Wynne B** eds 1999 *Risk, environment and modernity* Sage, London 203-223
- EEC** 1992 *Council directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora* EEC, Brussels
- Ehrenfeld D** 1989 Why put a value on biodiversity? In **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 212-216
- Ehrlich P** 1968 *The population bomb* New York, Ballantine Books

- 1989 The loss of diversity: causes and consequences in **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 21-27
- **and Ehrlich A** 1981 *Extinction: the causes and consequences of the disappearance of species* Ballantine Books, New York
- **and Wilson E** 1991 Biodiversity studies: science and policy *Science* 253 758-762
- Elias P and Keogh G** 1982 Industrial decline and unemployment in the inner city areas of Great Britain: a review of the evidence *Urban Studies* 19(1) 1-16
- Elton C** 1958 *The ecology of invasions by animals and plants* Chapman and Hall, London
- English Partnerships** 1999 *Introduction* available at <http://www.englishpartnerships.co.uk/htm/bus/b.htm> accessed 6/3/00
- Environment Agency** 2002 *Contaminated land* available at http://www.environment-agency.gov.uk/yourenv/eff/land/213950/contaminated/?lang=_e®ion= accessed 17/09/02
- Ericson R Baranek P and Chan J** 1991 *Representing order: crime law and justice in the news media* Oxford University Press, Milton Keynes
- Escobar A** 1995 *Encountering development: The making and unmaking of the Third World* Princeton University Press, Princeton
- 1996 Constructing nature: elements for a poststructural political ecology in **Peet R and Watts M** eds 1996 *Liberation ecology: environment, development, social movement* London, Routledge 46-68
- 1998 Whose knowledge, whose nature? Biodiversity, conservation, and the political ecology of social movements *Journal of Political Ecology* 5 53-81
- ESRC/NERC/EA** 2001 *ESRC/NERC research workshop held in Bristol 4/01* summary available from ESRC
- Evans C** 1999 *Derelict land and brownland regeneration* Chandos, Oxford
- Ezrahi Y** 1990 *Science and the transformation of contemporary democracy* Harvard University Press, Mas.
- Faeth S and Kane T** 1978 Urban biogeography: city parks as islands for Diptera and Coleoptera *Oecologia* 32 127-133
- Fairclough N** 1992 *Discourse and social change* Polity, Cambridge
- 1995 *Critical discourse analysis: the critical study of language* Longman, London
- **and Wodak R** 1997 Critical discourse analysis in **Van Dijk T** ed *Discourse as social interaction: discourse studies vol. 2- a multidisciplinary introduction* Sage, Newbury Park 258-84
- Falk S** 2000 Characteristics of 'recombinant' urban sites in the Warwickshire sub-region, with discussion of their conservation in **Barker G** *Ecological recombination in urban areas: implications for nature conservation* proceedings of workshop at CEH Monkswood available from Man and Biosphere Forum <http://www.nmw.ac.uk/mab/UrbanForum/Publications/> accessed 10/4/01 p.18-20
- Filer C** ed 1997 *The political economy of forest management in Papua New Guinea* Papua New Guinea National Research Institute, Boroko
- Fitzsimmons M** 1989 The matter of nature *Antipode* 21(2) 106-120
- Flyvbjerg B** 1998 *Rationality and power* University of Chicago Press, Chicago
- Forman R** 1991 Landscape corridors: from theoretical foundations to public policy in **Saunders D and Hobbs R** eds *Nature conservation 2: the role of corridors* Surrey Beatty and Sons, Chipping Norton 71-84
- Foucault M** 1973 *The order of things* Vintage, New York
- 1977 *Discipline and punish* London, Allen Lane

- 1980 *Power / knowledge: selected interviews and other writings 1972-77* Pantheon, New York
- 1984 Nietzsche, genealogy, history in **Rabinow P** ed *The Foucault reader* Pantheon, New York 76-100
- Furbey R** 1999 Urban regeneration: reflections on a metaphor *Critical Social Policy* 19(4) 419-445
- Gaston K and Spicer J** 1998 *Biodiversity* Blackwells, Oxford
- Gates P** 2001 Edward Osbourne Wilson in **Palmer J** ed *Fifty key thinkers on the environment* Routledge, London 246-252
- Gaze J** 1988 *Figures in a landscape: a history of the national trust* National Trust, London
- Gibbons M Limoges C Nowotny H Schwartzman S Scott P and Trow M** 1994 *The new production of knowledge: the dynamics of science and research in contemporary societies* Sage, London
- Gibson C** 1998 *Brownfield: red data. The value artificial habitats have for uncommon invertebrates* English Nature Research Report No.273 English Nature, Peterborough
- Gibson-Graham JK** 1996 *The end of capitalism (as we knew it)* Blackwell, Cambridge Mas.
- Giddens A** 1976 *New rules of sociological method* Hutchinson, London
- 1981 *A contemporary critique of historical materialism: vol. 1. Power, property and the state* University of California Press, Berkeley
- 1984 *The constitution of society* Cambridge, Polity
- 1985 Time, space and regionalisation in **Gregory D and Urry J** eds *Social relations and spatial structures* MacMillan, Basingstoke 265-295
- 1991 *Modernity and self-identity: self and society in the late modern age* Polity Press, Cambridge
- 1998 *The third way* Polity Press, Cambridge
- Gilbert O** 1989 *The ecology of urban habitats* Chapman and Hall, London
- 1992 *The flowering of cities: the natural flora of urban 'commons'* English Nature, Peterborough
- Gillham B** 2000 *The research interview* Continuum, London
- Glacken C** 1967 *Traces on the Rhodian shore: nature and culture in Western thought from ancient times to the end of the Eighteenth Century* University of California Press, Berkeley
- Glaser B and Strauss A** 1967 *The discovery of grounded theory: strategies for qualitative research* Aldine, Chicago
- Glasson J** 1994 EIA-only the tip of the iceberg? *Town and Country Planning* 63 42-45
- 1999 The first 10 years of the U.K. EIA system: strengths, weaknesses, opportunities and threats *Planning Practice and Research* 14 (4)
- **Therivel A and Chadwick A** 1998 *An introduction to environmental assessment* UCL Press, London
- Gleick J** 1988 *Chaos: making a new science* Penguin, New York
- Glowka L Burhenne-Guilmin F and Synge H** 1994 *A guide to the Convention on Biological Diversity* IUCN, Gland
- Godin B** 1998 Writing performative history: the New Atlantis? *Social Studies of Science* 28(3) 465-489
- Golley F** 1993 *A history of the ecosystem concept in ecology: more than the sum of the parts* Yale University Press, New Haven
- Goodman D** 1999 Agro-food studies in the 'age of ecology' *Sociologia-ruralis* 39 17-38

- Goodwin P** 1998 'Hired hands' or 'local voice': understandings and experience of local participation in conservation *Transactions of the Institute of British Geographers* 23 481-499
- Gore A** 1992 *Earth in balance: ecology and the human spirit* Houghton Mifflin, Boston
- Grabher G and Stark D** 1997 Organizing diversity: evolutionary theory, network analysis and post-socialism in **Grabher G and Stark D** eds *Restructuring networks in post-socialism: legacies, linkages, localities* Oxford University Press, Oxford 1-32
- Gracey H** 1973 The 1947 planning system: the plan-making process in **Hall P Gracey H Drewett R and Thomas R** eds *The containment of urban England volume two: the planning system* George Allen and Unwin, London 74-94
- Greater London Council** 1985 *Nature conservation guidelines for London: ecology handbook no.3* London GLC Department of Transportation and Development, London
- Greed C** 1993 *Town planning* Longman, Harlow
- Gregory D** 1994 *Geographical imaginations* Blackwell, Cambridge Mas.
- Gregory K Gurnell A and Petts G** 2002 Restructuring physical geography *Transactions of the Institute of British Geographers* 27 136-154
- Grime J** 1979 *Plant strategies and vegetation processes* Wiley and Sons, Chichester
- Grimm N Grove J Pickett S and Redman C** 2000 Integrated approaches to long-term studies of urban ecological systems *BioScience* 50 571-84
- Gross P and Levitt N** 1994 *Higher superstition: the academic left and its quarrels with science* John Hopkins University Press, Baltimore
- Grove-White R** 1993 Environmentalism: a new moral discourse? In Milton K ed *Environmentalism: the view from anthropology* London, Routledge 18-30
- 1996 Environmental knowledge and public policy needs: on humanising the research agenda in **Lash S Szerzynski B and Wynne B** eds *Risk, environment, modernity: towards a new ecology* Sage, London
- Gunnarsson B Linell P and Nordberg B** 1997 *The construction of professional discourse* Longman, London
- Habermas J** 1993 *Justification and application: remarks on discourse ethics* Polity Press, Cambridge
- Haila Y** 1999 Biodiversity and the divide between culture and nature *Biodiversity conservation* 8(1) 165-181
- Hajer M** 1995 *The politics of environmental discourse: ecological modernisation and the policy process* Clarendon Press, Oxford University Press
- Häkli J** 1996 Culture and politics of nature in the city: the case of Berlin's 'green wedge' *Capitalism, Nature, Socialism* 7(2) 125-138
- Hall P Gracey H and Thomas R** 1973 The 1947 planning system: objectives in **Hall P Gracey H Drewett R and Thomas R** eds *The containment of urban England volume two: the planning system* George Allen and Unwin, London 35-70
- Halpern S** 1992 *UNCED: process and documentation* ACUNS, Providence
- Handley J** 1996 *The post-industrial landscape* Groundwork Foundation, Birmingham
- Hanski I and Gilpin M** eds 1997 *Metapopulation biology* Academic Press, London
- Haraway D** 1989 *Primate visions: gender race and nature in the world of modern science* Routledge, New York
- 1991 *Simians, cyborgs and women: the reinvention of nature* Free Association Books Ltd., London
- Hardin R** 1968 The tragedy of the commons *Science* 163 1243-1248

- Hardey D** 1991 *From new towns to green politics: campaigning for town and country planning 1946-1990* Spon, London
- Harley J** 1988 Maps, knowledge and power in **Cosgrove D and Daniels S** eds *The iconography of landscape* University of Cambridge Press, Cambridge 277-312
- 1992 Deconstructing the map in **Barnes T and Duncan J** eds *Writing worlds: discourse, text and metaphor in the representation of landscape* Routledge, London 231-247
- Harrison C and Burgess J** 1994 Social constructions of nature: a case study of conflicts over the development of Rainham Marshes *Transactions of the Institute of British Geographers* 19 291-310
- **and Davies G** 2002 Conserving biodiversity that matters: practitioners' perspectives on brownfield development and urban nature conservation in London *Journal of Environmental Management* 65 95-108
- Harvey D** 1973 *Social justice and the city* Edward Arnold, London
- 1978 The urban process under capitalism *International Journal of Urban and Regional Research* 2 101-131
- 1982 *The limits to capital* The University of Chicago Press, Chicago
- 1984 On the history and present condition of geography *Professional Geographer* 36 1-11
- 1993 The nature of environment: dialectics of social and environmental change in **Milibrand R and Panitch L** eds *Socialist register: real problems, false solutions* Merlin Press, London 1-15
- 1996 *Justice, nature and the geography of difference* Blackwells, Oxford
- Haylett C** 2001 Modernisation, welfare and 'third-way' politics: limits to theorising in 'thirds'? *Transactions of the Institute of British Geographers* 26 43-56
- Hays S** 1998 *Explorations in environmental history* University of Pittsburgh, Pittsburgh
- Healey P** 1992 Planning through debate: the communicative turn in planning theory *Town Planning Review* 63(2) 143-162
- 1997 *Collaborative planning: shaping places in a fragmented society* Macmillan, London
- **and Shaw T** 1994 Changing meanings of the 'environment' in the British planning system *Transactions of the Institute of British Geographers* 19 425-438
- Held D** 1995 *Democracy and the global order* Cambridge, Polity
- Henry N and Pinch S** 2000 Spatialising knowledge: placing the knowledge community of motor sport valley *Geoforum* 31(2) 191-208
- Hershkovitz L** 1993 Political ecology and environmental management in the Loess Plateau, China *Human Ecology: An Interdisciplinary Journal* 21 327-354
- Hetherington K** 1997 *The badlands of modernity: heterotopia and social ordering* Routledge, London
- Heywood V and Baste I** 1995 Introduction in **Heywood V** ed *Global biodiversity assessment* Cambridge University Press, Cambridge 1-19
- Higgs E** 1997 What is good ecological restoration? *Society for Ecological Restoration News* 10 (2)
- Hillier J** 1999 Going round the back? Complex networks and informal action in local planning processes *Environment and Planning A* 32 33-54
- Hinchliffe S** 1999 Cities and natures: intimate strangers in **Allen J Massey D and Pryke M** *Unsettling cities* Routledge, London 137-180
- 2001 Indeterminacy in-decisions— science, policy and politics in the BSE crisis *Transactions of the Institute of British Geographers* 26 182-204
- Ho M-W and Fox S** 1988 *Evolutionary processes and metaphors* John Wiley and Sons, Chichester

- Hodgson R and Rollnick S** 1989 More fun, less stress: how to survive in research in **Parry G and Watts F** eds *Behavioural and mental health research: a handbook of skills and methods* Laurence Erlbaum, Hove 75-89
- Holquist M** 1990 *Dialogism: Bakhtin and his world* Routledge, London
- Horkheimer M and Adorno T** 1972 *The dialectic of Enlightenment* Herder and Herder, New York
- Hoskins W** 1985 *The making of the English landscape* Penguin, London
- Howard E** 1902 *Garden cities of tomorrow* Swan Sonnenschein, London
- Huston M** 1994 *Biological diversity: the coexistence of species on changing landscapes* Cambridge University Press, Cambridge
- Huston S** 1997 Urban political ecology: an introduction *Capitalism, Nature, Society* 8(1) 131-137
- Hutchinson G** 1961 The paradox of the plankton *American Naturalist* 95 137-145
- Huxley J** 1947 *Conservation of nature in England and Wales* HMSO, London
- Iedema R** 1999 Formalising organisational meaning *Discourse and Society* 10(1) 49-65
- and **Wodak R** 1999 Introduction: organisational discourses and practices *Discourse and Society* 10(1) 5-19
- IGBP** 1992 *Removing uncertainties* Global Environmental Change Bulletin 35
- Innes J** 1994 *Planning through consensus- building: a new view of the consensus planning ideal* University of California IURD, Berkeley
- Jackson D** 2000 Guidance on the interpretation of the Biodiversity Broad Habitat Classification (terrestrial and freshwater types): definitions and the relationship with other habitat classifications *JNCC Report No. 307* JNCC, Peterborough
- Jahn T** 1996 Urban ecology- perspectives of social-ecological research *Capitalism, Nature, Socialism* 7(2) 5-19
- Jamison A Ayerman J and Cramer J** 1990 *The making of the new environmental consciousness* Edinburgh University Press, Edinburgh
- Jary D and Jary J** 1999 *Dictionary of sociology* HarperCollins, Glasgow
- Jasanoff S** 1996 Is science socially constructed- and can it still inform public policy *Science and Engineering Ethics* 2 263-276
- and **Wynne B** 1998 Science and decision-making in **Rayner S and Malone E** eds *Human choice and climate change. Vol. 1: the societal framework* Battelle Press, Columbus OH 1-88
- Jepson W** 2002 Globalisation and the politics of scale in the Brazilian biosafety debate *paper delivered in the 'political ecology and the politics of scale' session at the 2002 Association of American Geographers Conference* 22/3/02
- Jessop B** 1991 Thatcherism: the British road to post-Fordism in **Jessop B Kastendiek H Nielson K and Pederson O** eds *The politics of flexibility* Edward Elgar, Aldershot 83-101
- 1994 Post-Fordism and the state in **Amin A and Malden M** *Post-Fordism: a reader* Blackwell, Oxford 251-279
- 2000: The crisis of the national spatio-temporal fix and the ecological dominance of globalizing capitalism. *International Journal of Urban and Regional Research* 24(2) 323-360
- Joerges B** 1999 Do politics have artefacts? *Social Studies of Science* 29(3) 411-431
- Jones C Wood C and Dipper B** 1998 Environmental assessment in the U.K. planning process *Town Planning Review* 69 315-339

- Kates R**, 2002 Humboldt's dream, beyond disciplines and sustainability science: contested identities and a restructuring academy *Annals of the Association of American Geographers* 92 79-81
- Keil R** 1998 Globalisation makes states: perspectives of local governance in the age of the world city *Review of International Political Economy* 15 616-646
- **and Graham J** 1998 Reasserting nature: constructing urban environments after Fordism in **Braun B and Castree N** eds *Remaking reality: nature at the millennium* Routledge, London 100-125
- Kendall J and Knapp M** 1995 A loose and baggy monster: boundaries, definitions and typologies in **Smith J Rochester C and Hedley R** eds *An introduction to the voluntary sector* Routledge, London 66-95
- Kendle A and Rose J** 2000 The aliens have landed! What are the justifications for 'native only' policies in landscape plantings? *Landscape and Urban Planning* 47 19-31
- Kipfer S** 1996 Whose sustainability? ecology, hegemonic politics and the future of the city in **Keil R Wekerle G and Bell D** eds *Local places in the age of the global city* Black Rose Books, Montreal 117-124
- **Hartmann F and Marino S** 1996 Cities, nature and socialism: towards an urban agenda for research and action *Capitalism, Nature, Socialism* 7(2) 5-19
- Klein J** 1990 *Interdisciplinarity* Wayne State University Press, Detroit
- Knorr K** 1981 *The manufacture of knowledge: an essay on the constructivist and contextual nature of science* Pergamon, Oxford
- Korzybski A** 1948 *Science and sanity: an introduction to non-Aristotelian systems and general semantics* The Internal Non-Aristotelian Library, Lakeville CT
- Kowarik I** 1990 Some response of flora and vegetation to urbanisation in Central Europe in **Sukopp H Hejny S and Kowarik I** eds *Urban ecology- plants and plant communities in urban environments* SPB academic Publishing, The Hague 45-74
- Krippendorff K** 1980 *Content analysis: an introduction to its methodology* Sage, London
- Kuhn T** 1970 *The structure of scientific revolutions* University of Chicago Press, Chicago
- Kwa C** 1987 Representations of nature mediating between ecology and science policy: the case of the International Biological Program *Social Studies of Science* 17 413-442
- Laclau E** 1990 *New reflexions on the revolution of our time* Verso, London
- 1994 *The making of political identities* Verso, London
- Legendijk A and Cornford J** 2000 Regional institutions and knowledge - tracking new forms of regional development policy *Geoforum* 31(2) 209-218
- Lahteenmaki M** 1999 On meaning and understanding: a dialogical approach *Dialogism* 1 74-91
- Lane S** 2001 Constructive comments on D. Massey 'space-time, "science" and the relationship between physical and human geography' *Transactions of the Institute of British Geographers* 26 243-256
- Latham A** 2002 Retheorising the scale of globalisation: topologies, actor-networks and cosmopolitanism in **Herod A and Wright M** eds *Geographies of power: placing scale* Blackwells, Oxford 115-144
- Latour B** 1987 *Science in action* Harvard University Press, Cambridge Mas.
- 1988 *The pasteurisation of France* Harvard University Press, Cambridge Mas.
- 1990 Drawing things together in **Lynch M and Woolgar S** eds *Representation in scientific practice* MIT Press, Cambridge Mas. 19-68
- 1991 Technology is society made durable in **Law J** ed *A sociology of monsters* Routledge and Kegan Paul, London 101-131

- 1992 *Aramis, or the love of technology* Decouverte, Paris
- 1993 *We have never been modern* Harvester Wheatsheaf, London.
- 1998 On recalling ANT in **Law J and Hassard J** eds *Actor Network Theory and after* Blackwells, Oxford 15-25
- 1999 *Pandora's hope: essays on the reality of science studies* Harvard University Press, Cambridge, Mas.
- **and Woolgar S** 1986 *Laboratory life* Princeton University Press, Chichester
- Law J** 1994 *Organising modernity* Blackwells, Oxford
- **and Hassard J** eds 1998 *Actor Network Theory and after* Blackwells, Oxford
- **and Hetherington K** 1999 Materialities, spatialities, globalities in **Bryson J Daniels P Henry N and Pollard J** eds *Knowledge, space, economy* Routledge, London 34-49
- Lawton J** 1994 What do species do in ecosystems? *Oikos* 71 367-374
- Lefebvre H** 1976 *The survival of capitalism* Allison and Busby, London
- Legrand J** 1988 *Chronicle of the Twentieth Century* Chronicle, London
- Lekakis J** 2000 Environmental policy-making in Greece: examining the interaction of bureaucratic and academic cultures in Greece *Journal of Environmental Policy and Planning* 2(1) 69-86
- Lemke J** 1990 Technical discourse and technocratic ideology in **Halliday M Gibbons J and Nicholas H** eds *Learning, keeping and using language* Amsterdam, John Benjamins 435-60
- 1999 Discourse and organisational dynamics: website communication and institutional change *Discourse and Society* 10(1) 21-47
- Lewontin R** 1979 Sociobiology as an adaptationist program *Behavioural Science* 24 5-14
- 1983 Gene, organism and environment in **Bendall D** ed *Evolution from molecules to men* Cambridge University Press, Cambridge 273-285
- 1995 *The doctrine of DNA* Penguin, Harmondsworth
- **and Levins R** 1999 Evolutionary psychology *Capitalism, Nature Socialism* 10(3) 127-130
- Light A** 2001 The urban blind spot in environmental ethics *Environmental Politics* 10(1) 7-35
- Lincoln Y and Guba E** 1985 *Naturalistic inquiry* Sage, London
- Lindeman R** 1942 The trophic-dynamic aspect of ecology *Ecology* 23 399-418
- Lindley T** 1986 Landuse of reclamation sites *Landscape Design* 164 60-64
- Ling C** 2001 Rebuilding the post-industrial landscape: interaction between landscape and biodiversity on derelict land *Groundwork U.K. Changing Places Programme* available from Groundwork U.K.
- Lipietz A** 2000 Political ecology and the future of Marxism *Capitalism, Nature, Socialism* 11(1) 69-86
- Little C** 1990 *Greenways for America* John Hopkins University Press, Baltimore
- Livingstone D** 1995a The spaces of knowledge: contributions towards a historical geography of science *Society and Space* 13 5-34
- 1995b The polity of nature: representation, virtue, strategy *Ecumene* 2(4) 353-77
- Lomolino M** 2001 The species-area relationship: new challenges for an old pattern *Progress in Physical Geography* 25(1) 1-21
- London Biodiversity Partnership** 2002 *Wasteland HAP* London Biodiversity Partnership, London
- Loveless J** 1987 *Towards an urban renaissance* ASI Research Ltd., London
- Lovelock J** 1979 *Gaia : a new look at life on earth* Oxford University Press, Oxford
- 1989 The Earth as a living organism in **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 486-492

- Lowe P** 1983 Values and institutions in the history of British nature conservation in **Warren A and Goldsmith F** eds *Conservation in perspective* Wiley, Chichester 329-52
- Lubchenco J** 1998 Entering the century of the environment: a new social contract for science *Science* 279 491-497
- Lugo A** 1989 Estimating reductions in the diversity of tropical forest species in **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 58-70
- Luke T** 1999 Environmentality as governmentality in **Darier E** ed *Discourses of the environment* Blackwells, Oxford 121-151
- Lyotard J** 1984 *The postmodern condition: a report on knowledge* University of Minnesota Press, Minneapolis
- Mabey R** 1999 *The unofficial countryside* Pimlico, London
- and **Evans T** 1980 *The flowering of Britain* Hutchinson, London
- MacArthur R** 1955 Fluctuations of animal populations and a measure of community stability *Ecology* 36 533-536
- and **Wilson E** 1967 *The theory of island biogeography* Princeton University Press, Princeton NJ
- MacCormack M and Strathern C** eds 1980 *Nature, culture, gender* Cambridge University Press, Cambridge
- MacEwan A and MacEwan M** 1982 *National parks: conservation or cosmetics?* Allen and Unwin, London
- MacLeod G and Goodwin N** 1999 Space, scale and state strategy: rethinking urban and regional governance *Progress in Human Geography* 23(4) 503-27
- Macnaghten P and Urry J** 1998 *Contested natures* Sage, London
- Maddox J** 1994 The frontiers of ignorance *Nature* 372 11-36
- Malbert B** 1998 Participatory approaches to sustainable urban development: reflexions on practice in Seattle, Vancouver and Waitakere *Planning Practice and Research* 13(2) 183-189
- Manning P and Cullum Swann B** 1994 Narrative, content and semiotic analysis in **Denzin N and Lincoln Y** eds *Handbook of qualitative research* Sage, London 463-477
- Margules C and Pressey R** 2000 Systematic conservation planning *Nature* 405 243-253
- **Higgs A and Rafe R** 1982 Modern biogeographic theory: are there lessons for nature reserve design? *Biological Conservation* 24 115-128
- Marshall R and Smith C** 1999 Planning for nature conservation: the role and performance of English District Local Authorities in the 1990s *Journal of Environmental Planning and Management* 24 691-706
- Marston S** 2000 The social construction of scale *Progress in Human Geography* 24(2) 219-242
- Martin J** 1992 *English text: system and structure* Johns Benjamins, Amsterdam
- 1995 Interpersonal meaning, persuasion and public discourse *Australian Journal of Linguistics* 15 33-67
- Martin R** 2001 Geography and public policy: the case of the missing agenda *Progress in Human Geography* 25 189-210
- Mason M** 2001 Transnational environmental obligations: locating new spaces of accountability in a post-Westphalian order *Transactions of the Institute of British Geographers* 26 407-429
- Massey D** 1984 *Spatial divisions of labour: social structures and the geography of production* Macmillan, London

- 1999a Space-time, 'science' and the relationship between physical geography and human geography *Transactions of the Institute of British Geographers* 24 261-276
- 1999b Power-geometries and the politics of space-time *Hettner Lecture* University of Heidelberg, Germany
- 2001 Talking of space-time *Transactions of the Institute of British Geographers* 26 257-261
- **and Allen J** eds 1988 *Uneven redevelopment: cities and regions in transition* Open University Press, Milton Keynes
- **Allen J and Pile S** eds 1999 *City worlds* Routledge, London
- May R** 1986a The search for patterns in the balance of nature: advances and retreats *Ecology* 67 1115-1126
- 1986b When two and two do not make four: nonlinear phenomena in ecology *Proceedings of the Royal Society of London* 228 241-266
- May T** 1993 *Research in the field* Oxford University Press, Buckingham
- McAfee K** 1999 Selling nature to save it? Biodiversity and green developmentalism *Environment and Planning D: Society and Space* 17 133-54
- McCann K** 2000 The stability-diversity debate *Nature* 405 228-233
- McCormick J** 1991 *British politics and the environment* Wiley, Chichester
- McCracken G** 1988 *The long interview: qualitative research methods vol. 13* Sage, Thousand Oaks Cal.
- McGuire T** 1996 Towards a political ecology: observations on the social science of fleet dynamics and local knowledge. *The Fisheries Centre, University of British Columbia*
- McIlvenna M** 2001 Losing the plot *Guardian Society* 20/6/01
- McIntosh R** 1985 *The background of ecology: concept and theory* Cambridge University Press, Cambridge
- McKibben B** 1999 *The end of nature* Random House, New York
- Meadows D** 1972 *The limits to growth: a report for the Club of Rome project on the predicament of mankind* Universe Books, New York
- Miller J and Hobbs R** Conservation where people live and work *Conservation Biology* 16(2) 330-337
- Ministry of Housing and Local Government** 1962 *The green belts* HMSO, London
- Mol A and Law J** 1994 Regions, networks and fluids: anaemia and social topology *Social Studies of Science* 26 641-671
- Molino A** 1998 Zen, Lacan and the alien ego in **Molino A** ed *The couch and the tree: dialogues in psychoanalysis and Buddhism* North Point Press, New York 290-306
- Moos A and Dear M** 1986 Structuration theory in urban analysis: 1. Theoretical exegesis *Environment and Planning A* 18 231-252
- MORI** 1995 *Derelict land in Britain- a survey of public opinion* MORI, London
- Mörtberg U and Wallentinus H** 2000 Red-listed forest bird species in an urban environment- assessment of green-space corridors *Landscape and Urban Planning* 50(4) 215-226
- Moseley Bog Conservation Group** 2002 *Moseley Bog and Dell* available at http://www.b13.net/lc/cms/page_view.asp?ID=505 accessed 16/9/02
- Mouffe C** 1996 Deconstruction, pragmatism and the politics of democracy in **Mouffe C** ed *Deconstruction and pragmatism* Routledge, London 1-12
- Muir K Phillips M and Healey M** 2000 Shades of green in local authority policy making: a regional case study *Area* 32 369-82
- Mumford L** 1965 *The city in history* Penguin, Harmondsworth

- Murdoch J** 1995 Actor networks and the evolution of economic forms: combining description and explanation in theories of regulation, flexible specialisation and networks *Environment and Planning A* 27 731-757
- 1997 Inhuman/nonhuman/human: actor network theory and prospects for a non-dualistic and symmetrical perspective upon society and nature *Environment and Planning D: Society and Space* 15 731-756
- 1998 The spaces of actor network theory *Geoforum* 29 (4) 357-374
- **and Marsden T** 1995 The spatialisation of politics: local and national actor-spaces in environmental conflict *Transactions of the Institute of British Geographers* 20 368-380
- Myers G** 2002 Political ecology, the politics of scale and the Sustainable Cities program in Southern Africa *paper delivered at the Association of American Geographers Conference* 21/3/02
- Myers N** 1983 *A wealth of wild species: storehouse for human welfare* Westview Press, Boulder
- Myerson G and Rydin Y** 1996 *The language of the environment: a new rhetoric* London, UCL Press
- Nash R** 1989 *The rights of nature: a history of environmental ethics* University of Wisconsin Press, Madison
- National Audit Office** 1988 *The DoE derelict land grant* HMSO, London
- Nicholls A and Margules C** 1991 The design of studies to demonstrate the biological importance of corridors in **Saunders D and Hobbs R** eds *Nature conservation 2: the role of corridors* Surrey Beatty and Sons, Chipping Norton 49-61
- Nicholson-Lord D** 1987 *The greening of the cities* Routledge and Kegan Paul, London
- Nissani M** 1995 Fruits, salads and smoothies: a working definition of interdisciplinarity *Journal of Educational Thought* 29 119-126
- 1996 The greenhouse effect: an interdisciplinary perspective *Population and Environment: a Journal of Interdisciplinary Studies* 17 459-489
- 1997 Ten Cheers for Interdisciplinarity: the case for interdisciplinary knowledge and research *Social Science Journal* 34(2) 201-216
- Norgaard R** The rise of the global exchange economy and the loss of biological diversity in **Wilson E** ed *Biodiversity* National Academy Press, Washington DC 206-211
- Norton B** 1989 Commodity, amenity and morality: the limits of quantification in valuing biodiversity in **Wilson E** ed 1989 *Biodiversity* National Academy Press, Washington DC 200-205
- Noss R** 1987 Protecting natural areas in fragmented landscapes *Natural Areas Journal* 7 2-13
- 1992 Issues of scale in conservation biology in **Fiedler P and Jain S** eds *Conservation biology: the theory and practice of nature conservation, preservation, and management* Chapman and Hall, New York 240-241
- O'Connor J** 1988 Capitalism, nature and socialism: a theoretical introduction *Capitalism, Nature and Socialism* 1 11-38
- O'Neill J** 1993 *Ecology, policy and politics* London, Routledge
- O'Neill P and Whatmore S** 2000 The business of place: networks of property, partnership and produce *Geoforum* 31 121-136
- O'Riordan T** 1995a *Environmental science for environmental management* Longman, Harlow
- 1995b The application of the precautionary principle in the U.K. *Environment and Planning A* 27 1534-1538

- Oakes T** 1997 Place and the paradox of modernity *Annals of The Association of American Geographers* 87(3) 509-531
- Oatley N** ed 1998 *Cities, economic competition and urban policy* Paul Chapman, London
- Odum E** 1953 *Fundamentals of ecology* Saunders, Philadelphia
- Oeschlager M** 1991 *The idea of wilderness: from prehistory to the age of ecology* Yale University Press, New Haven
- Oke T** 1978 *Boundary layer climates* Methuen, London
- Owen D** 1964 *English philanthropy* Oxford University Press, Oxford
- Owens S** 1996 *Rocks and hard places: mineral resource planning and sustainability* Council for the Protection of Rural England, London
- Paine R** 1984 Ecological determinism in the competition for space *Ecology* 65 1339-1348
- Pearce F** 1998 A real waste *New Scientist Comment* 11/4/98
- Peck J** 1999 Grey geography *Transactions of the Institute of British Geographers* 24 131-135
- Peck S** 1998 *Planning for biodiversity: issues and examples* Island Press, Washington D.C.
- Peet R and Watts M** eds 1996 *Liberation Ecology: environment, development, social movement* London, Routledge
- Pepper D** 1993 *Eco-socialism: from deep ecology to social justice* Routledge, London
- Peretti J** 1998 Nativism and nature: rethinking biological invasion *Environmental Values* 7 183-192
- Petrie H** 1986 Do you see what I see? The epistemology of interdisciplinary inquiry in **Chubin D** ed *Interdisciplinary analysis and research* Mt. Airy, Lomond 115-130
- Petulla J** 1980 *American environmental history: the exploitation and conservation of nature* Boyd & Fraser, San Francisco
- Phillips J** 1999 Methodology, scale and the field of dreams *Annals of the Association of American Geographers* 89(4) 754-760
- Pimm S** 1991 *The balance of nature? Ecological issues in the conservation of species and communities* University of Chicago Press, Chicago
- Platt J** 1981 Evidence and proof in documentary research: 1. Some specific problems of documentary research *Sociological Review* 29(1) 31-52
- Popper K** 1963 *Conjectures and refutation: the growth of scientific knowledge* Routledge, London
- POST** 1998 *A brown and pleasant land: household growth and brownfield sites* HMSO, London
- 2000 *Biodiversity and conservation* HMSO, London
- Potter J and Wetherell M** 1987 *Discourse and social psychology: beyond attitudes and behaviour* Sage, London
- Power M** 1994 *The audit explosion* Demos, London
- Pryke M** 1994 Looking back on the space of a boom: (re)developing spatial matrices in the city of London *Environment and Planning A* 26 235-264
- Purvis A and Hector A** 2000 Getting the measure of biodiversity *Nature* 405 212-219
- Ratcliffe D** 1977 *A nature conservation review* Cambridge University Press, Cambridge
- Raynsford N** 1998 Hansard written answers to parliamentary questions 8/4, Col.290 37876 HMSO, London
- Raulet G** 1983 Structuralism and post-structuralism: an interview with Michel Foucault *Telos* 55(1) 195-211
- Relph E** 1976 *Place and placelessness* Pion, London
- Renkema J** 1993 *Discourse studies: an introductory textbook* John Benjamins Publishing
- Ricoeur P** 1977 *The rule of metaphor* University of Toronto Press, Toronto

- Robert Turley Associates** 2000 *Sainsbury's supermarkets: environmental statement sections 1-10*, Selly Oak Robert Turley Associates, London
- Robson C** 1993 *Real world research* Blackwell, Oxford
- Rodwell J** 1991 *British plant communities, volume 1: woodlands and scrub* Cambridge University Press, Cambridge
- Rohde C and Kendle A** 1994 Human well-being, natural landscapes and wildlife in urban areas. A Review *English Nature Research Report No.22* English Nature, Peterborough
- Rolando A** 1997 Avian community structure along an urbanisation gradient *Italian Journal of Zoology* 64 341-349
- Rose G** 1982 *Deciphering sociological research* Macmillan, London
- Rudlin D** 1998 *Tomorrow: a peaceful path to urban reform. The feasibility of accommodating 75% of new homes in urban areas* Friends of the Earth, London
- Running S Loveland T and Pierce L** 1994 A vegetation classification logic based on remote sensing for use in global bio-geochemical models *Ambio* 23(1) 77-81
- Ruscio K** 1986 Bridging specialisations: reflections from biology and political science *Review of Higher Education* 10 29-45
- Rutherford P** 1999 The entry of life into history in **Darier E** ed *Discourses of the environment* Blackwells, Oxford 37-66
- Ryder J and Silver H** 1990 *Modern English society* Methuen, London
- Rydin Y** 1998 Land use planning and environmental capacity: reassessing the use of regulatory tools to achieve sustainable development *Journal of Environmental Planning and Management* 41(6) 749-765
- Sadler D** 1981 Intuitive data processing as a potential source of bias in educational evaluation *Educational Evaluation and Policy Analysis* 3 25-31
- Sandilands C** 1999 Sex at the limits in **Darier E** *Discourses of the environment* Blackwells, Oxford 79-94
- Sassen S** 1994 *Cities in a world economy* Pine Forge Press, London
- Savard J Clergeau P and Mennechez G** 2000 Biodiversity concepts and urban ecosystems *Landscape and Urban Planning* 48 131-142
- Sayer A** 1992 *Method in social science: a realist approach* Routledge, London
- Schama S** 1995 *Landscape and memory* London, HarperCollins
- Schroeder R** 1999 Geographies of environmental intervention in Africa *Progress in Human Geography* 23(3) 359-378
- Scott J** 1990 *A matter of record: documentary sources in social research* Polity Press, Cambridge
- Select Committee on Environmental, Transport and Regional Affairs** 1998 Q4 *Hansard* 110
- 1999 *Twentieth report: U.K. biodiversity* HMSO, London
- Selman P** 1998 LA 21: substance or spin? *Journal of Environmental Planning and Management* 41(5) 533-554
- **and Wragg A** 1999 Local sustainability planning: from interest-driven networks to vision-driven super-networks *Planning Practice and Research* 14(3) 329-40
- Sennett R** 1992 *Flesh and stone: the body and the city in Western civilisation* Faber and Faber, London
- Shackley S and Wynne B** 1995 Global climate change: the mutual construction of an emergent science-policy domain *Science and Public Policy* 22 218-30
- Sheail J** 1976 *Nature in trust: the history of nature conservation in Britain* Blackie, Glasgow

- Shepherd P** 2000 Origins of the city flora and fauna in **Barker G** ed *Ecological recombination in urban areas: Implications for nature conservation* Proceedings of workshop at CEH Monkswood available from Man and Biosphere Forum <http://www.nmw.ac.uk/mab/UrbanForum/Publications/> accessed 10/4/01
- Sheridan T** 1995 Arizona: the political ecology of a desert state *Journal of Political Ecology* 2 41-56
- Shirley P** 1996 *Urban wildlife* Whittet Books, London
- 1999 *The Wildlife Trust/ Urban Wildlife Partnership's response to the report of the Urban Task Force "towards an urban renaissance"* first draft available from the Urban Wildlife Partnership
- **and Box J** 1998 *Biodiversity, brownfield sites and housing: quality of life issues for people and wildlife* The Urban Wildlife Partnership, Newark
- Shiva V** 1994 *Close to home: women reconnect ecology, health and development* London, Earthscan
- Shotter J and Billig M** 1998 A Bakhtinian psychology: from out of the heads of individuals and into the dialogues between them in **Bell M and Gardiner M** eds *Bakhtin and the human sciences: no last words* Sage, London 13-29
- Silverman D** 1985 *Qualitative methodology and sociology* Gower, Aldershot
- Smith A** 2001 Constructions of nature and the regeneration of the East Durham coalfield, North East England, U.K. *paper presented at Association Of American Geographers Meeting New York 2001*
- Smith N** 1984 *Uneven development: nature, capital and the production of space* Blackwell, Oxford
- 1992 Geography, difference and the politics of scale in **Doherty J Graham E and Malek M** *Postmodernism and the social sciences* London, Macmillan 57-79
- 1995 Remaking scale: competition and cooperation in prenational and postnational Europe in **Eskelinen H and Snickars F** eds *Competitive European peripheries* Springer Verlag, Berlin 59-74
- 2000 Scale in **Johnston R** ed *The dictionary of human geography* Blackwell, Cambridge Mas. 724-27
- Snow C** 1964a *A second look* Cambridge University Press, London
- 1964b *The two cultures* Cambridge University Press, London
- Soja E** 1989 *Postmodern geographies* Verso, London
- **and Hooper B** 1993 The spaces that differences make: some notes on the geographical margins of the new cultural politics in **Keith M and Pile S** eds *Place and the politics of identity* Routledge, London 183-205
- Soulé M** 1985 What is conservation biology? *Bioscience* 35 727-734
- 1987 *Viable populations for conservation* Cambridge University Press, Cambridge
- 1990 The onslaught of alien species and other challenges in the coming decades *Conservation Biology* 4(3) 233-239
- Spellerberg I and Gaywood M** 1993 Linear features: linear habitats and wildlife corridors *English Nature Research Report No. 60* English Nature, Peterborough
- Spencer T and Whatmore S** 2001 Bio-geographies: putting life back into the discipline *Transactions of the Institute of British Geographers* 26 139-142
- Stake R** 1994 Case studies in **Denzin N and Lincoln Y** eds *Handbook of qualitative research* Sage, London 236-247
- Steel J Nadin V Daniels R and Westlake T** 1995 *The efficiency and effectiveness of local plan inquiries* HMSO, London

- Stoddart D** 1987 To claim the high ground: geography for the end of the century. *Transactions of the Institute of British Geographers* 12 327-336
- Stott P** 1998 Biogeography and ecology in crisis: the urgent need for a new metalanguage *Journal of Biogeography* 25 1-2
- Strong M** 2001 *Where on earth are we going?* Texere, New York
- Sukopp H** 1998 Urban ecology- scientific and practical aspects in **Breuste J Feldman H Uhlman O** eds *Urban ecology* Springer Verlag, Berlin 3-16
- **and Werner P** 1982 *Nature in cities* Nature and Environment Series No.28 Council of Europe, Strasbourg
- **and Werner P** 1983 Urban environments and vegetation *Geobotany* 5 247-260
- Swyngedouw E** 1996 The city as hybrid- on nature, society and cyborg urbanisation *Capitalism, Nature, Socialism* 7(2) 65-80
- 1997a Power, nature and the city. The conquest of water and the political ecology of urbanisation in Guyaquil, Ecuador: 1880-1990 *Environment and Planning A* 29(2) 311-332
- 1997b Neither global nor local: “glocalisation” and the politics of scale in **Cox K** ed *Spaces of globalisation: reasserting the power of the local* Guildford Press, London 137-166
- 1999 Modernity and hybridity: nature, *regeneracionismo*, and the production of the Spanish waterscape, 1890-1930 *Annals of the Association of American Geographers* 89(3) 443-465
- 2000 Authoritarian governance, power and the politics of rescaling *Environment and Planning D: Society and Space* 18 63-76
- 2002 Urban political ecology: justice and scale in advanced countries: introduction. *Paper delivered at the 2002 Association of American Geographers Conference* 22/3/02
- **and Kaika M** 1999 The environment of the city or...the urbanisation of nature in **Bridge G and Watson S** eds *Companion to urban studies* Blackwell, Oxford 567-580
- Szacki j Glowacka I Liro A and Matuszkiewicz A** 1994 The role of connectivity in the urban landscape: some results of research *Memorabilia Zoologica* 49 49-56
- Szerszynski B** 1993 Uncommon ground: moral discourse, foundationalism and the environmental movement Unpublished PhD dissertation submitted to Lancaster University
- 1996 On knowing what to do: environmentalism and the modern problematic in **Lash S Szerszynski B and Wynne B** eds *Risk, environment and Modernity: towards a new ecology* London, Sage 104-38
- Takacs D** 1996 *The idea of biodiversity: philosophies of paradise* John Hopkins University Press
- Tangley L** 1986 Biological diversity goes public *Bioscience* 36 708-711
- Tansley A** 1911 *Types of British vegetation* Cambridge University Press, Cambridge
- 1935 The use and abuse of vegetational terms and concepts *Ecology* 16 (3) 284-307
- Teagle W** 1978 *The endless village: the wildlife of Birmingham, Dudley, Sandwell, Walsall and Wolverhampton* Nature Conservancy Council, Shrewsbury
- Tesch R** 1990 *Qualitative research: analysis types and software tools* Falmer, London
- Thomas D and Middleton, N** 1994 *Desertification: exploding the myth* Wiley, Chichester
- Thompson M and Rayner S** 1998 Cultural discourses in **Rayner S and Malone E** eds *Human choice and climate change. Vol. 1: the societal framework* Battelle Press, Columbus OH 265-344
- Thornley A** ed 1991 *Urban planning under Thatcherism: the challenge of the market* Routledge, London
- Thrift N** 1996 *Spatial formations* London, Thousand Oaks

- 1999 Steps to an ecology of place in **Massey D Allen J and Sarre P** eds *Human Geography Today* Polity Press, Cambridge
- 2002 The future of geography *Geoforum* 33 291-298
- **and Olds K** 1996 Refiguring the economic in economic geography *Progress in Human Geography* 20 311-337
- Tickell A and Peck J** 1992 Accumulation, regulation and the geographies of post-fordism: missing links in regulationist research *Progress in Human Geography* 16(2) 199-218
- Tilman D** 1996 Biodiversity: population versus ecosystem stability *Ecology* 77 350-363
- 2000 Causes, consequences, and ethics of biodiversity *Nature* 405 208-211
- Torring J** 1999 *New theories of discourse: Laclau, Mouffe and Zizek* Blackwells, Oxford
- Towers G** 2000 Applying the political geography of scale: grassroots strategies and environmental justice *Professional Geographer* 52 23-36
- Town and Country Planning Authority** 1998 *Inquiry into housing: evidence submitted to the House of Commons Environment, Transport and Regional Affairs Committee* available from the Town and Country Planning Authority
- Trepl L** 1990 Research on the anthropogenic migration of plants and naturalisation: its history and current state of development in **Sukopp H Hejny S and Kowarik I** eds *Urban Ecology* SPB Academic Publishing, The Hague 75-97
- Treweek J** 1999 *Ecological impact assessment* Blackwell Science, Oxford
- Tuan Y-F** 1974 *Topophilia: a study of environmental perception, attitudes, and values* Prentice Hall, New York
- U.K. Biodiversity Steering Group** 1995 *Biodiversity: the U.K. steering group report. Volume 1: meeting the Rio challenge* HMSO, London
- U.K. Biodiversity Group** 2002 <http://www.ukbap.org.uk/Plans/index.htm> visited 14/1/02
- UKLIAG** 1997a *Guidance for local biodiversity action plans: an introduction* UKLIAG, London
- 1997b *Guidance for local biodiversity action plans: developing partnerships* UKLIAG, London
- 1997c *Guidance for local biodiversity action plans: how LBAPs relate to other plans* UKLIAG, London
- 1997d *Guidance for local biodiversity action plans: evaluating priorities and setting targets for habitats and species* UKLIAG, London
- UKRTSD** 1997 *Housing and urban capacity* available from the UKRTSD
- United Nations** 1987 *Our common future* United Nations Department of Public Information, New York
- 1992 *Earth Summit Agenda 21: the United Nations programme of action from Rio* United Nations Department of Public Information, New York
- Upton C** 1993 *Birmingham: a history* Phillimore, Birmingham
- Urban Initiatives / Birmingham City Council** 1999a *Selly Oak development study* Birmingham City Council, Birmingham
- 1999b *Selly Oak development study: outcome of public consultation* Birmingham City Council, Birmingham
- URGENT** 2000 *Annual meeting: Cardiff 9-10/4/2000. Proceedings* available from URGENT Science Coordination Office, CEH Wallingford, Maclean Building, Wallingford, OXON
- 2001 *Ecology project summaries* available from URGENT Programme Manager, Graham Leeks, gill@ceh.ac.uk
- Urry J** 1995 *Consuming places* London, Routledge

- Ursin J** 2000 Group dynamics in the production of new knowledge- a theoretical framework *Paper presented at the European Conference on Educational Research, Edinburgh, 20-23/9/00*
- US Congress Code** 2000 *Title 22- foreign relations and intercourse, chapter 7 - international bureaus, congresses etc. Sec. 274a. International biological program* U.S. Government Printing Office, Washington
- Van Dijk T** ed 1985 *Handbook of discourse analysis: vol. 4 discourse analysis in society* Academic Press, London
- Velody I and Williams R** eds 1998 *The politics of constructionism* Sage, London
- Voloshinov V** 1986 *Marxism and the philosophy of language* Harvard University Press, Cambridge Mas.
- Walker B** 1992 Biodiversity and ecological redundancy *Conservation Biology* 6 18-23
- Wallwork K** 1974 *Derelict land* David and Charles, Newton Abbott
- Ward J** 1999 Biodiversity of floodplain river ecosystems: ecotones and connectivity *Regulated River* 15 125-139
- Ward S** 1998 *Selling places: the marketing and promotion of towns and cities 1850-2000* Spon, London
- Waterton C Grove-White R Rodwell J and Wynne B** 1995 *Corine: databases and nature conservation- the new politics of information in the European Union* Centre for Social and Environmental Change, Lancaster University
- Wells H Wells G and Huxley J** 1934 *The science of life* N/A
- Whatmore S** 1997 Dissecting the autonomous self: hybrid cartographies for a relational ethics *Environment and Planning D* 15 37-53
- 1999 Hybrid geographies in **Massey D Allen J and Sarre P** eds *Human geography today* Cambridge, Polity 22-39
- **and Boucher S** 1993 Bargaining with nature: the discourse and practice of environmental planning gain *Transactions of the Institute of British Geographers* 18 166-78
- **and Thorne L** 1998 Wild(er)ness: reconfiguring the geographies of wildlife *Transactions of the Institute of British Geographers* 23 435-454
- Wheater P** 1999 *Urban habitats* Routledge, London
- Whitfield J** 2001 Conservationists patch it up: urban wildlife may not use green corridors *Nature Science Update* 20th December 2001
- Wikström S and Normann R** 1994 *Knowledge and value: a new perspective on corporate transformation* Routledge, London
- Wildlife Trusts** 2002 <http://www.wildlifetrusts.org/> accessed 14/1/02
- Wilks S and Hall P** 1994 Off the agenda? *Town and Country Planning* 63(7/8) 217
- Williams M** 1994 The relations of environmental history and historical geography *Journal of Historical Geography* 20(1) 3-21
- Williams R** 1973 *The country and the city* Chatto Windus, London
- Williamson M and Fitter A** 1996 The varying success of invaders *Ecology* 77 1661-1666
- Wilson E** 1971 *The insect societies* Belknap Press, Cambridge Mas.
- 1975 *Sociobiology: the new synthesis* Harvard University Press, Cambridge Mas.
- 1978a *On human nature* Harvard University Press, Cambridge Mas.
- 1978b *Life on Earth* Sinauer Associates, Sunderland Mas.
- 1984 *Biophilia* Harvard University Press, Cambridge Mas.
- ed 1989 *Biodiversity* National Academy Press, Washington DC
- 1992 *The diversity of life* Penguin, Harmondsworth
- 1997 *Consilience: the unity of knowledge* Random House, New York

- and **Bosser W** 1971b *A primer of population biology* Sinauer Associates, Stamford
- Wolch J** 1990 *The shadow state: government and voluntary sector in transition* The Foundation Centre, New York
- **West K and Gaines T** 1995 Transspecies urban theory *Environment and Planning D: Society and Space* 13 735-760
- and **Emel J** eds 1998 *Animal geographies* London, Verso
- Wood G** 2000 Ten years on: an empirical analysis of U.K. environmental statement submissions since the implementation of Directive 85/337/EEC *Journal of Environmental Planning & Management* 43(5) 721-747
- Woolgar S** 1986 On the alleged distinction between discourse and praxis *Social Studies of Science* 16 309-317
- and **Cooper G** 1999 Do artefacts have ambivalence? *Social Studies of Science* 29(3) 433-449
- World Commission on Environment and Development** 1987 *Brundtland report: our common future* Oxford University Press, Oxford
- Worster D** 1977 *Nature's economy: a history of ecological ideas* Sierra Club Books, New York
- 1984 History as natural history: an essay on theory and method *Pacific Historical Review* 53(16) 1-19
- 1988 *The ends of the earth: perspectives on modern environmental history* Cambridge University Press, Cambridge
- Wynne B** 1984 The institutional context of science, models and policy: the IIASA energy study *Policy Sciences* 17(3) 277-320
- 1996 May the sheep safely graze? A reflexive view of the expert-lay knowledge divide in **Lash S Szerszynski B and Wynne B** eds *Risk, environment and modernity* Sage, London 44-83
- Yanes M Velasco J and Suárez F** 1995 Permeability of roads and railways to vertebrates: the importance of culverts *Biological Conservation* 71 217-222
- Yearley S** 1996 *Sociology, environmentalism, globalisation* London, Sage
- Yeung O** 1998 *Global governance: drawing insights from the environmental experience* MIT Press, Cambridge Mas.
- Yin R** 1981 The case study as a serious research strategy *Knowledge: Creation, Diffusion, Utilisation* 3 97-114
- 1989 *Case study research: design and methods* Sage, London
- Ziman J** 1994 *Prometheus bound: science in a dynamic steady state* Cambridge University Press, Cambridge
- **Rip A and Cozzens S** 1994 *The research system in transition* Kluwer, Boston
- Zimmerer K** 1994 The 'new ecology' and human geography: the prospect and promise of integration *Annals of the Association of American Geographers* 84(1) 108-125
- 2000a Rescaling irrigation in Latin America: the cultural images and political ecology of water resources *Ecumene* 7(2) 150-175
- 2000b The reworking of conservation geographies: nonequilibrium landscapes and nature-society hybrids *Annals of the Association of American Geographers* 90(2) 356-369
- Zukin S** 1991 *Landscapes of power: from Detroit to Disney World* Berkeley, University of California Press