ENGLISH NATURE

Report Number
641

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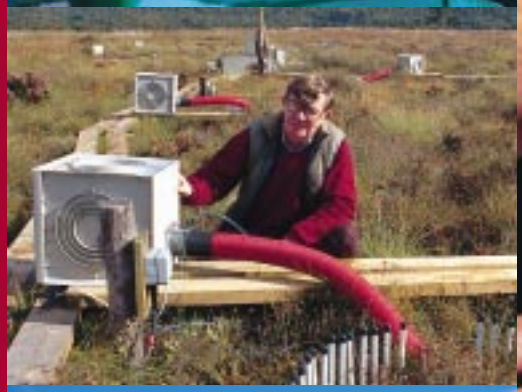

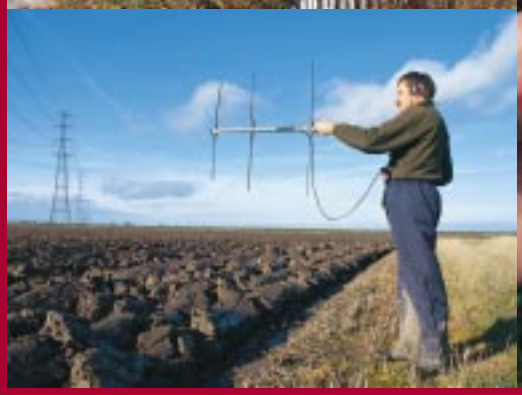

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'Opportunity maps' for landscape-scale conservation of biodiversity: A good practice study

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ISSN 0967-876X

Acknowledgements

The authors are grateful to all those who have taken time to share their knowledge and thoughts on their individual opportunity mapping initiatives, or have signposted us to the best individuals to ask. Many lead players in existing initiatives have taken time to answer detailed questions about their projects, providing an invaluable information base for the analysis in this report. Thanks are also due to John Everitt at The Wildlife Trusts for providing access to the 47 Wildlife Trusts in our appeal for information, and to the Wildlife Trusts who responded to that appeal.

In particular we are grateful to those who gave their time to attend the two workshops in Peterborough and Cirencester: Harry Barton, Craig Blackwell, Simon Brenman, Lex Comber, Andrew Jones, Keith Jones, Penny Knock, Dominic Lamb, Richard Moyse, Ian Paterson, Heather Sohl, Lawrence Tricker, Catherine Weightman and Tony Whitbread.

The authors extend particular thanks to Steve Preston of Sites and Surveillance Team at English Nature in Peterborough, who was the Nominated Officer for this contract and provided encouragement and guidance throughout the course of this assignment. Thanks are also due to Simon Bates of Devon Team for providing background guidance on the previous nature map work which provided part of the springboard for this study.

All errors of fact or interpretation are the responsibility of the authors.

Gavin Saunders
Alison Parfitt

June 2005

Executive summary

1. Given recent widespread interest and activity in landscape-scale mapping of biodiversity targets, collectively described here as 'opportunity mapping', English Nature commissioned this study of the experience of those involved in this field, to capture some key learning points so that good practice elements may be promulgated. To do this, the authors spoke to representatives of opportunity mapping initiatives across the country, and brought together practitioners to exchange experiences in two special peer group workshops.

2. Opportunity maps are defined as 'broad-scale, strategic visions for change which offer a spatially-based tool for identifying where environmental enhancement could or should be delivered in the future, using existing areas of environmental value as a starting point'. Opportunity mapping offers a refreshingly holistic approach to envisioning a future landscape richer in biodiversity, which should also acknowledge at least and hopefully take full account of all other environmental interests (including landscape, historic, access, resource protection). It encourages practitioners to recognise and plan for the necessary ecological functionality of that landscape, offering a practical tool for managing the effects of climate change on natural systems. It represents a natural spatial extension of the biodiversity action planning process, allowing 'opportunity space' for the achievement of BAP targets to be defined. It enables interdisciplinary working and integration between branches of the heritage (historic and cultural) sectors, and between environmental, social and economic planners. And it offers a product which, if well executed, can convey the forward agenda for biodiversity in a fully integrated context to a lay audience more effectively and engagingly than text or figures can do.

3. There are currently approaching forty opportunity mapping initiatives of all kinds either completed, in use or under development across England. Most English regions are covered by at least one regional-scale initiative, with a larger number at sub-regional or county level, and some at a more local level still.

4. Opportunity mapping is both a technical discipline and a strategic process. This study has shown that there is some valuable technical learning to be shared on methodologies for opportunity mapping, that there are principles from other areas of policy development which could be applied to the process behind map making, and that there is some new ground to be covered in terms of communication of map products themselves. These findings are presented as recommended good practice for taking this discipline forward.

5. In relation to process, six principles are proposed:

- Opportunity maps should make links from and to the relevant BAP.
- They should be based on strong partnerships from the outset.
- Partnerships should be on-going to invest long-term in the development of the map and the implementation of the action it proposes.

- Mapping initiatives should try to ensure continuity across boundaries and between scales of mapping.
- A dialogue should be established with local expertise to give authority to the map.
- A mapping partnership must make links to other sectors, eg Historic Environment, Landscape, Resource Protection, Access

6. In relation to methodology, four principles are proposed:

- Opportunity maps should use the best data available, but not be unnecessarily constrained by its absence.
- They should adopt a level of complexity for the mapping methodology which is in keeping with the map's purposes.
- They should use at least a basic ecological rationale to provide a specification for mapped areas.
- They should use a landscape framework (eg local landscape character assessments, JCA and sub JCAs) to provide for a holistic coverage of the area in question.

7. In relation to communication, four principles are proposed:

- An opportunity map should be designed to suit its purpose
- It should be understandable to look at.
- Due care should be given to the words which accompany the map, to avoid misunderstanding.
- The right media should be used to communicate the map to its intended audiences.

8. Opportunity maps and the processes which underlie them are still at a formative stage, at least in the UK, though experience is more extensive in some respects elsewhere in Europe. We are in a period of experimentation, and need to continue experimenting. What is crucial is that the learning which arises from this experimentation is captured, recognised and shared. The study recommends that a practitioners' network be established to enable this learning to continue beyond the publication of this report and to ensure ongoing sharing of knowledge and distribution of best practice. It is clear that Opportunity Maps can provide a potentially valuable contribution to informing or influencing the agendas for shaping the future environment.

Contents

Project brief

A number of approaches have evolved in England and elsewhere in the UK over recent years which aim to deliver biodiversity targets on a landscape scale, by mapping where Biodiversity Action Plan (BAP) habitat might be restored, re-created or created. Whilst terminology is variable and reflects local development, these approaches might be described as 'opportunity maps', with the term 'nature map' or 'ecological network' having also been used.

These mapping projects set out where habitats should or could be created, as opposed to simply proposing numerical targets within an area, as defined by a local BAP or Natural Area Profile. In doing so a number of projects show the beginnings of an ecosystem approach which recognises the interactions between habitat patches and the scope for improving conditions for species movements across wide landscapes. So far this approach seems to have been developed most in the nature conservation sector, though further development of a strategic approach to wider land management aspirations beyond this heritage sector is likely to follow.

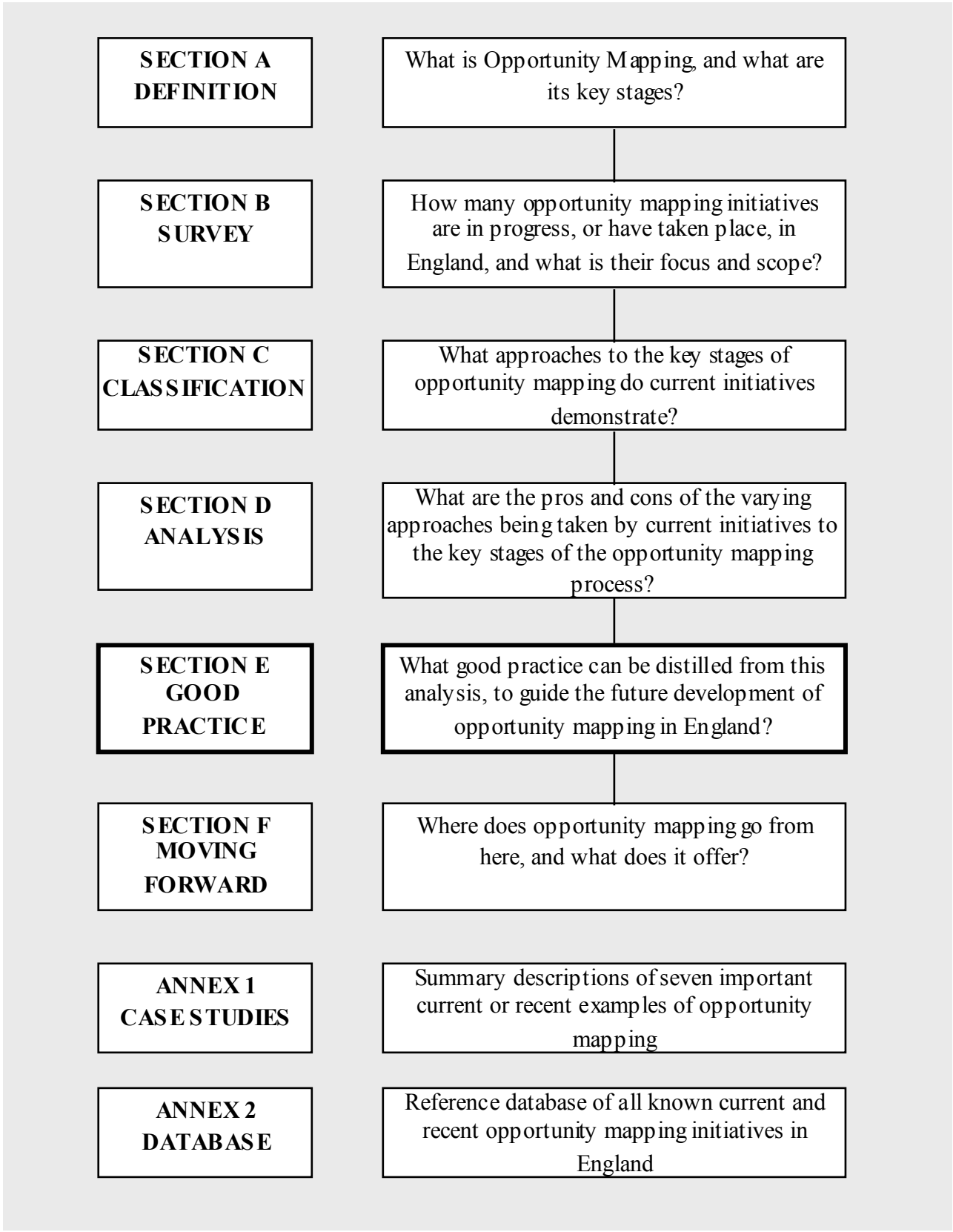
English Nature has been interested for some time in the concept of opportunity mapping and how it might be applied at a range of spatial scales from national to local. English Nature's Lifescapes pilot projects have developed thinking on a Natural Area scale and have aimed to produce visions of future landscapes, or model the options which might be pursued at specific locations. Lessons from the Lifescapes pilots have been gathered and in particular it has been recognised that the provision and delivery of such information is by no means straightforward and will vary according to local circumstances and partners.

The potential role of strategic mapping was further explored during 2003 by a working group within English Nature led by Simon Bates, which considered the scope for an application of the nature mapping concept at an England-wide level. In doing so the group examined a number of mapping case studies in different regions, and it became clear that much more could be learned by examining in detail the variety of approaches so far developed.

Given this background English Nature commissioned this contract in order to capture some of the key learning points from opportunity mapping exercises to date, so that good practice elements could be promulgated.

Meanwhile English Nature is continuing to study the modelling of habitat potential and the means to integrate landscape information into biodiversity-driven initiatives. Given the context of the current reorganisation within the statutory nature conservation, landscape, access, recreation and land management sectors in England, this subject is likely to be integral to an holistic environmental strategic and policy approach in the future, an area in which Natural England will need to lead and prioritise activity.

Structure of this report



Section A - The definition and context of opportunity mapping

1 The origins and definition of opportunity mapping

1.1 From the mid 1990s on, the UK BAP introduced into conservation thinking the idea of setting measurable targets to quantify a forward agenda for biodiversity. For habitats, that agenda is about holding on to what we still have, while also restoring and creating some of what we have lost. Conceptually BAP targets were a big step forward for the sector, introducing an element of business planning into what had previously been a somewhat open ended desire to reverse previous losses.

1.2 Immediately prior to the advent of the BAP, English Nature's Natural Areas approach defined 'biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation' (Biodiversity: The UK Steering Group Report, HMSO, 1995). Taken alongside the Countryside Commission's Countryside Character Areas (and subsequently brought together as Joint Character Areas), Natural Areas introduced a spatial, whole-landscape dimension to conservation planning.

1.3 BAP targets and Natural Areas were initially combined in a rather crude fashion by allocating appropriate portions of targets to each Natural Area, but without taking the spatial definition of targets beyond the Natural Area level.

1.4 As BAP targeting and its associated apparatus has evolved, recognition has grown of the need to restore ecological health at a landscape scale, to secure long term environmental sustainability, especially in the face of the growing threat from climate change. This requires conservation planning to look beyond protected areas and discrete wildlife sites, to wider natural processes functioning across landscapes. BAP targets are insufficient by themselves to define this landscape functionality. Furthermore, the somewhat abstracted nature of their presentation as hectarages and population sizes does not lend itself to popular presentation and understanding.

1.5 Where BAP targeting, Natural Area thinking and awareness of landscape functionality have come together, spatial planning for biodiversity conservation – or opportunity mapping – has begun to evolve, with rapid progress in England and elsewhere over the course of the past five years. At the turn of the millennium there were perhaps only three or four initiatives in progress, but since that time the approach has grown in popularity, driven by a desire to make BAP targets more meaningful to the public, through a need to influence regional development planning processes, to a commitment to developing a more expansionist agenda for nature conservation, influenced in part by the debate about the re-establishment of so-called 'wildland' in Britain.

1.6 There is a case for suggesting that opportunity mapping as a discipline is too emergent to be closely defined at this stage. However, from the definitions used by those who

have pursued the idea most directly to date, the following composite definition seems to capture the concept:

Opportunity maps are broad-scale, strategic visions for change which offer a spatially-based tool for identifying where environmental enhancement could or should be delivered in the future, using existing areas of environmental value as a starting point.

1.7 This outline of the evolution of this process is intentionally focused on the UK experience. The concept of opportunity mapping has a longer pedigree on mainland Europe, where it generally comes under the heading of ecological networks. A number of European countries have well-planned ecological networks in a conceptual or practical state of development.

2 The hazards of conveying a simple idea

2.1 The power of opportunity maps lies in their ability to translate complex biodiversity and other land use priorities into understandable images, able to tie in with other land use planning agendas, and provide a visual framework for target setting which is more fitting for land use planning than numerical and textual approaches. Like any powerful tool however, opportunity maps have the potential to unsafe if they are not constructed and handled carefully.

2.2 At one level the approach seems beguilingly simple: drawing lines on maps to illustrate the objectives of biodiversity conservation (or other heritage sector) is straightforward, and maps are easier to understand, and more interesting, than lists of figures. However there are pitfalls. This kind of strategic mapping goes further than simply defining what is already there, but also indicates what *could* be there, and what *should* be there if certain targets are to be met. Most audiences are not used to maps which define a potential landscape as well as the actual one, and the scope for misunderstanding is therefore considerable. Added to this, lines on maps are traditionally associated with designations of various kinds, whereas opportunity areas by definition are about illustrating options in a loose fashion which guides debate and future planning. When opportunity areas are drawn at a scale which allows the land they cover to be identified closely, this distinction between reality and opportunity may be too subtle to avoid incurring antagonism from landowners and policy makers.

2.3 Added to this, opportunity maps have not had the benefit of a common template on which to draw. BAPs have evolved using the same general structure (vision – objectives - targets - action plan), initiated at a national level, with this structure being reflected in all national, regional and local habitat and species plans. By contrast, the more organic local development of opportunity mapping has much in its favour, in that it maximises local relevance and ingenuity, but it may create maps which have little in common in terms of methodology or presentation, and which do not complement one another across boundaries. This diversity may be healthy, but may merely serve to exacerbate the problems of misunderstanding described above.

3 An exercise in applied biogeography

3.1 The ecological theory which lies behind opportunity mapping initiatives, whether implied or explicitly argued, is not new. Ever since MacArthur and Wilson put forward the theory of island biogeography in the 1960s, the field of landscape ecology has been developing the idea that habitat patches in a landscape do not exist in a vacuum, but are influenced by their size, their position relative to one another, and the physical structure of the landscape in between them. Bigger habitat patches, closer to one another, set in an intervening landscape which is not hostile to species movement, are likely to be more 'functional' in ecological terms.

3.2 The message of opportunity maps is that the future sustainability of habitats demands not only that existing habitat patches are protected, but that they are expanded and connected across landscapes, and that such expansion will be more feasible and appropriate in some locations than others. This may be a novel concept to some audiences, who are familiar with the traditional approach of UK protected areas policy, which has sought to protect only the best examples of different habitats, viewed in isolation, and managed to maintain their wildlife value in spite of their relatively small size and isolation. The landscape level demands a completely new perspective which views areas holistically, and recognises the effect one area of land may have on its neighbours.

3.3 The theoretical background of landscape ecology can be used loosely or applied very specifically in opportunity mapping. It may be enough simply to take away the principle that the bigger and more concentrated habitat patches are in a given landscape, the better. At the opposite extreme, the theory could be used to try and define the dimensions of ecologically functional landscapes, to produce a template which opportunity maps should match.

4 Sharing agendas

4.1 There is a commonly-referred to 'bunker mentality' between different land use and policy sectors, with economic, social and environmental agendas for land use being advanced without reference to one another, and common cause being discovered only occasionally by accident. The same boxed thinking has been evident amongst the heritage sectors, and even within the biodiversity sector itself there has been criticism that different NGO and statutory partners send mixed messages to their audiences, with different emphases and priorities being advanced by different parties. Within the biodiversity sector, the BAP process has gone a long way to encourage a shared agenda and a single message, but the way that agenda is manifest on the ground may still vary greatly.

4.2 Opportunity maps can in theory help to overcome this confusion, offering a vehicle for integrating the strategic aspirations of the conservation sector into a single spatial agenda which can be owned collectively by all parties. In other words, they could help conservationists to speak with one voice, and direct their combined efforts to the places most capable of producing the goods.

4.3 In many cases a collective, partnership approach to opportunity mapping is a natural follow-on from previous biodiversity planning work. This common thinking could even extend beyond the biodiversity sector to encompass landscape and the historic environment, or even overlap with economic and social agendas. However, given that opportunity mapping is a novel, interesting discipline, seen as breaking new ground in several respects, and evolving simultaneously in different areas without a unifying framework, the risk exists that maps will be produced in a disjunctive fashion by individual organisations or a small circle, risking a return to the divergent messages of the past.

5 Key themes for exploring good practice

5.1 Opportunity mapping represents both a technical discipline and a strategic process, and any attempt to define good practice in the subject needs to address both technical and process themes. Broadly, this study has shown that there is some valuable technical learning to be shared on methodologies for opportunity mapping, some principles to be adopted from other areas of policy development to apply to the process behind map making, and some new ground to be covered in terms of communication of map products. In the light of this, three themes present themselves as warranting special exploration in this report.

5.2 **Process**. Like any land use planning exercise, opportunity maps need to gain widespread support and buy-in if they are to effect change. How can opportunity mapping initiatives develop the right level of partnership and breadth of involvement in their preparation, such that their products can carry weight and contribute to a common agenda for land use change? How can the map production process remain live, to allow the product to evolve as understanding of its subject matter improves?

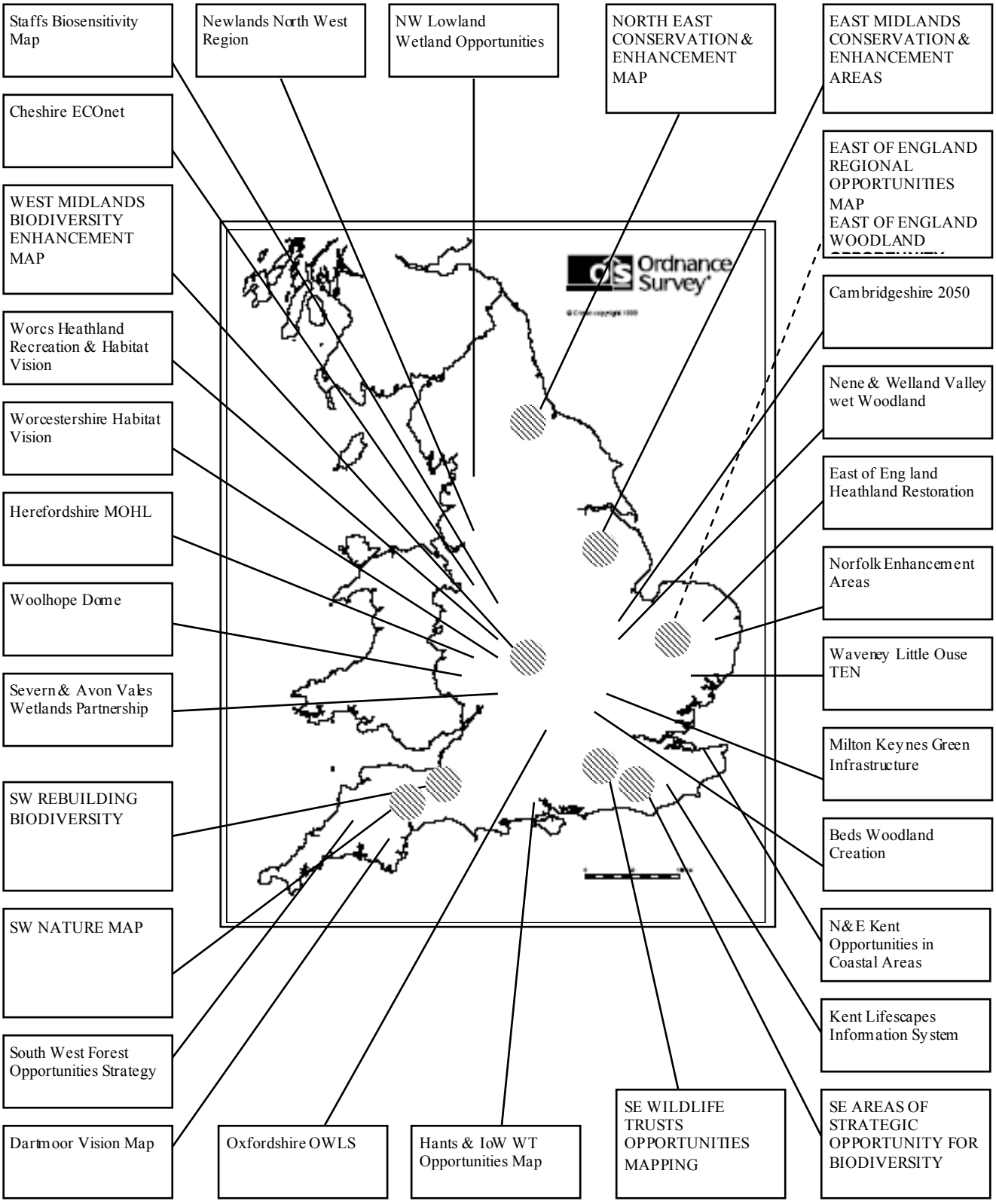
5.3 **Methodology**. A simple concept – that wildlife needs more room – is the tip of a complex iceberg. How should landscape ecology theory influence maps? How should maps relate to and be constrained by existing data? Should they say something about all parts of the landscape, or just selected zones? Experience to date in opportunity mapping offers a number of models for using the theory to benefit the mapping process, from which lessons can certainly be drawn.

5.4 **Communication**. How should maps be 'marketed' to their intended audience to maximise the power of their simple visual message and avoid the pitfalls of misinterpretation? How should the intended audience for the map determine the method of presentation and communication? What media are best suited to communicating the map and its messages?

5.5 These three themes form the structure of the classification, analysis and good practice sections which follow.

Section B - A survey of current and recent opportunity mapping initiatives in England

6 Locations of known mapping initiatives in England



7 Summary descriptions of known opportunity mapping initiatives in England

7.1 On current information there appear to be approaching forty opportunity mapping initiatives of all kinds either completed, in use or under development across England. Most English regions are covered by at least one regional-scale initiative, with a larger number at sub-regional or county level, and a few at a more local level still.

7.2 The largest amount of activity to date has been in the East of England and the West Midlands, with several initiatives also in the South East, South West, North West and East Midlands. The North East seems to be least well served by this type of activity at present.

7.3 In addition to the initiatives summarised here, English Nature's recent Lifescapes pilot projects (in the South Downs, Bowland and Suffolk) have developed thinking at a Natural Area scale and aimed to produce visions of the future landscape, or model the options which might be taken forward. The data management element of the Lifescapes initiative has also helped shape the evolution of some of the initiatives in this list (Kent K-LIS, Herefordshire MOHL and Oxfordshire OWLS).

7.4 The following table provides a brief summary of the initiatives surveyed in this study. Annex 1 provides a more detailed appraisal of seven initiatives, to illustrate some key themes and practice, while details of all the following initiatives, including references and web links where available, are given in Annex 2.

Scale	Title		Summary	Dates
North West				
Regional	NW1	Newlands NW Region	FC and RDA-led regional approach to decision-making system for environmental enhancement of derelict land, using index of multiple deprivation	In progress
Sub-regional	NW2	NW lowland wetland targeting	EN-commissioned GIS exercise for s NW Natural Areas, using multiple datasets to derive areas of potential for restoration and creation of wetland habitats	Completed mid 2004
County	NW3	Cheshire ECOnet	County Council led initiative with universities and European partners to define core habitat, restoration areas, corridors and buffer zones across county using ecological needs of certain target species	Map phase 1999 to 2003
North East				
Regional	NE1	NE regional conservation & enhancement map	EN-led exercise aimed at Regional Spatial Strategy showing key spot locations for conservation /enhancement, plus upland zones, coastal, magnesian limestone and whin sill	2003-04
West Midlands				
Regional	WM1	West Mids biodiversity enhancement areas	Initiative by regional biodiversity partnership to develop map of strategic locations for biodiversity enhancement, adopted with accompanying policy in RPG	2003-04

Scale	Title		Summary	Dates
Sub-county	WM2	Herefordshire MOHL	County Council-led project arising out of Lifescapes to develop a complex GIS-based database of most of county using LDU2s as framework, to produce a landscape and biodiversity related decision making tool	In progress
Sub-county	WM3	Woolhope Dome Biodiversity project	WT initiated GIS-based visioning exercise for a small area of Herefordshire to stimulate public interest and guide change	2001
County	WM4	Staffordshire Biosensitivity Strategy	Strategic Environmental Assessment for County Council on biodiversity for Structure Plan	2004
Sub-county	WM5	North Worcs heathland recreation strategy	Heathland mapping. No information available at present	1997
County	WM6	Worcestershire habitat vision pilot	Pilot habitat visioning project	In progress
Sub-regional	WM7	Severn & Avon Vales Wetlands Partnership	EN/EA/RSPB initiated mapping of catchment in 1999 leading to establishment of partnership for wetland conservation and restoration	Map in 2000
East Midlands				
Regional	EM1	East Mids conservation & enhancement areas	Initiative by regional biodiversity forum in response to RPG providing schematic map as spatial version of BAP targets showing priority conservation and enhancement areas	2002/03
Eastern				
Regional	E1	East of England regional opportunity map	Initiative by regional biodiversity forum in response to RPG and predicted growth levels, to develop a GIS-based network of biodiversity areas and corridors, using LDU1s as basis	2004
Regional	E2	East of England heathland restoration potential	Initiative by consortium of interests including RDA to develop a GIS-based tool to identify areas for heathland re-creation, taking account of environmental, economic & social factors	2003
Regional	E7	East of England woodland opportunity map	FC-led GIS-based initiative to identify and score ancient woodland clusters with restoration potential	2004
County	E3	Norfolk enhancement areas	Simple schematic visioning map produced by WT and biodiversity partnership, published as a popular leaflet to stimulate debate. Gave rise to Eastern regional opportunity map initiative above	2003
County	E4	Cambridgeshire 2050 Vision	Simple schematic map produced by biodiversity partnership to draw attention to restoration agenda and influence agri-environment targeting, published in a popular leaflet form	2002
County	E8	Bedfordshire wet woodland creation project	Mapping of restoration and creation opportunities	In progress
Sub-county	E5	Waveney/Little	County Council-led, Interreg-funded project to	2001

Scale	Title		Summary	Dates
		Ouse TEN project	develop a wetlands-based ecological network for a river corridor on Norfolk-Suffolk border	
Sub-county	E6	Nene & Welland Valley wet woodland mapping	English Nature/FC led partnership to produce woodland map for Peterborough area	Current
Sub-county	E9	Milton Keynes Green Infrastructure	English Nature-initiated, multi-agency project to produce simple map of green infrastructure (greenspace and connecting corridors) in city in face of growth forecasts	2003
South West				
Regional	SW1	Rebuilding Biodiversity in the South West	WT initiative to drive investment in targeted restoration, using ecological viability theory to define minimum scale and number of functional areas for priority habitats, and map these using local knowledge	In progress
Regional	SW2	South West Nature Map	Regional biodiversity partnership initiative to identify the best options for investment of resources for biodiversity conservation, using Rebuilding Biodiversity methodology, aimed at Regional Spatial Strategy	In progress
Sub-county	SW3	Dartmoor Vision	English Nature/NPA driven exercise to map priority areas for conservation and enhancement, covering biodiversity and archaeology, as unified message to landowners and guide advisory work	2003
Sub-regional	SW4	South West Forest Opportunities Map	Forestry-led GIS-based initiative to map optimum locations for woodland creation using multiple datasets relating to growth potential, landscape and biodiversity constraints, social and recreational opportunities	2003
South East				
Regional	SE1	SE Areas of Strategic Opportunity for Biodiversity	English Nature-initiated GIS-based exercise producing grid-based map of overlaid datasets to define strategic areas for restoration	2004
Regional	SE2	SE Wildlife Trusts opportunity mapping exercise	Regional WTs initiative triggered by work in Hants, using similar approach to target areas of potential where WT input likely to be most effective. Looking at experience sharing and cross-boundary issues	In progress
County	SE3	Oxfordshire OWLS	County Council project initiated to show links between LCA and BAP, producing an integrated web-based GIS database to inform strategic decision making on related landscape character and biodiversity issues	Website launched 2005
County	SE4	Kent Lifescapes Information System (K-LIS)	Interactive web-based GIS facility developed by County Council and English Nature, containing landscape and biodiversity information to inform decision making on agri-environment and development planning	Website went live 2004

Scale	Title		Summary	Dates
County	SE5	Hampshire & IoW biodiversity opportunity areas	WT exercise to inform internal development plan, to help direct resources to areas of the county with potential for restoration where WT action is likely to be most effective.	2004
Sub-county	SE6	N & E Kent opportunities in coastal areas	Exercise covering the Sheringham to Lowestoft, North and East Kent, Folkestone to Selsey Bill and Solent & Poole Bay Natural Areas, looking at biodiversity opportunities in intertidal areas facing coastal squeeze, to inform development of Shoreline Management Plan	2003-04

Section C - A classification of approaches in opportunity mapping

8 Discerning patterns within existing practice

8.1 The thirty-one opportunity mapping initiatives listed in the survey above have sprung from a variety of backgrounds, in response to a range of circumstances, and using a spectrum of different approaches. This diversity can be categorised under the three themes of process, methodology and communication to discern a pattern in the way opportunity mapping has been approached in England to date.

8.2 The following section first defines a set of topics under the three themes, which give rise to a series of questions which allow mapping initiatives to be distinguished one from another. This is followed by a classification of initiatives under the topic headings.

9 Classification by themes and topics

Process

9.1 Across the range of recent and current opportunity mapping initiatives, the breadth of ownership of the mapping process varies greatly amongst potential partners, both within and beyond the biodiversity sector. Beyond the formal degree of partnership behind the map is the amount of involvement of the wider network of stakeholder interest in the area covered by the map, and again this varies considerably. Three topics provide useful headings under which to compare and contrast current practice:

- **Partnership** – does the map represent a collective position or an individual organisation's view?
- **Dialogue** – how wide a range of stakeholders have been involved or are set to become involved with the preparation of the map?
- **Scope** – how far does the map venture into the wider sustainability agenda in what it defines?

Methodology

9.2 The manner in which current opportunity maps are constructed varies widely from very complex ecological rationales to simple assumptions, and from detailed verified datasets to extrapolations from sketchy data based on expert opinion. Thus ecological content and relationship to data sources provide the two main topics under which to classify current practice:

- **Use of data** – how do available data sources and data gaps influence the map?
- **Scientific rationale** – does the map employ an ecological rationale to guide the size, shape, location or number of opportunity areas it defines?

Communication

9.3 Opportunity maps occupy different roles in the land use policy debate, either initiating an agenda, contributing to an existing policy process, or providing an objective information source for others to access. The portrayal, commentary and method of broadcasting of the map all vary according to the purpose the map is seeking to serve:

- **Strategic role** – where does the map sit in the wider land use decision-making process?
- **Portrayal** – what does the map actually show, and how does it portray it?
- **Commentary** – what language and message, intended for its audiences, accompanies the map?
- **Media** – how is the map conveyed to its intended audiences?

9.4 The following section categorises the approaches observed amongst existing opportunity mapping initiatives by topic. A spectrum of three or more types of approach is defined under each topic, with a cross reference back to initiative codes in the survey in section B.

10 Process

10.1 Partnership

Does the map represent a collective position or an individual organisation's view?

Approach	Details	Examples
Initiated and led by local BAP partnership	The map is produced under the aegis of a partnership, most commonly provided by the regional or county BAP partnership for an area. In other cases the map is are driven by a partnership involving a subset of local or regional BAP partners.	West Midlands biodiversity enhancement areas East Mids conservation & enhancement areas South West Nature Map Cambridgeshire 2050 Vision
Initiated by one or more parties, then 'sold' to wider partnership	The map project has become partnership exercise after having been initiated by one party. Sometimes the map process may still be regarded, intentionally or otherwise, as being most closely associated with that one party despite the broader formal ownership. In one case the methodology remains the intellectual property of one party, though the map it has helped generate is collectively owned.	Rebuilding Biodiversity in the South West Newlands NW Region Herefordshire MOHL Cheshire ECOnet
One party only	The map is initiated by and associated with one party acting alone with involvement of others only via consultation.	SE Wildlife Trusts opportunity mapping exercise

10.2 Dialogue

How wide a range of stakeholders has been involved or is set to become involved with the preparation of the map?

Approach	Details	Examples
Consultant-led exercise based on GIS data manipulation	The map is produced by external consultants who lead the technical development of the project, with some projects being run entirely by consultants on behalf of the commissioning party. Some consultancies have developed a particular expertise in the subject, leading them to become involved in several initiatives.	NW lowland wetland targeting SE Areas of Strategic Opportunity for Biodiversity
Collective exercise within biodiversity sector	The map draws on local expert knowledge, either based on a simple discussion without a complex methodology behind it, or within the framework of a technical methodology.	South West Nature Map Cambridgeshire 2050 Vision Norfolk enhancement areas
Collective exercise beyond biodiversity sector	The map draws on data, conventions and perspectives outside the biodiversity sector, possibly including landscape characterisation, archaeology, or social and economic deprivation.	Newlands NW Region Dartmoor Vision South West Forest Opportunities Map Oxfordshire OWLS Kent K-LIS Herefordshire MOHL

10.3 Scope

How far does the map venture into the wider sustainability agenda in what it defines?

Approach	Details	Examples
Biodiversity agenda only	The map is confined to a consideration of biodiversity alone, defining areas purely on the basis of habitat and species information and physical data.	Majority of examples
Biodiversity and landscape character	The map places biodiversity considerations into a landscape framework through the use of the LDU level 1 or level 2 classifications.	Oxfordshire OWLS Kent K-LIS Herefordshire MOHL East of England regional opportunity map
Biodiversity led, with reference to other agendas	The map is biodiversity led, but takes other environmental or social objectives into consideration at some level, by using them as a further filter or as a criterion in wider scoring.	East of England heathland restoration potential
Equal weight for social need & environment potential	The map uses social data as a leading factor in prioritising areas on the map, using the index of multiple deprivation as a tool to quantify social need.	Newlands NW Region

11 Methodology

11.1 Use of data

How do available data sources and data gaps influence the map?

Approach	Details	Examples
Comprehensive, verified data available and used	In counties where data availability and quality is good, and the purpose of the map requires it, the full breadth of data has been used and brought to bear in the map and tools associated with it, or scrutinised in the process of map production.	Kent K-LIS South West Nature Map
Comprehensive data available but not used	In some cases although the data may be there, the map may only be attempting a generalised impression of opportunity areas, and so the detail of available data is not used	Cambridgeshire 2050 Vision Norfolk enhancement areas
Data not comprehensive, map restricted	Where the map's method of construction relies on verified data, but that data is not consistently available across the region in question, the map has had to take the lowest common denominator in what it portrays.	SE Areas of Strategic Opportunity for Biodiversity
Data not comprehensive, map extrapolates	In other instances the way the map has been constructed (eg involving an element of expert opinion) will not have been constrained by data availability, and verified data has served in these cases as a guide, with extrapolations to fill unsurveyed areas	SE Wildlife Trusts opportunity mapping exercise

11.2 Scientific rationale

Does the map employ an ecological rationale to guide the size, shape, location or number of opportunity areas it defines?

Approach	Details	Examples
Simple sketching of areas of potential	Maps produced very simply by 'sketching' areas through discussion between knowledgeable individuals, to capture the professional opinion 'in people's heads' about where the best opportunities lie.	Norfolk enhancement areas Cambridgeshire 2050 Vision
Digitising of areas identified using simple rules	Maps produced by applying a simple rule through GIS, such as taking existing habitat patches and drawing a buffer of fixed radius around them.	NE regional conservation & enhancement map SE Wildlife Trusts opportunity mapping exercise
Detailed analysis of multiple datasets	Maps produced through detailed, GIS-generated comparison of multiple datasets to identify areas meeting multiple objectives.	SE Areas of Strategic Opportunity for Biodiversity Newlands NW Region NW lowland wetland targeting

Approach	Details	Examples
Detailed ecological rationale	Ecological requirements of target species are modelled and compared against habitat data for the area of interest to generate, using GIS, a map of existing core and potential restoration areas to fit target species' needs.	Cheshire ECOnet
Detailed ecological rationale plus local opinion	Templates for viable landscape units are defined in terms of size and habitat concentration using a complex ecological rationale, then applied to the existing landscape using local expertise guided by the template figures.	Rebuilding Biodiversity in the South West

12 Communication

12.1 Strategic role

Where does the map sit in the wider land use decision-making process?

Approach	Details	Examples
Assisting decision-making by others	Maps which provide guidance on opportunities (and also constraints) for land management (ie suggesting the 'best' thing to do) at any given location, covering the whole landscape, usually at a county scale. Designed to influence how resources are spent once the location for spending them is decided by others.	Oxfordshire OWLS Kent Lifescapes Information System
Gaining access to the development agenda	Maps produced by the biodiversity sector as a contribution to the regional development planning agenda, to summarise forward opportunities for biodiversity alongside constraints provided by environmental designations. Designed to achieve recognition for biodiversity in a process instigated and driven by other sectors.	NE regional conservation & enhancement map West Midlands biodiversity enhancement areas East Mids conservation & enhancement areas South West Nature Map
Visualising a new targeted agenda for change	Maps produced as a statement of strategic purpose, defining and targeting priorities for habitat restoration at a landscape scale. Designed to influence where resources are spent. Designed to set a specific targeted agenda by the instigating parties, rather than identify all opportunities.	Cheshire ECOnet Rebuilding Biodiversity in the South West SE Wildlife Trusts opportunity mapping exercise Newlands NW Region
Stimulating public debate	Maps produced with a general public audience in mind, conveying a conservation vision for an area in a simple, visual, non-technical way. Serve as a catalyst for discussion, and are effective as a means of translating figures into pictures, and conveying a holistic message.	Norfolk enhancement areas Cambridgeshire 2050 Vision

12.2 Portrayal

What does the map actually show, and how does it portray it?

Approach	Details	Examples
Attributes for all parcels of land	The map provides comprehensive information on all land across the area in question, coding the potential uses of each parcel.	Oxfordshire OWLS Kent Lifescapes Information System Herefordshire MOHL
Selected opportunity areas without distinction	The map selectively highlights a proportion of the land area as having potential for habitat expansion, but does not differentiate between areas in terms of priority or suitability.	Norfolk enhancement areas Cambridgeshire 2050 Vision NE regional conservation & enhancement map
Selected opportunity areas with attributes	The map selectively highlights opportunity areas and then provides some level of evaluation of their priority, based on their suitability or urgency for action.	NW lowland wetland targeting SE Areas of Strategic Opportunity for Biodiversity
Only land above defined threshold	The opportunity areas are filtered against certain factors so that the map only shows those areas which fall above a certain threshold. This may be through a scoring system, or where datasets are overlaid by only showing those sites where several objectives are met.	Newlands NW Region Kent Lifescapes Information System (part)
Definition of ecological minima	The mapping rationale includes an aim of defining a minimum goal for conservation – what is the minimum amount of habitat needed for long term sustainability – and represents this minimum by highlighting the top scoring areas which fall above a threshold or within a defined number.	Rebuilding Biodiversity in the South West Cheshire ECOnet

12.3 Commentary

What language and message, intended for its audiences, accompanies the map?

Approach	Details	Examples
Policy-making audience only	The map has been produced with a planning policy audience in mind, and uses language and forms of presentation which serve this end.	West Midlands biodiversity enhancement areas NE regional conservation & enhancement map South West Nature Map SE Areas of Strategic Opportunity for Biodiversity
Planning. Land use and public audiences	The map has been developed into an interactive web-based system which can be interrogated remotely by users.	Oxfordshire OWLS Kent Lifescapes Information System Cheshire ECOnet
General non-technical public audience	The map has been produced with a public as well as a policy maker audience in mind, and uses simpler language and a more summarised style.	Norfolk enhancement areas Cambridgeshire 2050 Vision

Approach	Details	Examples
Practical land manager audience	The map is being used in the field in discussions with landowners in relation to agri-environment targeting.	Dartmoor Vision Woolhope Dome Biodiversity project South West Forest Opportunities Map
Internal audience only	The map has been prepared purely for internal use to guide the development plans of their organisations, though the result may still have a valuable external currency.	Hampshire & IoW biodiversity opportunity areas SE Wildlife Trusts opportunity mapping exercise

12.4 Media

How is the map conveyed to its intended audiences?

Approach	Details	Examples
Leaflet	The map lends itself to publication in leaflet form.	Cambridgeshire 2050 Vision Norfolk enhancement areas
Local paper	The map is published in a local paper with an accompanying article.	Waveney/Little Ouse TEN project
Website	The map is available on a partnership or partner's website.	South West Nature Map
Interactive website	The map is available primarily through a website in a form which allows users to interrogate it for specific detailed information.	Oxfordshire OWLS Kent Lifescapes Information System Cheshire ECOnet
Directed to policy or technical audience only	The map is directed straight to a specific policy or technical audience without accompanying public presentation.	NE Regional, SW Nature Map
Landowners	The map is presented to landowners to explain the strategic aims of the partnership	Dartmoor Vision South West Forest Opportunities Map
Published technical manual	Technical manual on methodology published separately	Rebuilding Biodiversity in the South West

Section D - An analysis of lessons emerging from experience to date

13 Peer review exercise

13.1 Those who have been involved in the opportunity mapping initiatives described in the previous section have amassed a valuable body of experience from which others can usefully learn in the future. Some of this experience is factual, adding to a potential toolkit for future opportunity mapping. Other experience is perhaps more philosophical, giving insights into the place of opportunity mapping in the wider environmental debate, and the nature of the human interactions involved in making this kind of initiative work.

13.2 To draw on that experience, two seminars were held during March 2005 to bring together two representative groups of individual practitioners from different parts of England, whose work and views would be informative to their peers and valuable for this study. Several of the projects highlighted by these discussions are considered in detail in Annex 1. Attendees at the seminars are shown below.

Seminar 1 **Northminster House, Peterborough** **18 March 2005**	**Seminar 2** **Abbey Home Farm, Cirencester** **23 March 2005**
Attendees: Ian Paterson, English Nature Regional Policy Officer, East Midlands Biodiversity Partnership Keith Jones, Conservator, Forestry Commission NW England Penny Knock, Policy & Development Officer, Forestry Commission NW England Lawrence Tricker, Countryside Partnerships Manager, Kent County Council Andrew Jones, County Ecologist, Kent County Council Lex Comber, Senior Research Consultant, ADAS Catherine Weightman, Biodiversity Partnership Co-ordinator for Cambridgeshire and Peterborough Richard Moyse, Senior Conservation Officer, Kent Wildlife Trust Steve Preston, English Nature	Attendees: Craig Blackwell, County Ecologist, Oxfordshire County Council Dominic Lamb, Countryside Manager, South Oxfordshire District Council Heather Sohl, South West Biodiversity Coordinator, SW Biodiversity Partnership Tony Whitbread, Head of Conservation, Sussex Wildlife Trust Simon Brenman, Director of Regional Programmes, South West Wildlife Trusts Harry Barton, Head of Conservation, Wiltshire Wildlife Trust

13.3 At each seminar, representatives of each initiative were asked to provide a brief presentation to the group on their mapping project. Following consideration of each case study, a facilitated discussion then broadened into an exchange of experience and perspectives under the four main themes introduced in the sections above. An analysis of these discussions reveals a range of valuable insights into opportunity mapping, as presented in the following section.

14 Analysis of process issues

14.1 Relationship with BAP

Lessons emerging

- Biodiversity Action Plans benefit from a spatial expression of their targets, especially for targets relating to habitat restoration, and opportunity maps can provide a vehicle for this.
- Opportunity maps should not be regarded as a direct representation of BAP target figures, but rather a representation of the 'opportunity space' for the delivery of those targets. In this way opportunity maps can focus BAP delivery, and provide a useful way of testing the validity of numerical BAP targets which may have been set originally without the benefit of a spatial dimension. Therefore while in theory these maps provide a step on from BAP targets, defining areas for delivery, in practice by defining those areas, a review and refinement of the BAP targets themselves becomes possible, or necessary.
- Especially in relation to habitat restoration, a given parcel of land may lend itself to more than one target. For example, in a rich landscape of woodland and grassland in close proximity, a target for woodland expansion might be achievable on the same spot as a target for grassland restoration. In such cases a judgement needs to be made as to which target should take precedence at each location. An opportunity map which depicts multiple habitats will need to deal with this issue. The problem may be resolved by recognising that one of the competing habitats has priority by virtue of its relative rarity, or the greater weight placed upon it by the relevant BAP, or the fact that one habitat can only be restored on restricted soil types, whereas the other is theoretically more ubiquitous. An opportunity map can avoid the problem by defining opportunity areas as mosaics within which a certain (undefined) proportion of the land area should be restored to one priority habitat, with others habitats occupying the remaining space.
- Opportunity maps generally represent only the macro agenda for habitat expansion at a landscape scale, and are not intended to describe the whole biodiversity agenda which includes work on smaller sites, reserves or locally-significant features of the wider countryside. This wider agenda will also account for its share of biodiversity target delivery, especially for certain species groups and linear habitat features.
- Given the novel nature of opportunity mapping, there is a risk that those involved in developing a map may feel they have moved on beyond – possibly well beyond - the numerical BAP target era, and that their map usurps the need for BAP targets. Whether or not that is true in the longer term, it certainly is not the case yet, and the

currency and acceptability of BAP targets need to be recognised by opportunity mapping partnerships.

Evidence

- In a number of recent initiatives, especially those developed by regional or county BAP partnerships, the evolution of the BAP targeting process into a spatial planning process has been seen as a natural step. The regional processes in the east Midlands, North East and West Midlands offer good examples.
- It is implicit in a number of regional initiatives that the process of opportunity mapping, though seen as a natural extension of BAP targeting, also requires a feedback loop into the process of reviewing and refining the BAP targets themselves.
- Landscape unit based maps which provide information on all land parcels (eg Oxfordshire OWLS and Kent Lifescapes Information System) have the scope to accommodate – and probably go well beyond – the scope of BAP targets for an area. Macro-scale regional maps which only identify selected parts of the landscape as opportunity areas (such as most of the regional exercises) only show areas for 'headline' activity, which might not be expected to accommodate all BAP targets for an area, and the partial role of the opportunity map in this respect is stressed by most partnerships.
- The Rebuilding Biodiversity in the South West initiative defines Strategic Nature Areas as units of land within which a proportion of the available area (generally 30%) should be restored to a given priority habitat, with the remainder as other habitats and land uses. This allows for subsequent flexibility in planning how potentially 'competing' habitats should take up the available space.
- The impression is given by some projects that the link back to BAP targets has been something of an afterthought, made for reasons of political continuity rather than because there is a practical value in using BAP targets as a driver. In some cases this may be because targets have proved too loose or unspecific, or have seemed poorly founded with hindsight, to be translated into a mapped form.

14.2 Partnerships in map development

Lessons emerging

- Opportunity mapping projects need to be built on strong partnerships from the outset. Successful partnerships pool collective wisdom and skills, especially if they combine different disciplines – policy makers, practitioners, academics, marketers. Partnerships avoid problems of ownership and perceived partisan agendas. Partnerships enable effective communication and keep people in the loop, allowing feedback and exchange.
- The existing environmental partnerships already in place at regional or county level are the best place to start a mapping process.
- It will never be so easy to sell a mapping project to that full partnership if the map has been produced in isolation by one party.
- Partnerships should develop a map with the objective of making its product (and mechanism for its generation) freely available to all those who can benefit from it,

rather than being constrained by notions of intellectual property rights. For this to be possible the costs of map development need to be kept as low as possible, and the cost and effort needs to be shared widely.

- Partnerships of expertise should look to wide horizons for possible sources of support and expertise. This might include advisory input from other regions where opportunity mapping has already progressed, or technical input from partners in Europe or overseas. Such links may serve to strengthen the science behind the map and avoid mistakes which others have encountered.

Evidence

- Mapping initiatives which have been rooted in regional or county BAP partnerships from the outset enjoy broad support within the sector. There are several examples of good practice in this respect, including the North East Regional map, the East Midlands regional initiative, and the East of England regional map.
- Mapping initiatives which have been initiated by one party or a small group, without buy-in from the wider sector from the start, can experience problems in gaining the necessary support at a later stage. In the case of the Herefordshire MOHL much of the development work for the map was done before the initiative went public with its full potential partnership, causing some difficulties in gaining the support the project deserves.
- Maps developed by one party and then brought to the partnership table and may have been constructed from a perspective which is too skewed to the authoring party to satisfy the broader partnership's requirements. The South West Wildlife Trusts developed Rebuilding Biodiversity with their own strategic needs primarily in mind: when the initiative was brought to the Regional Biodiversity Partnership for collective use in developing the SW Nature Map, considerable time was needed to bring people on board, and to define the subtle differences of emphasis between the Wildlife Trusts perspective and the partnership's needs for its own Nature Map.
- Some mapping projects have been carried out largely by consultants, such as the NW Lowland Wetland Targeting initiative, with involvement of a broader partnership only occurring through consultation at various stages. While this approach may produce a sound product, it may make it more difficult to achieve the necessary collective ownership.
- While some mapping initiatives draw heavily on ecological theory, there is little evidence of academic involvement in projects. Cheshire ECOnet is a good example of a broad partnership bringing together expertise from several UK universities.
- Cheshire ECOnet also provides a good example of a transnational partnership, involving the Alterra Institute of the Netherlands as source of the LARCH modelling programme.

14.3 Maintaining partnerships beyond map publication

Lessons emerging

- Opportunity mapping is an emerging discipline, and current approaches are likely to be refined and improved considerably over the next few years as the science, consistency and data availability improves. Therefore the products of the mapping

process should not be regarded as final, but rather as current iterations of an evolving case (but see 16.3).

- Given the likely need to develop the map over time, the partnership behind it needs to remain active and able to facilitate this evolution.
- The more a mapping process costs to run in the first place (in staff time or technology costs), the less likely it is to be repeated at a later date when the data and science has improved. While some of these costs will be one-off developmental costs which would not need to be repeated, there is a case for keeping all costs to a minimum so that the process remains light on its feet.
- Maintaining a partnership will make it easier to proceed towards implementation of the priorities for action which the map highlights.

Evidence

- In providing the methodology behind the South West Nature Map, the SW Wildlife Trusts have stressed that its current product is a first iteration, which will be revised at a later date. This has helped some sceptical parties to accept the map at this stage, in the knowledge that there will be opportunity to improve it later.
- The Dutch LARCH model which has been used in the Cheshire ECOnet project offers a rigorous mechanism for defining ecological networks which could be used anywhere in England, as well as being re-run in Cheshire as data improves. But the initial run of the model for one county cost in the region of £20,000, which might deter some from adopting such an approach, albeit one which offers a good deal of scientific rigour.
- Few mapping initiatives have yet been in existence long enough to be judged by the acid test of their effect on implementation – ie whether they mean that more, better action for biodiversity actually takes place on the ground. In some cases such implementation is underway: the Cheshire ECOnet partnership has initiated a Sandstone Ridge project to restore and connect habitats in a targeted area covered by the wider Cheshire map. The South West Wildlife Trusts have secured grant aid for focused habitat restoration work in some of the priority Strategic Nature Areas identified by Rebuilding Biodiversity.

14.4 Continuity across boundaries and between scales

Lessons emerging

- Because maps are being developed independently at different scales and for different areas using different approaches they are likely to produce different pictures. If their opportunity areas are constructed on very different premises then maps may contradict each other, either across boundaries or from regional scale to county scale, devaluing the message of both maps to their respective audiences.
- If two initiatives are in progress simultaneously in two adjoining regions or counties, some communication across the shared boundary should allow major contradictions to be avoided.

- If a regional initiative and a county project are both addressing the same area, albeit at different scales, communication between mapping partnerships again should ensure the maps complement one another adequately.
- A productive interaction is more likely to be achieved if Natural Areas (or Joint Character Areas) are used as the framework for mapping, rather than administrative boundaries, though achieving a collective approach to a Natural Area which spans more than one county may be challenging.

Evidence

- In some instances data accessibility has prevented maps from ensuring a proper overlap. For example the NW Lowland Wetland targeting map consultants were unable to access GIS data from the Cheshire ECOnet, thus precluding a matching of outcomes between the two maps.
- In a number of instances however, different, overlapping maps succeed in giving the same broad message for a given area of overlap, either by design or by reaching similar conclusions independently.
- The South West Nature Map and Rebuilding Biodiversity - two initiatives covering the same area - have come together to work on producing a single shared product.
- In the South East, the SE Wildlife Trusts have developed their own draft ecological network map independently from the EN-led regional map of Areas of Strategic Opportunity for Biodiversity, intentionally to highlight the different results this throws up. Though this is useful food for debate it could be argued that the message it gives to external audiences may undermine their cause.
- The South West Nature Map/Rebuilding Biodiversity project sought to involve local expertise on a Natural Area basis, to allow all opportunity areas in a common natural unit of landscape (a Natural Area) to be evaluated together. However, because local experts were mobilised via county BAP partnerships, those county partnerships insisted on carrying out the task on a county basis. Thus Natural Areas spanning county boundaries had to be considered in county segments, causing problems of consistent treatment between counties.
- Differences across boundaries may reflect different levels of data availability, for example as found in the South East (see 15.1)

14.5 Stakeholder dialogue

Lessons emerging

- Dialogue in the mapping process can and should go beyond the immediate instigating partnership, to engage with stakeholders by virtue of their local or specialist knowledge. Opportunity maps which engage local sources of expertise in their development, rather than simply generate their products electronically, are likely to be more authoritative and certainly better received. Thus there is a strong case for developing a dialogue with local experts in the mapping process.
- The trick is to maintain a strategic overview while taking account of local knowledge, and this may be best achieved by drafting opportunity areas using a single regional methodology, and then refining the boundaries of those areas using local knowledge

to ensure they take account of features and factors which regionally-available datasets cannot access.

Alternatively opportunity areas can be selected using local experts in the first instance, but using a regionally-consistent set of 'rules' to govern the size, number or location of opportunity areas chosen.

Evidence

- A number of maps are based purely on local expert opinion, rather than such opinion supplementing a GIS-driven mechanism – the Cambridgeshire 2050 map and the East Midlands Regional Conservation & Enhancement map are two examples at different scales. These seem to have been successful in presenting a view which represents the settled view of the biodiversity sector.

14.6 Cross-sectoral integration

Lessons emerging

- If opportunity area identified on environmental grounds can be overlaid with spatial data on social and economic need, there is the potential to identify opportunity areas which 'tick several boxes' and which consequently are likely to attract particular funding support.
- As well as encouraging joined-up thinking and wider partnerships, this offers a pragmatic tool for locating opportunity areas where investment is most likely to be achievable.
- While this approach can work for social and economic data which occupy a similar spatial footprint to environmental data, in other cases social and economic data will be off-set in their impact, precluding a matching up of agendas at discrete locations.
- Within the narrower scope of the heritage sector (biodiversity, landscape, historic environment) it is possible to use opportunity maps effectively as a route to integrated thinking and shared agendas.
- The biodiversity-landscape linkage seems best pursued through the adoption of Landscape Description Units (LDUs) as a framework for opportunity mapping.
- Priority locations for conservation of the historic environment can be represented readily on opportunity maps. Degree of overlap between historic and natural environmental priorities can be used as a means of prioritising between opportunity areas.

Evidence

- The scope for combining environmental with social and economic data to identify areas offering multiple benefits has been explored in greatest depth by the Newlands North West initiative led by the Forestry Commission with a partnership under the NW Regional Development Agency, which has explored the use of the Public Benefits Recording System (PBRS), latterly superseded by the use of the Index of Multiple Deprivation (IMD). Overlaying IMD data on the 'derelict, underused and

neglected' land survey data identifies areas with high social need and low current environmental benefits, where investment could serve environmental and social ends.

- The use of LDUs as a framework has been demonstrated by Oxfordshire OWLS, Kent K-LIS and the East of England regional opportunity map, with Herefordshire MOHL pursuing a similar approach (see 15.3).
- The biodiversity and historic environment agendas have been brought together effectively in the Dartmoor Vision map.

15 Analysis of methodology issues

15.1 Use of data

Lessons emerging

Biodiversity data (especially habitat information) and data on ecological capacity (geology, soil type, hydrology, topography) are essential tools in opportunity mapping. The mapping process needs to access the most comprehensive and verified data available.

- However, in few places is the data resource complete or ideal in all respects. Processes like opportunity mapping need to continue to develop even if all desirable data are not available.
- At a regional level the availability of consistent, verified data across a region will greatly enhance the quality and practicability of an opportunity mapping process.
- A clear distinction needs to be made between verifiable data and extrapolation or expert opinion.
- Local Records Centres are crucial to opportunity mapping processes. They should be brought on board as partnership members from an early stage.
- The process of producing opportunity maps will in itself identify priorities for new data & data products. Problems and barriers presented by data failings should be noted in the course of developing a map, so that an agenda for data improvement can be generated by the process.

Evidence

- The National Biodiversity Network pilot in the South West has produced a consistent regional dataset on 40 UK BAP Priority Habitats, providing a resource without which the region-wide SW Nature Map would have been severely hampered.
- The South East Areas of Strategic Opportunity for Biodiversity map was undermined by the inconsistencies between datasets for the constituent counties of the region, and was obliged to take a lowest common denominator in its GIS-driven calculation of opportunity area locations.
- The potential value of comprehensive data is shown vividly by the Kent K-LIS web-based map products.
- Cheshire ECOnet converted paper inventories of priority habitats onto GIS in order to be able to undertake spatial analysis. LARCH modelling did not require actual species data.

15.2 Ecological rationales

Lessons emerging

- There is not a single, settled view in landscape ecology to use as a text book for designing an opportunity mapping process. Though the basic principles are widely accepted (that species populations in habitat patches are affected by their surroundings, and are more likely to persist on larger sites or in landscapes with a greater concentration of patches, and an intervening landscape which is not hostile to genetic exchange), the research data available does not offer straightforward, consistent answers to questions about how big and how close habitat patches need to be, and what makes an intervening landscape hospitable to species movement.
- Furthermore, some argue that habitat quality within individual patches is more important to functionality and sustainability than quantity, size or isolation. It seems clear that ecological viability is determined by a number of interacting variables, and isolating the effect of one is very difficult. Generalised rules may be approximated, but must necessarily be viewed with caution and used only as a guide.
- The basic principles of seeking larger patches, in closer association, with a better intervening landscape can successfully be used as an underlying rationale for opportunity area selection, but the precise figures used will necessarily be theoretical, approximated from limited research data, and requiring update as the research improves.
- Though only approximate, and open to debate, figures which provide a specification for opportunity area size do have the advantage of providing a unifying consistency when used to shape a regional map. This is helpful when mapping is done separately by different groups of local expertise working over an extended period.
- As the maps take shape, it is important to record the rationale behind the decisions that are taken, to provide an 'audit trail' to help map users to follow the logic behind areas selected.

Evidence

- Two opportunity mapping initiatives to date stand out for their adoption of ecological rationales in opportunity area selection. Both are conceptually complex.
- The Cheshire ECOnet project was led by Cheshire County Council as UK partner in the EU Life ECOnet initiative. There have been two distinct phases in the Cheshire work. First, the County Council undertook a GIS-based mapping exercise to define an ecological network comprising core areas (existing habitat), nature restoration areas (for targeted habitat restoration) corridors (for species dispersal and migration) and buffer zones (for protection from external pollution). Following on from this exercise, the Alterra Institute, partners with Cheshire in the Life ECOnet programme, ran their LARCH programme for the county, modelling the spatial needs of selected species (15 species of butterfly, amphibian, bird and small mammal) using a combination of area requirements and dispersal capacity. A third phase involved the design of a scenario (with stakeholder involvement) that would improve the ecosystems of the target species, and then re-running the LARCH model against the scenario to see if the situation would result in real ecological benefits. The advantage

of these approaches is their relative objectivity and consistency. Its disadvantage is cost, in that running the LARCH analysis programme was an expensive one-off exercise.

- The Rebuilding Biodiversity methodology developed by the South West Wildlife Trusts uses an approach derived from Ecoregional Planning in the US to define Strategic Nature Areas (SNAs) for a series of priority habitats, each made up of habitat patches of prescribed size, making up a prescribed proportion of the SNA surface area, thus giving a minimum level of habitat concentration across a landscape. Individual habitat patch size is derived from Minimum Dynamic Area figures for area-limited species characteristic of each habitat. The actual selection of opportunity areas is done by hand using local experts guided by the figures from the rationale. The advantage of this approach is that it combines a consistent ecological rationale with local expert views, and is relatively cheap to use, though time-costly in the development of the theory. The disadvantage is the relative weaknesses of the figures used in the rationale, and the degree to which different groups of experts have been prepared to stick to the guidelines in selecting areas.
- Both these approaches potentially offer a scientific rigour to opportunity mapping, but both are science-heavy and are open to criticism over the validity of parts of their complex methodologies. It remains to be seen whether the much larger investment in ecological rationale made by these projects pays off in a more effective outcome on the ground.
- Several other mapping initiatives use an ecological rationale in a simpler or less explicit form. The basic ecological notion that habitat are best restored close to existing source populations, where the soil and other physical factors are correct, underpins the majority of approaches. The dimensions and content of opportunity areas are not prescribed however. Instead, in instances where the mapping process needs to define a minimum size for areas to appear on the map, an arbitrary figure is used and the GIS programmed to remove any composite mapped area which falls below that threshold. The South East ASOB map and the Kent K-LIS map both use a threshold size limit in this way.
- An additional tool which recognises the importance of patch isolation in mapping is offered by the East of England Regional Biodiversity map. This used an Inverse Distance Weighting technique to define degree of fragmentation, producing a map showing relative isolation of habitat patches which could be used as a guide to density of source patches for restoration. Degree of isolation scores were divided into three categories, which formed the basis of three levels of biodiversity enhancement area.

15.3 Landscape frameworks

Lessons emerging

- Maps which offer a decision-making tool for others are, by definition, comprehensive in their coverage of the landscape, in that they seek to offer advice to guide land use decisions wherever they might need to be taken. Other maps do not attempt to provide this decision-making tool, but instead are designed to set out an agenda for change or to focus on particular discrete areas.
- Though valid in their own terms, these latter types of map suffer from the anxiety they cause amongst some of their audience about the ‘white areas’ on the map which are

outside the boundaries of the opportunity areas. Concerns are expressed by some of that audience that the white areas are devalued by default through this process, despite holding important, albeit dispersed, conservation features. These maps do not set out to undermine these white areas, but the impression of lack of significance is inevitably left in the observer's mind. Some maps have sought to overcome this difficulty by assigning a background colour to the white areas, to counter the impression of 'empty' white space, but clearly this does not address the fundamental problem.

- It can reasonably be argued that a regional-scale map, which sets out to prioritise between different areas of land, must by definition reject a proportion of the landscape, but the contrast between included and excluded land is made more stark by the top-down approach of starting with a blank canvas and selecting opportunity areas from scratch. By contrast, maps which take a holistic approach still assign differing degrees of priority to different areas, but do so in a bottom-up manner, whereby all land is afforded some attribute, even if it is negligible. Larger zones of priority land, which would be highlighted as single entities through a top down approach, naturally take shape by the agglomeration of individual parcels each offering a particular set of qualities.
- Maps which provide a holistic approach to the landscape generally use landscape character designations as their basic framework. Joint Character Areas (JCAs) are broken down into a finer-scale set of Landscape Description Units (LDUs). Part of the value of LDUs in theory lies in the fact that they are a national database, available for all areas of England. In practice however the application of the Landscape Character Assessment (LCA) methodology has been different in different counties, meaning the results are not directly comparable at a local level and may not fit easily into the nested hierarchy of spatial units.
- JCAs have the advantage of bringing landscape character and biodiversity together, offering a potentially powerful basis for opportunity mapping at a national and regional level. However LDU1s, though potentially very useful at a regional level, are very general in some areas of the country, encompassing wide physical and vegetational variation in large single-type zones, making them inadequate for county scale use or lower. LDU2s and local LCAs are more detailed and offer more useful information, but may be too fine-grained to be usable at a regional scale. It is thus important that the appropriate scale of landscape unit is employed, with no one unit being effective at all scales.
- These approaches can only realistically be developed where data is comprehensive and consistent across the entire map area.

Evidence

- There are four major examples of the use of landscape units as a framework for comprehensive environmental information systems to guide decision making.
- The Kent Lifescapes Information System assigned a score to every land parcel above 0.2 ha for each of a series of six key habitats. Scores reflect presence of existing habitat, intensity of current land use, physical suitability of the land for the habitat, and landscape appropriateness based on LDU2s. Scores were placed into three categories, with the top 5% classed as representing the greatest opportunity for each habitat in question, 5-25% representing medium opportunity, and the remainder

classed as minor opportunity. The result is a map which directs the user to land which offers the best scope for extending, buffering and linking existing priority habitats.

- Oxfordshire's OWLS initiative combines a biological and landscape scoring system to produce a similar result. A Biomap of the county is based on bioscores which reflect the range and type of habitats associated with each LDU. The bioscores are grouped into broader biobands. A bioband which is classified as very high tends to support a wider range of wildlife habitats including some which may be of national or international importance. Lower biobands generally have fewer habitats and these are usually of more local importance. All areas of the county are assigned to a band. A biolandscape map combines landscape zones with bioscores to provide a detailed description of the actual and desirable natural character of the county, which can be interrogated to parish and sub-parish level.
- The Herefordshire MOHL initiative is at a more formative stage but follows similar principles in using LDU2s as a framework.
- The East of England Regional Biodiversity map, produced as a response to the Regional Spatial Strategy and the need to define a forward agenda for biodiversity in the face of development forecasts, used LDU1s as a framework, and then analysed the distribution of Priority Habitats within each LDU. Those with over 10% existing habitat were defined as Biodiversity Conservation Areas. The remaining LDUs were defined as Biodiversity Enhancement Areas, in three categories on the basis of proportion of existing habitat, 'rural proportion' as an indicator of habitat potential, and patch size/fragmentation.

15.4 Simple mapping approaches

Lessons emerging

- An opportunity map can be produced without the use of the complex ecological rationale, or a heavy reliance on GIS-based modelling. It can be drawn straightforwardly by a group of knowledgeable individuals looking at the physical capacity of the landscape to accommodate particular habitats. It need not consider the relative viability of the habitats which might be created in areas of different size.
- The result of this approach can be a disarmingly simple map which shows a straightforward set of habitat expansion zones. This approach has the advantage of being quick to produce, easy to repeat, and may be easier to convey to non-technical audiences. As a catalyst for initiating debate or illustrating the basic notion of habitat expansion, it can be very effective (see 16.2).

Evidence

- The best examples of this simple approach are the Cambridgeshire 2050 map and the Norfolk Enhancement Areas map. They have the advantage of being produced for counties whose habitat distribution is relatively sparse, making it easier to present a simple model for its expansion.

16 Analysis of communication issues

16.1 Strategic role

Lessons emerging

- The appearance, language and means of communication of an opportunity map should be dictated by its purpose and intended audience.
- Many opportunity mapping initiatives, especially at a regional scale, have been motivated by a perceived need to feed into the regional planning process, during the preparation of Regional Planning Guidance and of Regional Spatial Strategies. Decision-makers need tangible and comprehensible information to help them understand how the choices they make will impact on our future environment.
- Opportunity maps represent an innovative way of presenting a case, since the simplicity of a map has seldom been used in environmental policy making before, other than to define the absolute locations of designated areas. Since environmental mapping is closely associated with designation, there is a risk that opportunity areas will be equated with designations in policy makers' minds, with the result that they will be rejected during the planning process.
- Maps produced at a regional scale to influence regional policy generally offer schematic, strategic representations of priority areas, in keeping with the strategic representation of other regional development policies.
- Areas delineated on an opportunity map represent a different concept from areas shown on a traditional environmental constraints map. They show opportunities for creating, extending, and in planning terms, sometimes for mitigating and compensating. The culture of strategic planning is not yet very familiar with this concept, so opportunity maps need to be presented to planners carefully and clearly as a tool to help with positive planning.
- Those involved in preparing maps may themselves fall into a constraints frame of mind when choosing areas to be mapped. If participants in a mapping process argue that to leave an area off the map risks it being favoured for development, this shows that opportunity areas are being regarded as areas to defend in much the same way as traditional environmental designations. If this is the case planners are to be forgiven if they regard opportunity areas as simply a designation by another name.
- Where a mapping system is applying attributes to all parcels of land, rather than selective zones, it can be argued that there is a sliding scale between constraint and opportunity. Constraint in the traditional sense applies to existing prime habitat, regarded as a critical area into which development should not stray. From prime habitat through lower-value habitat to areas with low ecological value, the balance gradually shifts from constraint to opportunity, as the room for manoeuvre in terms of creative nature conservation and loss versus gain becomes broader.
- Opportunity maps are envisaged as offering a tool for agri-environmental targeting. Defra has already developed several mechanisms for targeting agri-environment schemes, and to be well received it is important that a mapping partnership recognises that their map may at best be viewed as one tool alongside several others to assist with targeting. An expectation that the map will become the pre-eminent vehicle for this targeting is unlikely to be fulfilled.

- Opportunity maps can encourage landscape-scale thinking in the realisation of BAP targets. They can generate valuable debate about future land use policy, and help target limited resources to best effect. They have the potential to help policy makers address the dynamism of natural processes into a proper context rather than regarding landscapes and wildlife as administratively fixed.
- Opportunity maps offer a potentially powerful tool in modelling possible land use responses to species shifts induced by climate change. Maps produced with this issue in mind have an immediate and very significant currency, to stimulate debate and attention for the issue regardless of how effective their model might currently be for dealing with ecological shifts.

Evidence

- When the East Midlands biodiversity partnership produced its own first regional map it was rejected by RPG inspectors as constituting an additional and inappropriate land designation. Latterly however, there are signs that planners and the planning system are coming to understand the opportunity area concept more readily, and maps have been adopted into regional spatial strategies successfully in the West Midlands, North East and South East, with the prospect of similar results in the South West and Eastern England.
- The Oxfordshire OWLS project has advocated the notion of a sliding scale between constraint and opportunity.
- Models for looking at implications of climate change for species movement are not yet well developed, yet some opportunity mapping initiatives, notably Rebuilding Biodiversity in the South West, have based their rationale on the need to plan for these changes.
- The Cambridgeshire Vision 2050 map seems to have been well received by Defra locally, and has contributed effectively to agri-environment targeting. Associated guidance notes have been prepared for farmers to illustrate the map's strategic message about the particular value of habitat restoration close to existing habitat patches.

16.2 Portrayal

Lessons emerging

- Maps are inherently a good medium for conveying a message about land use. Many people respond to and understand a map more readily than they would a version of the same information in text of in figures.
- However, maps are only interpretable if they include enough base information to allow people to orientate themselves. Blobs on regional maps with little more than county boundaries and major towns marked on them are unlikely to be understood. An OS base is needed to make them intelligible.
- GIS offers a wide range of options for colouring, shading and bordering opportunity areas, yet the scope for confusion and lack of clarity is immense. Where one type of information is overlaid on another, the scope for confusion is magnified. Simple

colour coding, and separation of different layers, is preferable to avoid these difficulties.

- Undoubtedly the easiest maps for the viewer to understand are those which can be interrogated and navigated on line, allowing layers to be viewed separately and magnification to be altered.
- Hard-edged opportunity areas can be misleading unless the boundary is intentionally definite. In most strategic maps at regional level this will not be the case, and an indicative, 'soft' boundary, using a hatched or a 'air-brushed' line.
- Not everyone finds maps easy to understand, and there may be scope for employing other approaches. Some of these may be high tech, like 'virtual reality' simulations of future landscapes, or photo-manipulations. Other may be low-tech, like sketches and illustrations.

Evidence

- At a regional scale some mapping projects have found it hard to present their information at a suitable scale (eg on A4 paper) which can accommodate a decipherable, meaningful OS base.
- The interactive web-based maps provided by Kent K-LIS and Oxfordshire OWLS offer the best solution to the user, in that data which cannot be placed when viewed at a regional level can be zoomed in upon to reveal an OS base at detailed local level. The Cheshire ECOnet Toolkit is also available via the web. This sophistication is beyond the scope of most maps however.
- At a strategic level, when compared against schematic spatial information in a regional spatial strategy for example, opportunity areas can be readily understood without a background OS layer when the intention is simply to show their spatial relationship to major urban centres, industrial areas and transportation links.
- The Dutch 'Sketchbook' produced as part of the Netherlands' programme for developing a national eco-network illustrates its projected future landscapes using simple pen and ink drawings of how a future networked landscape might look. Though intentionally imprecise, these images are accessible and help to bring the subject to life in way that a map does not.
- Some initiatives such as Newlands North West have taken GIS data manipulation to extremes in representing spatial data as three dimensional contour maps for factors such as multiple deprivation and overlap with incidence of derelict land.

16.3 Commentary

Lessons emerging

- Though novel and attractive as a vehicle for presenting their message, an opportunity map is not a panacea for establishing a forward conservation agenda by itself. Its effectiveness will only be as good as the explanatory commentary which accompanies it.
- Opportunity areas are a new concept, and not surprisingly some maps produce misunderstandings amongst target audiences about their meaning and purpose.

Concern is often expressed that land outside priority areas (the 'white areas') will be devalued by its exclusion.

- An opportunity map should provide a clear and unambiguous commentary to explain exactly what it depicts, to avoid misinterpretation of its message.
- The evolving, iterative nature of a map may make it seem too ephemeral for use in long-lived strategic documents like spatial strategies. The way round this is to emphasise that the essential message of the map (that opportunities for biodiversity expansion best pursued in those areas which have existing habitat fragments, and the correct physical conditions) and its basic framework (ie the locations of existing habitat fragments and suitable conditions) is likely to remain fixed, even though the dimensions of the opportunity areas may change.
- In these cases it is essential that the role of maps as one tool alongside many others in conservation planning is clarified, so that the continuing importance of conservation action in the wider countryside is not overlooked.
- Opportunity maps respect ecological principles whilst allowing a degree of economic exploitation. They are designed for a multi-use landscape so that the whole is greater than the sum of the parts. A statement that sets out the nature conservation goals and also demonstrates the socio-economic benefits of opportunity areas should accompany the map.

Evidence

- Maps produced as contributions to regional spatial strategies have developed explanatory texts to accompany policy statements. Good examples are the regional maps for the West Midlands and the North East, and the South East map of Areas of Strategic Opportunity.
- The Kent K-LIS and Oxfordshire OWLS initiatives, and also to some extent the Cheshire ECOnet Toolkit, have demonstrated the power of web-based media as a means of providing users with an accompanying commentary and instructions for using maps at a variety of scales, and interpreting what they show.

16.4 Media

Lessons emerging

- Given that maps can be an excellent way of conveying a simple message to a non-technical audience, there is scope to broadcast them through popular channels like local newspapers and magazines, or via leaflets or a variety of websites.
- Maps whose purpose is to assist decision-making necessarily need to be interactive and self-explanatory, and web-based systems can be a very effective means of communication.
- There is an inherent dilemma to be faced in deciding how to disseminate a map, relating to the need to balance the desirability of wide access with the risk of adverse reaction. The more adventurous a map is in identifying areas for habitat expansion, the more scope there will be for negative reaction from parties who will see this as a threatening agenda which may affect their freedom of action and the value of their land. The more detailed and local the map becomes, the more acute this issue may

become. This underlines once again the critical importance of explaining just what a boundary on a map actually means – explaining the meaning of opportunity as opposed to constraint.

Evidence

- The Cambridgeshire 2050 map was published through a leaflet mailshot and via the local BAP partnership website, and was launched through an event using school children to represent the map themselves in a school playground.
- The Waveney and Little Ouse TEN project published its map with an article in a local paper.
- The Norfolk Enhancement Areas map was published in leaflet form.
- Web-based mapping in Kent, Oxfordshire and Cheshire is practicable and very useful (provided its intended audience is aware of its availability). However its ability to drill down to field level may present problems in terms of the implied message about individual landowners' properties.

Section E - guidance on good practice in opportunity mapping

17 Turning experience into guidance

17.1 The experience of those involved in opportunity mapping initiatives to date suggests that, broadly speaking, opportunity maps will be most successful if they combine clarity of purpose, a sound partnership moving out into wide stakeholder dialogue, a broad consideration of heritage agendas, a methodology which fits the purpose, reliable data, and a clear and well-explained map product.

17.2 This section synthesises this experience into a set of simple guidance which, if widely adopted, could help to ensure that this subject progresses in a mutually aware, consistent and effective manner into the future.

17.3 The guidance is set out under the three headings of process, methodology and communication. For each element of the guidance, a principle is first defined, then general guidance is offered which expands on this principle, and finally specific options are offered relating to different opportunity mapping circumstances.

17.4 It must be emphasised that in many areas of opportunity mapping, there is no one size to fit all situations. What works in one region may not do so in another, and the options described in this section reflect the diversity of circumstances as far as possible. However the advice offered under the general guidance heading is intended to be as universal in its applicability as possible.

18 Guidance on good practice

Principle	General guidance	Specific options
18.1 Process guidance		
Make links from and to the BAP	• Opportunity maps should evolve from, and with a conscious linkage to, the relevant BAP, and provide a vehicle for a spatial expression of BAP targets, especially for targets relating to habitat restoration. • Opportunity maps should portray the 'opportunity space' for the delivery of BAP targets rather than prescribing exact locations. • Opportunity maps should test the validity of BAP targets and feed back into relevant BAP target review mechanisms.	• Opportunity maps produced on a regional scale should make clear that they represent only the macro agenda for habitat expansion at a landscape scale, and are not intended to describe the whole biodiversity agenda. • Opportunity maps which offer detailed information at field-level should offer weighted options for habitats at any given location, rather than prescribing one habitat when others might equally be feasible.
Forge a strong partnership from the outset	• An opportunity mapping project should be built on a strong strategic and technical partnership from the outset, and should reflect a shared agenda. • The existing environmental partnerships already in place at regional or county level are the best place to start a mapping process. • Partnerships should develop a map with the objective of making its product (and mechanism for its generation) freely available to all those who can benefit from it.	• If a mapping proposal is initiated by one party acting alone, it should be 'sold' to the wider biodiversity partnership for the area in question, as early as possible, and become a commonly owned process. • If a mapping partnership intends to develop a map with a strong emphasis on technical methodology, links should be made to relevant academic institutions, leading to academic representation on the partnership group.

Principle	General guidance	Specific options
Maintain an on-going partnership to invest in the map	• The products of the mapping process should not be regarded as final, but rather as current iterations of an evolving case. • The partnership behind a map should remain active and able to facilitate its evolution and implementation over time.	• If a mapping process requires substantial technical input to be created in the first place, the costs of that process should be kept to a minimum so that it will be feasible to repeat it at a later date as data improves.
Seek continuity across boundaries and between scales	• A mapping partnership should explore what similar initiatives are in progress in adjoining areas or at smaller scales in the same area, and establish links with those initiatives to ensure products complement one another • The framework for an opportunity map should be provided by appropriate landscape or catchment units, rather than administrative boundaries.	• If a regional map is initiated for a region where one or more counties already have maps in place, care should be taken to avoid producing regional opportunity areas which contradict a county map. • Depending on the scale of the map, the use of appropriate Landscape Character Assessments should be explored as a framework, to maximise complementarity between biodiversity and landscape interests, and provide for opportunity areas which span artificial administrative boundaries.
Establish a dialogue with local expertise to give authority to the map	• Mapping processes should engage local sources of expertise in their development in a hands-on contributory manner.	• Where local experts are involved in opportunity area selection, an overarching rationale for opportunity area size, location and definition should be used as guidance, to ensure the local selection process maintains an adequate degree of consistency across the whole map area.

Principle	General guidance	Specific options
Make links to other sectors	• Liaison between biodiversity, landscape and historic environment interests should be initiated by the mapping partnership to maximise opportunities for combining agendas and seeking synergies across the heritage sector. • Opportunities for broader discussion between environmental, social and economic sectors should be pursued wherever possible to explore options for combining targets in order to identify opportunity areas serving multiple objectives.	• The use of an appropriate local Landscape Character Assessment as a framework for biodiversity-led opportunity areas should be explored to help to link these two sectors. • Priority locations for conservation of the historic environment should be represented on opportunity maps where data and expertise is available. • A vast array of spatial data on social and economic need is readily available, and where it allows for social and economic evaluations within the same spatial scale, should be used as part of the prioritisation process for identifying areas where multiple benefits can be achieved.
18.2 Methodology guidance		
Use the best data but do not be constrained by its absence	• The mapping process should access the most comprehensive and verified data available. • Local Records Centres should be brought on board as partnership members from an early stage. • Problems and barriers presented by data failings should be noted in the course of developing a map as part of the rationale or commentary, so that an agenda for data improvement can be generated by the process.	• If there are holes in data availability, or disparities between county datasets across a region, the opportunity mapping process should still proceed even without all desirable data, using expert judgement on the distribution of habitat in place of hard records. • Where the map is built on more than just verified data, a clear distinction should be made between what is definitive and what is extrapolated.

Principle	General guidance	Specific options
Use an appropriate level of complexity for the map's purposes	• The mapping methodology should only be as complex as its purpose and audience dictates. • The degree of focus and investment in the methodology should not dwarf the time spent using and communicating the map.	• Where the purpose of a map is to stimulate a general public discussion on the idea of habitat expansion as a new concept, and is needed rapidly, then a simple sketched approach should be used which avoids complex rationales or GIS generation. • Maps which will be scrutinised at a fine scale, and which need a robust justification for presentation at planning inquiries, should employ a suitably strong and technically defensible methodology.
Use an ecological rationale to provide a specification for mapped areas	• Opportunity maps for biodiversity should be built on sound ecological science. • Maps should operate on the general principle that the viability of opportunity areas will increase as habitat patch size and relative proximity increase, and will be further enhanced as the functionality of the intervening landscape and the quality of habitat increases. • A record should be made of the decisions that are taken in defining each opportunity area, to provide an 'audit trail' to help map users to trace the logic behind areas selected.	• Where the map seeks to define a discrete unit of landscape as an opportunity area, a working hypothesis based on parameters of patch size, proximity and quality should be used to define limits for opportunity area size and position on the map, such that selected areas fall within these limits. • Where such theory is used to determine the dimensions of opportunity areas, the confidence limits accompanying the figures should be clearly stated, and the map development process should allow for future refinement of the figures as scientific understanding improves.

Principle	General guidance	Specific options
Use a landscape framework to provide a holistic coverage of the area	• Opportunity maps should seek to afford some attribute to all land in the area under consideration, even if there is negligible data, rather than leaving undefined 'white space'. • An appropriate local landscape character assessment or catchment map should be used to provide a framework for the map, with attributes being attached to all land within each polygon. • Even where the purpose of the map is to single out target areas for action, this singling out should be seem as a top layer derived from the starting point of a comprehensive coverage of the land surface.	• Depending on the scale of the map, different levels of LCA may be appropriate as a basic framework. In many circumstances, and especially at a county scale, LDU2s offer the most effective set of polygons within which to describe opportunity areas, given their cross-disciplinary derivation and GIS basis.
18.3 Communication guidance		
Design the map to suit its purpose	• The appearance, language and means of communication of an opportunity map should be dictated by its purpose and intended audience. • A map should not be begun until it is clear that it is needed (and anticipated) by the audiences to whom it will be directed. • An opportunity map should encourage practitioners and policy makers to address the dynamic nature of environmental processes at a landscape scale. • Opportunity maps should be designed to contribute to the process of planning for the effects of climate change.	• Maps produced at a regional scale to influence regional policy generally should offer a schematic, strategic representation of opportunity areas, in keeping with the strategic representation of other regional development policies. • Opportunity maps designed to assist the agri-environment targeting process should take account of the existing targeting method being used by DEFRA, and seek to add a useful extra level of detail to that existing framework.

Principle	General guidance	Specific options
Make the map understand-able to look at	• An opportunity map should be presented in as simple a visual form as possible, avoiding complex overlapping cross hatching or textures. • An OS base should be incorporated into the presentation of a map to aid interpretation. • Unless a solid boundary is justified by the map's purpose and data, an indicative, 'soft' boundary, using a dotted or 'air-brushed' line, should be used to define the edges of opportunity areas.	• Where feasible to do so opportunity maps should be made available on the internet in a form which allows interrogation of multiple layers of information. • Consideration should be given to the use of three dimensional projections and simple sketches to complement an opportunity map and make it easier to understand. •
Give due care to the words which accompany the map, to avoid misunderstand-ing	• An opportunity map should provide a clear and unambiguous commentary to explain exactly what it depicts, to avoid misinterpretation of its message. • A statement that sets out the nature conservation goals and also demonstrates the socio-economic benefits of opportunity areas should accompany the map. • The mapping partnership should emphasise that though the essential message of the map and its basic framework are likely to remain fixed, the dimensions of specific opportunity areas may change in subsequent iterations as the data and science improve.	• Opportunity maps produced to inform the planning process should be promoted as contributing to a multi-use landscape by offering a means to respect ecological principles whilst allowing a degree of economic exploitation. In this respect they are different from conventional constraint maps, and this distinction should be emphasised.

Principle	General guidance	Specific options
Use the right media to communicate the map to its intended audiences	• Maps should be promoted as far as practicably possible, using a variety of media, to maximise their value. • Before a map is promoted on a wide front, explanatory wording should be attached indelibly to it, to ensure that it does not cause confusion amongst secondary audiences. • Means to promote maps through the printed media or by other routes should be explored.	• Maps intended to spark or assist public debate should be made available through public media. • Maps whose purpose is to assist decision-making should be made available as interactive and self-explanatory web-based systems.

Section F - Moving forward: recommendations for future work

19 The case for opportunity maps

9.1 Opportunity maps are rapidly evolving as a major tool in strategic land use planning for biodiversity, with landscape character being a guiding principle in many, and the scope existing to extend their use to other heritage (historic and cultural) and environmental sectors, with overlaps into social and economic agendas. Produced with clarity of purpose, clarity of presentation and explanation, and flexibility to guide implementation they look to have potential to influence collective and integrated working and improve the communication of environmental messages into spatial planning.

19.2 The experience which has been amassed by the mapping initiatives undertaken to date offers a firm basis on which to grow. However, for opportunity maps to maximise their advantages and avoid the pitfalls described in the previous section, audiences for maps should reasonably expect a basic level of consistency between maps in what they portray, how they portray it, and what they mean. This is not to suggest that a single, standard model would be appropriate, as local circumstances vary and necessitate a tailoring of approach. However if the basic principles set out in the good practice section above were to be adopted, the room for confusion would be greatly reduced, and the level of audience understanding would increase.

20. An opportunity mapping practitioners' network

20.1 Opportunity maps and the processes which underlie them are still at a formative stage in the UK. We are in a period of experimentation, and need to continue experimenting. What is crucial is that the learning which arises from this experimentation is captured, recognised and shared.

20.2 If this learning is to be shared, and if the good practice suggested here is to be tested and adopted, a communication network is needed. Establishing and maintaining an 'opportunity mapping network', via a practitioners' website or newsletter, could serve this purpose. .

20.3 In addition to learning more about process, methodology and communication, there is a need for some evaluation with target audiences, to see whether opportunity maps are having the desired effect, to see how useful they are for prioritising implementation, and to learn how to use media more effectively to communicate the message in the maps. Due to the newness of many of the maps assessed within this contract a fuller investigation of this kind is not currently possible.

20 Future agendas ?

21.1 Opportunity maps are, by definition, agenda influencing or informing. They look to the future, and they visualise an ambitious forward agenda for ecological renewal which at the same time recognises, balances and accommodates the need for other

environmental and socio-economic development alongside it. Some of the maps considered in this study are also very holistic and integrated in their approach to different dimensions of natural and cultural heritage.

21.2 The opportunity mapping process could be natural locus around which the biodiversity, landscape and other agendas could come together in a spatial/landscape context. A series of maps covering the whole of England which sets a forward agenda for integrated and balanced environmental conservation, understandable to its audience, and suitably promoted would be a desirable aim and high priority for a range of organisations.

Annex 1 Case studies

The seven examples studied in this section were selected for their usefulness in illustrating certain approaches and experiences in opportunity mapping. A number of alternative examples could have been selected for this purpose, but it is beyond the scope of this study to consider any more examples to this depth.

The following table indicates which of the seven case studies can be regarded as exemplars in illustrating each of the principles of good practice cited in the main text of the report.

Principles		Case studies						
		Oxfordshire OWLS	Kent Lifescapes Information System	Rebuilding Biodiversity in the SW	SW Nature Map	Newlands North West	Cambridgeshire Vision 2050	East of England Regional Opportunity Map
Process	Links from and to the BAP				**X**		**X**	**X**
	Strong partnerships from the outset				**X**	**X**	**X**	**X**
	On-going partnerships			**X**				
	Continuity across boundaries and scales	**X**	**X**					**X**
	Dialogue with local expertise		**X**	**X**	**X**		**X**	
	Links to other sectors					**X**		
Methodology	Use the best data available	**X**	**X**	**X**	**X**			**X**
	Complexity in keeping with the purpose	**X**	**X**	**X**			**X**	
	Use an ecological rationale		**X**	**X**	**X**			**X**
	Use a landscape framework	**X**	**X**					**X**
Communication	Design the map to suit its purpose	**X**	**X**			**X**	**X**	
	Understandable to look at						**X**	
	Careful wording to accompany the map			**X**				
	Use right media to communicate the map	**X**	**X**				**X**	

Oxfordshire owls

Key features

- The Oxfordshire Wildlife and Landscape Study (OWLS) was initiated in 2001, with major work being completed in 2004. The project web site was launched in early 2005. It began as a national demonstration project to show the relationship between LCA and BAP, through a partnership between Oxfordshire County Council and EN and CA. The objectives of OWLS were to:
- Undertake a Landscape Character Assessment and Biodiversity Appraisal of Oxfordshire,
- Investigate the relationship between landscape character and biodiversity,
- Establish an integrated GIS database of landscape character and biodiversity data,
- Provide a framework which can potentially be used to inform strategic decision making on related landscape character and biodiversity issues within the county, and
- Establish a pilot project which could be promoted nationally.

Lessons offered on process

- During the development process 6 workshops were held for interest groups (planners, farmers and land owners, community groups) involving 30–40 people at each. This contributed to refining the methodology, uncovering weaknesses and informing how the approach could be developed at national and local scales. Originally a more extensive stakeholder engagement process had been intended, but funding restrictions precluded this.
- Prior to going live on the website the study went through only limited consultation process with the main partnership organisations in the county, but wider feedback via the website is being encouraged.
- The process has helped to shape a landscape-scale perception of countryside issues in the county.

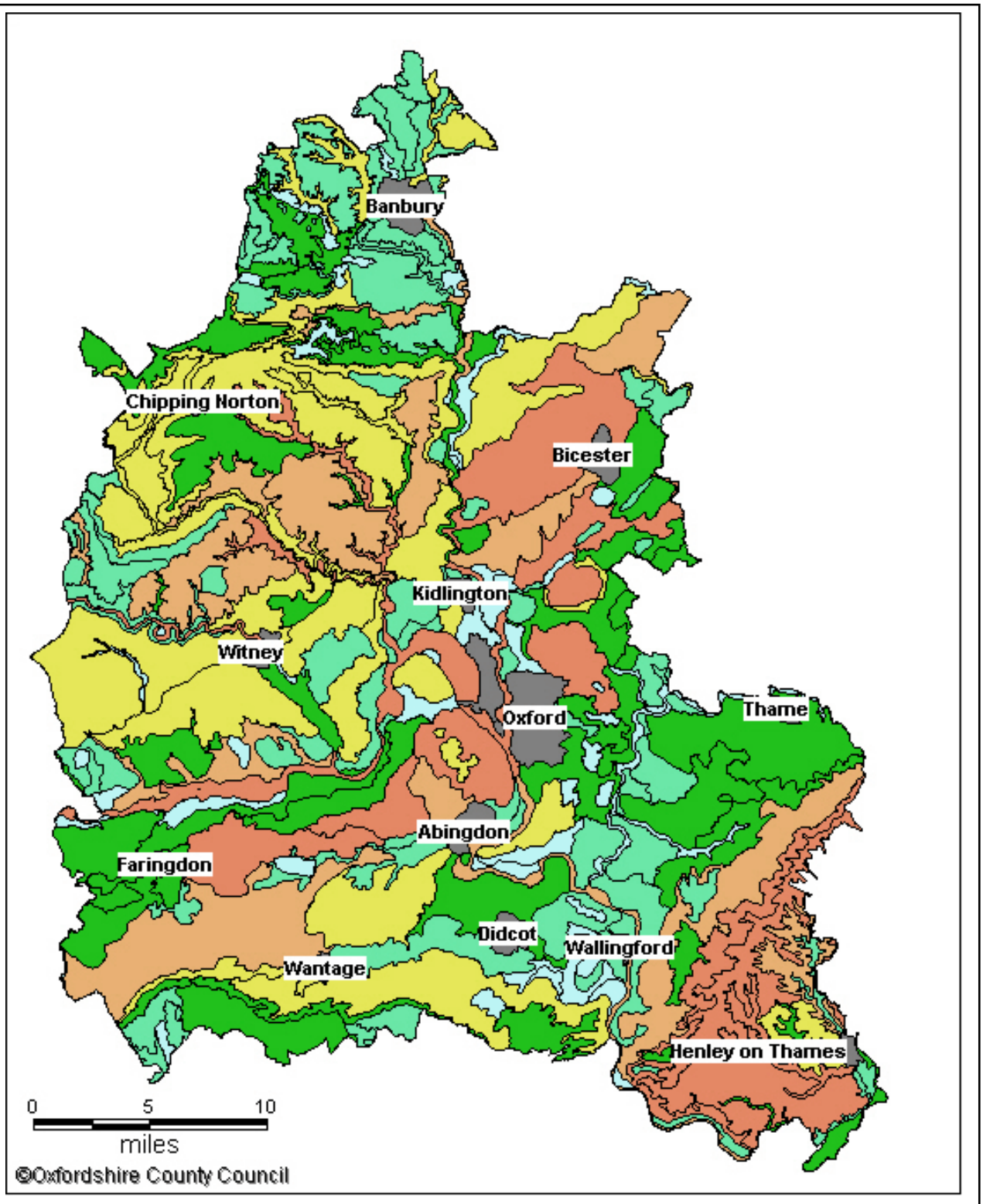
Lessons offered on methodology

- Use of GIS offers the best available options for creating relationships between different data sets, working between different scales, and updating information.
- The Landscape Assessment used for the project is based on a national typology of LDUs derived from national datasets. The biodiversity appraisal, and subsequent scoring system, was largely developed specifically for this study but it was based on previous work undertaken by Reading University in conjunction with their Living Landscapes Project. Landscape and habitat information was recorded for each LDU and the data was then placed on GIS. This field data was supplemented by additional information currently available for individual sites, such as Sites of Special Scientific Interest and county wildlife sites, within Oxfordshire.
- The combination of extensive field data with LDUs created a holistic 'bottom-up' structure which allows guidance to be offered about all land parcels.
- Those involved feel there is a need for a more standardised system so that one mapping project can immediately relate to and be compatible with another. This is a particular issue with AONBs, which have developed separate information and management systems, and some of which are without GIS facilities.

- A great deal of time was spent recording in the field, and with hindsight this could have been done more efficiently using aerial photo analysis followed by ground truthing.
- LCA work encourages surveyors to look at everything (landcover, buildings, historic features) though surveyors are unlikely to have equal expertise in all these aspects, making for inconsistent data quality. A modular process, involving the 'layering up' of data on landscape, biodiversity, buildings, etc over time, might have been preferable.

Lessons offered on communication

- OWLS is an interactive, practical tool by being made available on a dedicated website. The ability to begin with a regional overview and drill down to parish level, which GIS on the web offers, makes the package very powerful.
- A key function of the map is in guiding and enabling planning gain. In this respect it has been shown to influence development decision making, helping to ensure change is appropriate to an area. A further important role will be informing the targeting of management and restoration through Environmental Stewardship.
- Eventually, the project will be used to provide Supplementary Planning Guidance for Local Authorities. It also has the potential to serve as a tool in community strategy work.



OWLS 'Biomap' which combines landscape and habitat data in one layer

Kent lifescapes information system
Key features
• K-LIS is a web-based GIS application covering the county of Kent, produced by Kent County Council with support from EN. It gives access to spatial information about the countryside and biodiversity of Kent, as well as delivering advice on the targeting of wildlife habitat recreation and restoration at the local and strategic level. • The Internet site is specifically aimed at strategic decision makers in local government and agencies, and at local practitioners, notably farm advisors, enabling more informed decision-making on biodiversity issues across Kent. • The purpose of K-LIS is to support the delivery of policy and related programmes, including the SE Regional Plan, the Kent & Medway Structure Plan, LDFs, local BAPs, Rights of Way Improvement Plans, AONB management plans, ERDP agri-environment programmes, community plans, and developers funds from Section 106 agreements.
Lessons offered on process
• The development process for the map system included a series of workshops with local and national spatial planners, ecologists, farm advisors, plus opportunity mapping expertise from elsewhere. It was also found that parish councils were interested to be involved, to gain information on their local environments for planning and other purposes. Maintaining this wide dialogue has proved difficult, though the launch of a second version of K-LIS in summer 2005 will provide more opportunity for engagement. • The system has evolved under the leadership of a project manager, who has been retained into the operational phase. ADAS were engaged as technical consultants in the development of the system. ADAS have been retained as a source of on-going advice, and a link is provided on the K-LIS website for users to send feedback on suggestions for improvements to the system.
Lessons offered on methodology
• The system draws on datasets including current habitat extent, landscape character (LDU2s), access, site designations, existing agri-environment schemes, and aerial photo analysis. In this respect it has benefited greatly from the availability of such comprehensive data, without which such a system could not have been developed. • Capability maps for different habitats were created using data on soil type, hydrology, aspect and slope. Opportunity areas for each habitat were then defined on the basis of closeness to the same habitat, size of adjacent patches of the same habitat, closeness to designated sites, current land use, size of potential habitat area, closeness to river corridors, and time elapsed since loss. • Each of the above factors determining capability was given a numerical scale, and each land parcel scored against these scales. Degree of opportunity was then defined by setting thresholds, such that the top-scoring 5% of the land is defined as offering greatest opportunity, the next 20% medium opportunity, and the next 25% low opportunity. The remaining 50% of the land surface is not classified. • The percentage thresholds chosen are crucial to the appearance of the map and the overall impression of the advice it offers: changing the figures (eg including 10%

instead of 5% in the top category) would have a substantial impact. By definition these thresholds are arbitrary, and only with time will it be possible to judge their validity.
Lessons offered on communication
• The web-based system is simple to use and allows any area of the county to be displayed showing any combination of habitat, landscape and other data. Data can be viewed at a county through to field level. • To accompany the map system a policy wording has been prepared for the SE regional Plan, such that the map becomes an instrument of policy (ie the policy is to pursue environmental objectives through the use of the map). • A full technical manual on K-LIS is available to users to download via the website. A CD version is being prepared, to improve accessibility further. • The development of the system and its uses is on-going, with a plan in preparation to improve the usefulness of the map for proofing land use against the effects of climate change (using the BRANCH methodology). • There are plans to explore the use of 3D visual landscape tours as a way of bringing the map more to life.

Page from K-LIS interactive web map showing graded habitat opportunities by LDU

Rebuilding biodiversity in the south west

Key features

- Rebuilding Biodiversity (RB) was initiated by the South West Wildlife Trusts (SWWTs) in 2002, and manifested through the South West Nature Map, to be published in summer 2005, which adopts RB as its guiding approach.
- RB offers a model for defining the minimum necessary dimensions of ecologically functional landscapes in which viable populations of all characteristic species of a given priority habitats can be sustained. The vehicle for this is the notion of a Strategic Nature Area (SNA), an extensive area of landscape within which mosaics of habitat patches could be rebuilt in close association. SNAs are designed to contain a minimum number of patches of priority habitat, each of at least a minimum size, set in an area of landscape such that their cumulative area will be above a prescribed proportion of the land area, minimising the relative distance between patches.
- The methodology defines SNAs for a series of habitats, then sets out an approach to selecting SNAs by Natural Area using existing habitat concentrations as a guide, and evaluating each example to prioritise for conservation action. The methodology also offers the basis for defining minimum numbers of SNAs which should be conserved.
- The SWWTs immediate objective in developing the RB methodology is to use the results as a basis for the South West Wildlife Trusts' own regional investment in landscape-scale habitat conservation projects.

Lessons offered on process

- The joint RB/Nature Map process of involving local experts in SNA selection and prioritisation offers a very good example of stakeholder engagement, with over 100 experts at county level being given a real role in making choices about SNAs, guided by a common methodology.
- The process showed that it is difficult to achieve consensus amongst practitioners across a large region, especially when the model they are asked to accept is based on figures derived from theoretical ecology which by nature are open to debate. However, sufficient agreement was reached for the methodology to be used in all counties.
- The SWWT have been clear in stating that the methodology needs to evolve, as research and expertise becomes available, and a process for refining various aspects is being planned.
- RB evolved initially inside the SWWTs, who have retained ownership of the methodology to date. Latterly, when RB was used as the main tool in producing the SW Nature Map, the continuing SWWT ownership of a methodology being used in a collectively-owned mapping exercise led to some confusion amongst partners.

Lessons offered on methodology
• RB has gone further than any other initiative in England to date in constructing an ecological rationale for the size and content of opportunity areas. To do this the SWWTs adapted the Ecoregional Planning approach used by The Nature Conservancy in the US. For a UK context this used Natural Areas as a framework. • The theoretical structure of the SNA appears to be a sound one, which most people can grasp. The figures attached to that structure (minimum patch size in particular) are less convincing, because definitive research is not easily available to help determine them. • The logical end point of RB is that it is possible to define how much habitat is 'enough' to sustain viable populations into the future. However, practitioners involved with the mapping process have been reluctant to contemplate this idea, both in principle and because the figures are considered too questionable at this stage.
Lessons offered on communication
• Initially RB was launched by the SWWTs through a regional conference in 2003. There followed a gap, and once agreement was reached in 2004 to use RB for the SW Nature Map, some clarity about what RB was had been lost. • Earlier problems of explanation have been rectified to a large extent by preparing a full Technical Manual for the methodology, which defines RB independently of Nature Map, and explains the relationship between the two. • The existence of an audience for the product of RB is already proven, with the SWWTs already working closely with a large charitable trust which wishes to fund projects drawn specifically from the results of the RB process. • DEFRA RDS has expressed interest in working with the partnership in employing the map as an additional tool alongside other mechanisms for targeting Environmental Stewardship.

South west nature map

Key features

- The South West Nature Map (SWNM) evolved in response to the perceived need to present a simple visual statement of the regional biodiversity agenda, in order to:
- Focus large scale projects in selected zones that can maintain, restore and recreate the region's biodiversity assets,
- Illustrate where the major biodiversity concentrations are found and where BAP targets for maintenance, restoration and re-creation might be met,
- Influence the regional planning process, notably the Regional Spatial Strategy, and
- Assist in developing partnership activity for biodiversity in the region.

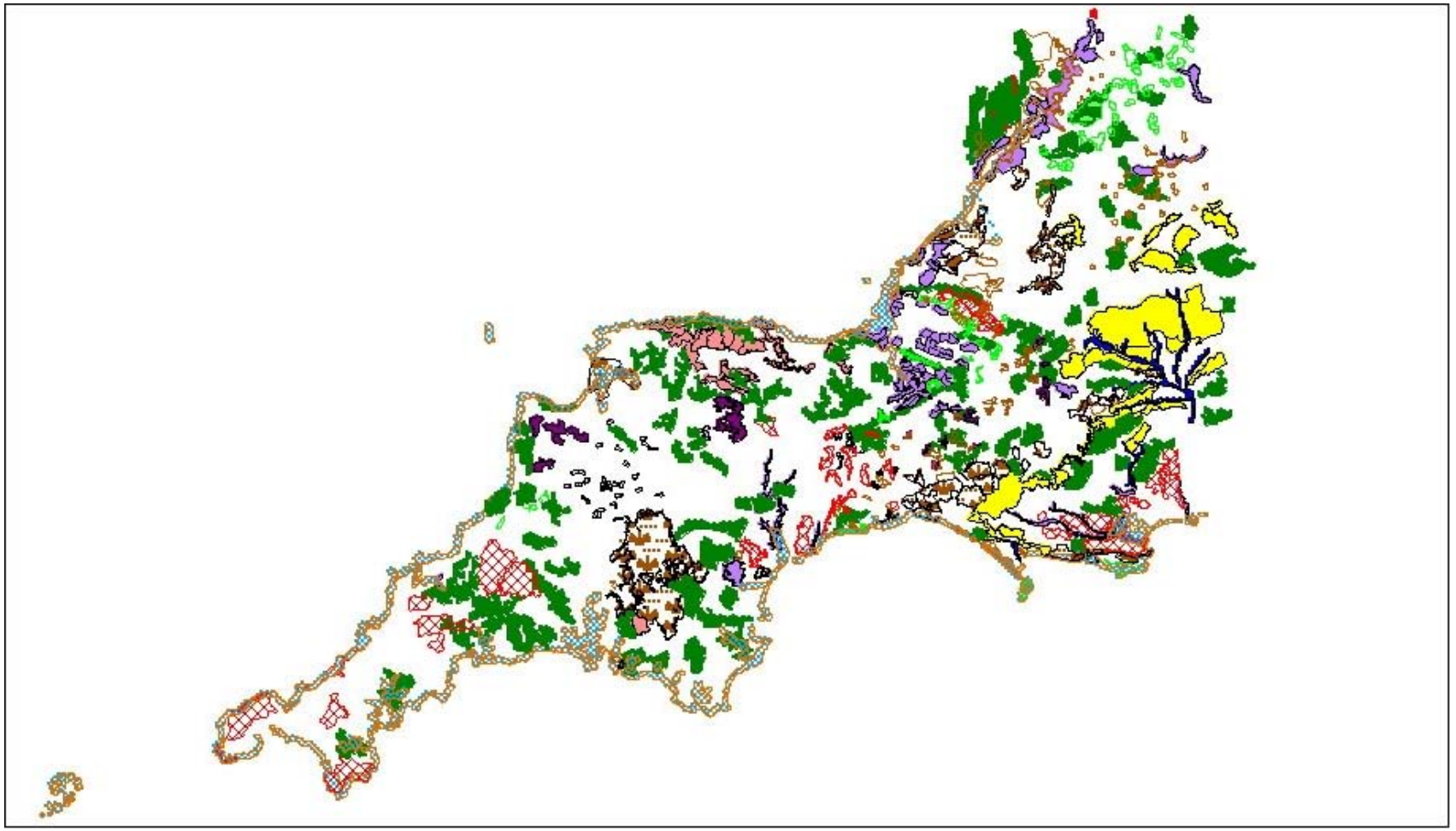
Lessons offered on process

- SWNM originated within the SW Regional Biodiversity Partnership, and was manifested initially as an element of the regional Biodiversity Implementation Strategy. It was thus seen as a natural continuation of the BAP process from the outset.
- The SWNM was produced in two phases (see methodology below). The first was carried out largely within the 'inner' partnership, and involved a GIS-based desk exercise. The second phase by contrast involved a very large exercise in engagement of local conservation expertise across the region, which took the task to each county in turn, and invited those with best local knowledge to refine the draft map by literally drawing the boundaries of the opportunity areas themselves, guided by the principles of the Rebuilding Biodiversity methodology. Two rounds of county meetings were carried out, to select and then to prioritise strategic nature Areas. In this way the process faced the inevitable local debate, disagreement and uncertainty head on, and encouraged that debate as much as a regional process with a limited timetable could do. The process as a whole involved nearly 20 workshops over an eight month period.
- The second phase of the process used county LBAP partnerships as structures through which to arrange local meetings. This was more effective as a means of reaching the correct people than a centrally-directed process would have been.

Lessons offered on methodology

- In the first stage of the construction of the map, existing habitat was mapped using inventory datasets of UK Biodiversity Priority Habitats compiled for the region as part of the National Biodiversity Network SW pilot project. This offered the great advantage of a regionally consistent, recently verified dataset as a basis for the map.
- In GIS a 500 metre buffer was projected around the combined inventories, and the product was then disaggregated into geographically distinct zones. All zones less than 1000 hectares were deleted. All land included on the map was therefore either a Priority Habitat or within 500 m of such a habitat, and fell within blocks of at least 1000 ha.
- For the second phase, this draft was reconsidered using the Rebuilding Biodiversity rationale to select discrete Strategic Nature Areas. This confirmed some of the areas selected during the GIS phase, rejected others, and included some additional areas.

•	In practice it proved difficult to persuade local experts to stick to the guideline figures offered by Rebuilding Biodiversity, and as a result in many cases opportunity areas larger than those required by the 'rules' were selected, making it more difficult to retain a regional consistency across the board.
Lessons offered on communication	
•	The first draft of SWNM was published in the regional Biodiversity Implementation Plan, as a small-scale map showing all opportunity areas in one colour. The map introduced the notion of what SWNM was seeking to achieve, but was too small a scale to be meaningful.
•	After the initial county-based SNA selection meetings using the RB methodology, the resulting draft map was made available for consultation with the wider partnership through the South West Observatory website. This provided wide access, though problems were encountered in posting maps with sufficient OS base detail to allow users to identify where the mapped opportunity areas were.
•	A text to accompany the map in the Regional Spatial Strategy process has been prepared. A major landfill operator is seeking to target investment of landfill tax credits in the region using the map as a guiding framework.



Draft South West Nature Map from April 2005 showing first results of selecting Strategic Nature Areas at county level using guidance on SNA size from Rebuilding Biodiversity. Colours indicate different 'lead' habitats in each SNA

Newlands north west

Key features

- Newlands is a partnership initiative between the Northwest Development Agency (NWDA) and the Forestry Commission (North West Conservancy), looking at derelict land – how much there is, and what can be done with it to improve quality of life and economic investment.
- Phase One of the project covered the Merseyside belt, phase 2 expanded over the whole region (Cumbria, Lancashire & Cheshire).

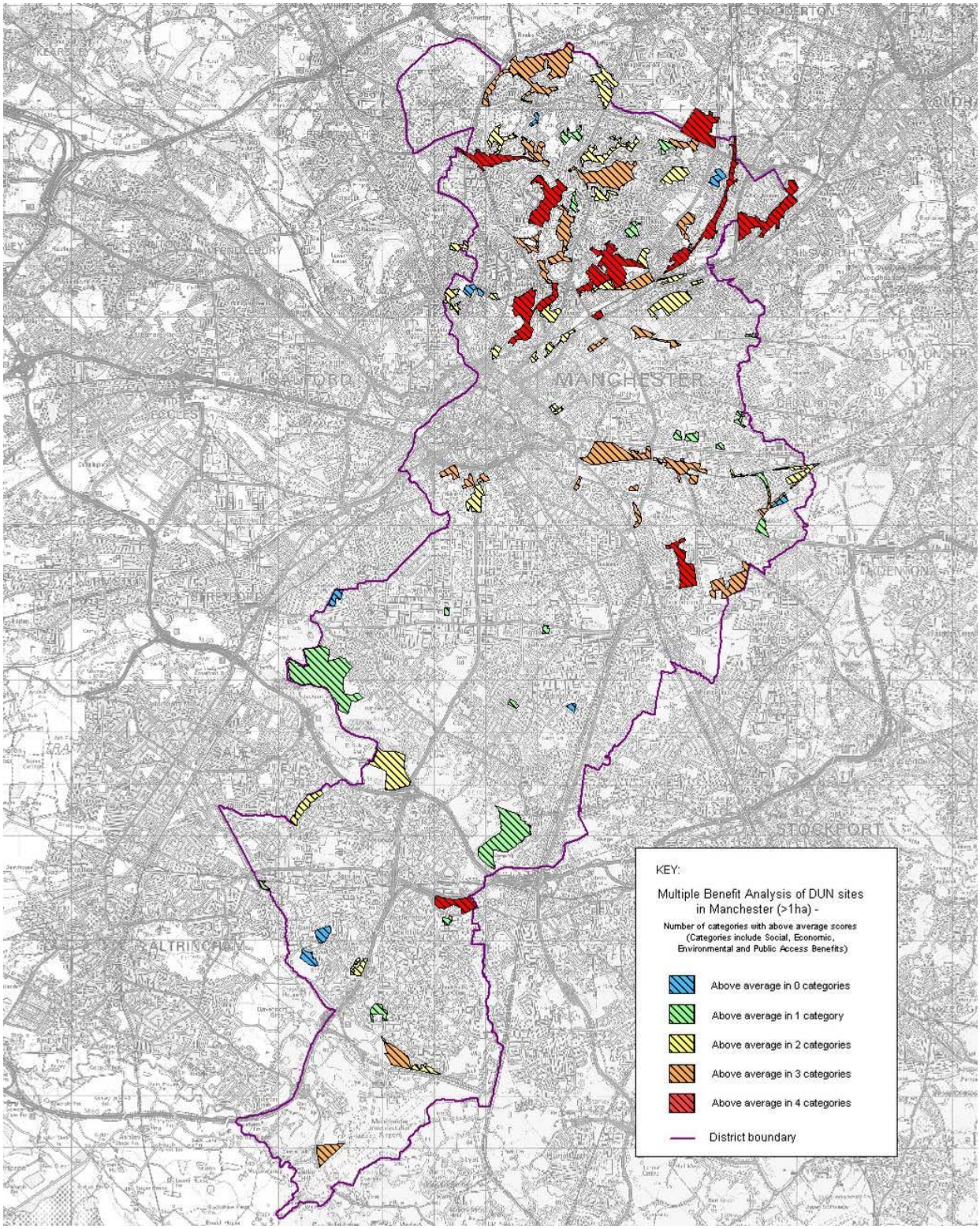
Lessons offered on process

- The project is a true multi-agency partnership involving the NWDA, FC, Association of Greater Manchester Authorities, Merseyside Authorities, three Community Forests, and consultants (TEP Environmental Partnership). Different partnerships have come together for different parts of the process.
- The philosophy of the project is very much about integrating social, economic and environmental needs on an equal basis, in order to identify where priorities for all three overlap. These overlaps then represent multiple objective 'win-win-win' opportunities, where investment of resources can serve everyone's interests. The project is unique in England in the extent to which it has pursued this approach to strategic integration. However it is still at a relatively early stage, and those involved are conscious for example that they have not yet been able to feed in environmental data of comparable depth to the economic and social data used. Once this happens it could potentially be very powerful as a way of identifying locations which serve multiple objectives.
- There has been huge investment in this process. TEP consultants have been working on it for 3 years: it is evolving fast. Seminars are being held to develop more links with CA, EN, EA etc. The whole project is still being developed, including mapping work and methodology refinement. The process will go on for some years.
- Other FC Conservancies are beginning to use the process, West Midlands Conservancy.
- The process allows for other strategies to be fed in, eg transport data, travel time data. The

Lessons offered on methodology

- Much use has been made in the project of existing data from numerous sources. The trick has been to find ways of making it work together. The process uses the following key components:
- **DUN** - survey of Derelict, Underused or Neglected land. This identified 3,800 sites over 1 hectare for potential 'soft' end use. Used aerial photography, National Land Use Database, Unitary Development Plans etc.
- **PBRS** - Public Benefit Recording System, which measured the co-location of social, economic, access & environmental benefits. PBRS was developed to target resources at sites with best potential benefit. This laborious data heavy scoring method has been superseded by software that uses GIS to show IMD - Index of Multiple Deprivation (Home Office data). Now it is possible to overlay DUN with IMD which shows that areas of high deprivation currently have few environmental benefits and are therefore where opportunities lie.
- **Newlands** is the benefits on the ground, pursued by FC itself. FC work to create 'soft' end use improvements to sites through land reclamation for new woodlands and

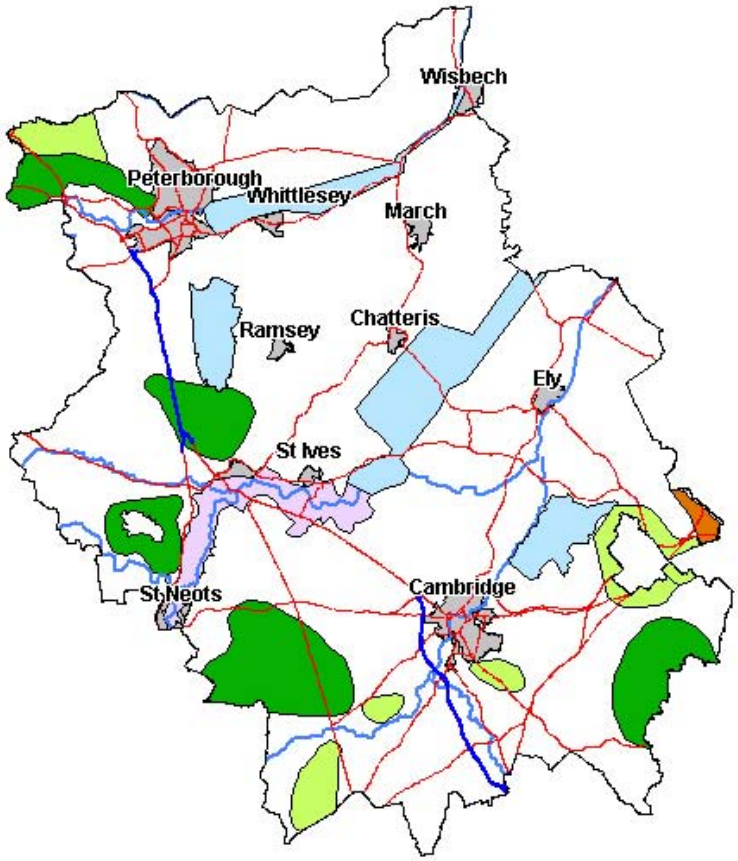
	open space. Newlands One is being developed in Greater Manchester & Merseyside. Newlands Two will take in rest of region.
•	The huge database can be used to generate maps which, like IMD, can go down to sub Ward scale (eg areas of c100 houses).
	Lessons offered on communication
•	It is too early for the process to have reached out to all audiences and achieved an impact, but the work is having an influence already. In Cumbria for example work has been done looking at opportunities for placing affordable housing, in woodland, close to existing settlement. However, many more people will need to appreciate what is being done and how this can be used before its potential can be fully realised.
•	The project has employed some sophisticated tools for visualising its complex data layers in GIS, including 3D projections of IMD and other data as colour coded 'contour maps'.



One output from Newlands NW process showing locations for woodland/public open space development which would offer multiple benefits

50 year wildlife vision for cambridgeshire and peterborough
Key features
• Following the preparation of the BAP for Cambridgeshire & Peterborough the biodiversity partnership recognised the need to draw attention to restoration, by way of a map which would set out a vision for the future. • In some senses this is a more straightforward concept to promote in this county, given the relative paucity of habitat which remains, and a map to visualise a restoration strategy has a fairly simple message to convey. • Given the objective of setting out a vision, and the nature of the habitat distribution involved, the partnership chose to go down a non-technical, publicly-understandable route which produced a simple map which could be used in a variety of ways and be appreciated by many audiences. In this respect the project stands out for its disarming simplicity, and the success it has achieved – perhaps because of that simplicity.
Lessons offered on process
• The map was prepared by the Biodiversity Partnership for Cambridgeshire & Peterborough habitat creation group, chaired by EN. • The process was straightforward: partners came together to agree a simple visual statement of priorities for habitat recreation areas, charged the Biodiversity Officer at CCC with preparing a simple map to illustrate these, and the LBAP Coordinator published the map in a leaflet. The leaflet was then used as a springboard for lodging the restoration message with planning, farming and public audiences.
Lessons offered on methodology
• The opportunity map was based on hotspots of existing biodiversity data and records as well as habitat creation projects underway or very likely to proceed. This supporting data has given the map authority and objectivity. • Four broad habitat types are defined (chalk and limestone grassland, wetlands, acid grassland and heath, and woodlands and hedgerows), with c.10 broad restoration zones highlighted across the county. • The resulting map presents a relatively simple, 'designed' view of the county, showing colour coded recreation areas. All the information is on one map, with no need for multiple layers.
Lessons offered on communication
• This project has taken a deliberately populist approach in the way it has presented and promoted its map. The focus of the strategy is a popular-style leaflet with a colourful reproduction of the map as its centrepiece, surrounded by colour photos of emblematic wildlife. The leaflet juxtaposes a map showing the current sparse and fragmented coverage of wildlife habitats in the county, alongside the vision map, thereby powerfully putting across its main message. The map has also been published on the Biodiversity Partnership's website. • A high profile public launch of the map took place at a primary school, with school children forming an image of the map in the playground for the assembled media. Press coverage was good, and the map has subsequently been well received by the public, councillors and planners.

- The map has been included in the Structure Plan, with accompanying policy wordings addressing the need for large habitat creation areas. This is now leading to several districts referring to the map in the preparation of Local Development Frameworks. Huntingdonshire District Council have taken the map one stage further at a district level and drawn a map with areas of Strategic Greenspace Enhancement and potential linkages between Areas of Strategic Greenspace Enhancement.
- The map has been welcomed by local DEFRA staff as a tool in agri-environment targeting, and is actively being used for that purpose. A farmers information pack on biodiversity has been produced to show how the ' buff areas' (the non targeted areas on the map) still support wildlife and can be improved as wildlife habitat.
- The map won a Green Apple Award, which was collected from a ceremony at the Houses of Parliament and thus received further good publicity.



Map for 50 Year Wildlife Vision for Cambridgeshire & Peterborough showing enhancement areas colour coded by main habitat, built around core habitat clusters

East of england regional opportunity map

Key features

- This initiative was driven by the need for an informed response by the Regional Biodiversity Forum to the environmental chapter of the Regional Planning Guidance (RPG14) currently in development for the East of England region. Given the high levels of growth outlined in RPG14, the need was identified for a network of biodiversity areas and corridors to both conserve existing biodiversity and restore and regenerate biodiversity in areas which may be suffering from a current deficit, with this set against the uncertain background of climate change.
- The partnership was also aware of the vision set out by the Pan European Biodiversity and Landscape Diversity Strategy to establish a Pan European Ecological Network, following common objectives and characteristics throughout the EU.

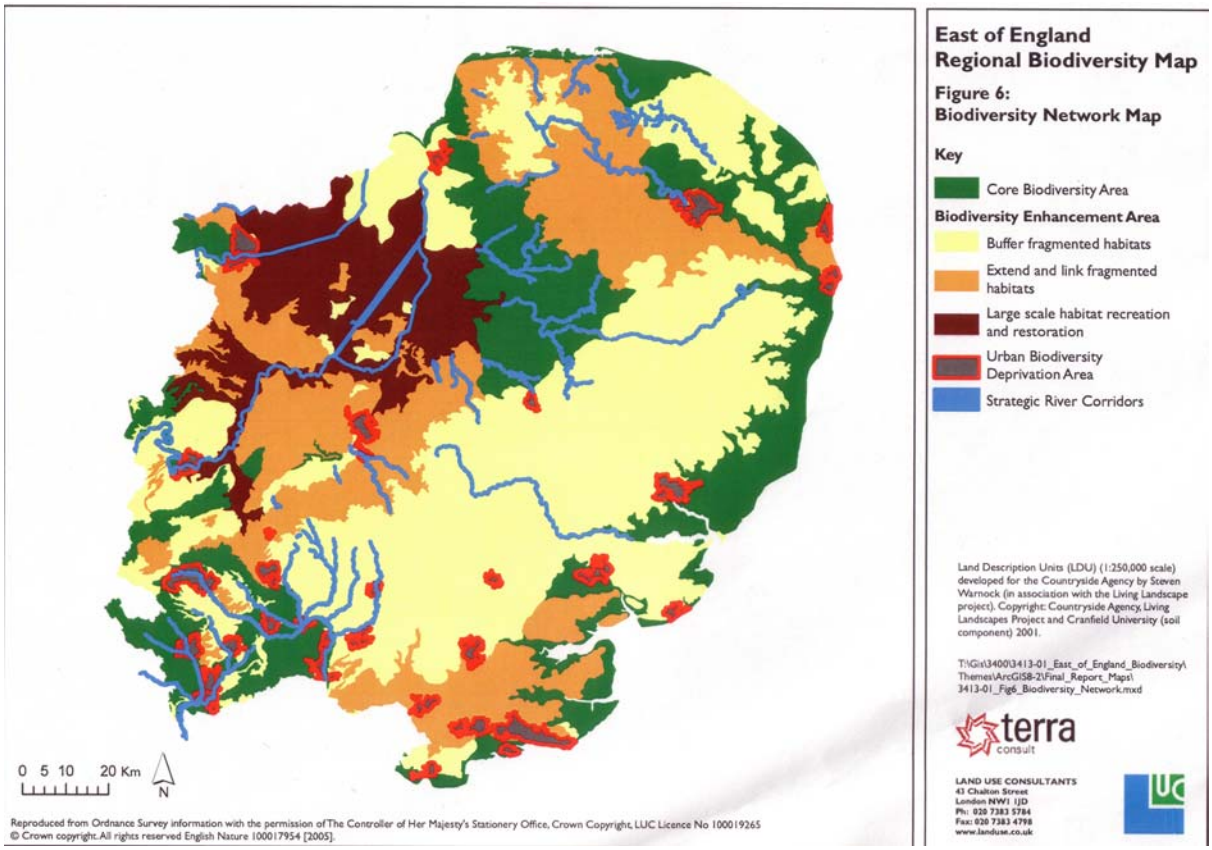
Lessons offered on process

- The map was initiated by the East of England Biodiversity Forum as a partnership exercise, though the technical development was carried out using consultants (LUC and Terra Consult – the latter having also produced the SE regional map)
- The map has only recently been prepared and feedback is being sought from the Biodiversity Forum
- It is hoped that the resultant regional biodiversity network is the first phase of more detailed, sub-regional studies throughout the East of England, enabling the methodology developed to be reused and applied at a finer scale.

Lessons offered on methodology

- The methodology made use of the LDU1 dataset for the region, plus Priority Habitat datasets supplied by EN, and other data from FC, DEFRA, Suffolk WT, the Broads Authority and the EA.
- The whole project was GIS generated. LDUs qualified as Biodiversity Conservation Areas if they contained over 10% cover of priority habitat, or over 10% cover by a statutory nature conservation designation, or over 10% cover by a designated County Wildlife Site. The remaining LDUs were defined as biodiversity enhancement areas, which were subdivided into three sub-classes to represent LDUs with different potential and opportunities for habitat recreation and enhancement. Subdivision was based on examination of characteristics relating to proportion of priority habitat area, the rurality of the LDU as an indicator of wildlife potential, patch size and fragmentation, and presence of lowland calcareous grassland (given a lower weighting).
- An Inverse Distance Weighting (IDW) technique was used to provide an indication of fragmentation. This produced a map showing relative isolation of habitat patches, useful as a guide to density of source patches for restoration. Degree of isolation scores were divided into 3 categories, which formed the basis of the 3 levels of biodiversity enhancement area.
- Different types pf priority habitat were not distinguished. Urban Improvement Areas were then defined on the basis of access to (ie distance from) green space or LNRs. Biodiversity Corridors were considered but only main and medium sized river and canal corridors were identified as such.

•	The Map thus has 4 components: Biodiversity Conservation Areas, Biodiversity Enhancement Areas (3 levels), Biodiversity Corridors and Urban Improvement Areas. Between them these categories cover the entire land surface. In this respect this map is probably the best example of a regional map which assigns attributes to the all land, by combining landscape and biodiversity datasets. It has succeeded in doing this through the use of LDU1s, which have worked satisfactorily here, but do not necessarily perform adequately in other regions (eg They were trialled in an early approach for the SW Nature Map, but were too large and amorphous in places to be practicable).
Lessons offered on communication	
•	The map is squarely aimed at a strategic planning audience. It is too early in its development for experience to be drawn from the process of communicating it to this audience.



East of England Regional Biodiversity Action Map – showing Core Biodiversity areas – green ; buffer fragmented habitats – pale yellow ; extend and link fragmented habitats - orange ; large scale habitat re-creation and restoration - brown ; urban biodiversity deprivation area - grey ; strategic river corridors blue. All areas based on Landscape Description Units (LDU1s)

Annex 2 Summary reference database

This lists 33 initiatives which were examined by the study.

It includes information for each project, such as:

- Contact name / details and date when information gathered ;
- Purpose and extent - aims /scale / timing;
- Process -leadership and participation;
- Methodology - data, theory and product ;
- Consequence – communication and influence ;
- Experience –good practice and lessons learnt ; Web references, where available.

[See separate electronic Excel spreadsheet available from English Nature]

ENGLISH NATURE

English Nature is the Government agency that champions the conservation of wildlife and geology throughout England.

This is one of a range of publications published by:
External Relations Team
English Nature
Northminster House
Peterborough PE1 1UA

www.english-nature.org.uk

Cover printed on Character Express, post consumer waste paper, ECF.

ISSN 0967-876X

Cover designed and printed by Status Design & Advertising, 2M, 5M, 5M.

Front cover photographs:
Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
Paul Glendell/English Nature 24,888