What Matters and Why
Environmental Capital: A New Approach

A Provisional Guide

Research and Development

Technical Report
E36

COUNTRYSIDE COMMISSION

ENVIRONMENT AGENCY

ENGLISH NATURE

ENGLISH HERITAGE

ENVIRONMENT AGENCY

What Matters and Why
Environmental Capital: A New Approach

A Provisional Guide

Technical Report
E36

COUNTRYSIDE COMMISSION

ENVIRONMENT AGENCY

ENGLISH NATURE

ENGLISH HERITAGE

What Matters and Why
Environmental Capital: A New Approach
A Provisional Guide

R&D Technical Report E36

Research Contractor:

CAG Consultants

Further copies of this report are available from:
Environment Agency R&D Dissemination Centre, c/o
WRc, Frankland Road, Swindon, Wilts SN5 8YF

tel: 01793-865000 fax: 01793-514562 e-mail: publications@wrcplc.co.uk

CONTENTS

Further copies of this provisional guide are available free from:

Planning for Sustainable Development Branch, Countryside Commission, John Dower house, Crescent Place, Cheltenham, GL50 3RA

This document is equivalent to the Environment Agency Research and Development Technical Report E36 produced through R&D project number E2-009

SUMMARY

This note summarises the new characterisation-based approach to environmental capital jointly proposed by the Countryside Commission, English Nature, English Heritage and the Environment Agency.

Why a new approach?

The notion of 'environmental capital' has become very widely used and influential. The metaphor of the environment as consisting of assets which can provide a stream of benefits or services conveys an important concept of sustainability. The usual division into 'critical', 'constant' and 'tradable' environmental capital reflects the intuition that some are more important and less replaceable than others.

However the concept has proved surprisingly problematic in use. Actual environmental assets often do not seem to fit neatly into just one of the three categories. Even when they do, defining an asset as 'critical', 'constant' or 'tradable' often does not help much in deciding how to manage it. Different organisations have codified and applied environmental capital in different ways, resulting in inconsistencies which have reduced its credibility.

By 1996 the four agencies had recognised that environmental capital had outgrown the strength of its foundations, and required (as it were) further underpinning. They commissioned CAG Consultants with Land Use Consultants to develop a new approach, drawing on the expertise of the agencies themselves, government departments, planning authorities and others. The result is *What Matters and Why: Environmental Capital: a new approach*, of which this paper is a summary.

The shift from *things* to *attributes*

The key difference in the new approach is to stand back from environmental *things* or *features*, and consider the *environmental functions* they perform, or the *services* they provide for human wellbeing. Having decided what area, feature or group of features is to be studied (which depends on the purpose of the assessment) the new approach asks:

(a) What are the *characteristics* or *attributes* of this place or object(s) which matter for sustainability?;
(b) *How important* is each of these, to who, and for what reasons or purposes?;
(c) What (if anything) could replace or *substitute for* each of these benefits?;
(d) On current trends do we expect to have *enough* of each of them?

From the answers to these questions we decide what kinds of *management action* are needed to protect and/or enhance each of these attributes. From these in turn we can deduce how environmental *features* - forests, buildings, parcels of land etc - need to be treated to maintain or enhance sustainability.

Benefits

This new way of thinking about environmental capital brings four important benefits. First, it recognises that a given feature may provide several different environmental benefits or 'services', each of which may be important in different ways and have different management implications. The same environmental capital assessment process can embrace all the different kinds of environmental interest including nature conservation, landscape, heritage, resource management and recreation. For example the same Georgian terrace might matter a great deal for historical and townscape reasons, quite a lot for nesting birds, and a little for informal recreation.

Second, the new approach brings a wider and subtler range of management responses than the three tier gradation of 'critical', 'constant' and 'tradable'. For example the new approach might indicate that certain parts of the actual fabric of the Georgian terrace in the last example were of immense historical significance and should be given the highest possible degree of protection; the exterior appearance was aesthetically extremely valuable and should be protected although its fabric could be reconstructed; loss of nesting sites should be compensated by creating new ones locally; and increased public access would be beneficial but not worth compromising other objectives for.

The management 'profile' which can be built up in this way, where each attribute of the feature is discussed separately, can show in as much detail as is useful what sorts of positive and negative effects a possible change will have. This is more helpful to anyone making decisions about the management of such an asset - or the appropriate response to a development proposal - than simply designating it as 'critical' or 'constant' environmental capital. This does not undermine protection for the most 'special'. Indeed by defining more precisely which *attributes* warrant the highest protection, and why, and distinguishing these from attributes which can be managed more flexibly, the new approach should both strengthen the case for protection and make it easier to reconcile with development pressures.

Third, by distinguishing the desired *level* of an attribute from its substitutability and importance the new approach can deal with *enhancement* - that is, increasing the quantity and quality of environmental stock - on the same basis as resisting damage (although some attributes, such as historical ones cannot be 'enhanced'!)

Finally the new approach draws on and extends the application of characterisation, the process of identifying and defining the particular characteristics which make each area distinctive, which is emerging as the basis for a unified approach to describing and understanding the environment.

Using the new approach

The new approach clarifies what it is about a place or object that matters for sustainability, and how it would need to be managed to improve (or at least not detract from!) sustainability. For example in land use planning, an environmental capital investigation should identify important attributes of the area's environment which are below target. The management aims for protection, substitution and enhancement would point to the kind of the objectives which could be put in the plan to promote environmental sustainability.

Such an exercise should concentrate solely on attributes that are significant at the scale of the plan. For example an analysis for a Structure Plan would consider attributes which are significant at a county level, such as the biodiversity functions of woodland. Attributes that matter at larger scales, such as the role of woodland in carbon sequestration, would be 'inherited' from larger scale environmental capital processes. Attributes that matter at a smaller scale - for example the recreational value of particular woods for people living in particular places - would be explored in local exercises (which would in turn 'inherit' management aims for biodiversity from the county level.)

For development control and similar decisions, environmental capital assessment can focus solely on important attributes which are significantly affected by the proposed development, and can help define the desirable forms of compensation and / or mitigation.

For biodiversity / nature conservation strategies and other initiatives aiming to *improve* some aspect of the environment, *potential* attributes - those which *could* be created in the area even if they are not there already - also need to be considered.

In all these cases, the environmental capital asessment is one *input* to the decision process. It does not replace or preempt the decision process. Sustainability will not necessarily prevail over other considerations. However it is hoped that clarifying and focusing the requirements for sustainability will increase the weight they are given,

Policy implications

The new approach highlights some gaps in environmental policy and practice. First, information. The Joint Character Map now gives the UK a basis for characterisation at subregional level, but there is no clear statement of what makes the environment distinct at regional or national levels, and only patchy information at local levels. A fuller picture of what there *is* will help us say what *matters*.

Second, objectives and targets. How strongly we protect an attribute, or seek to replace it or enhance it, depends on how scarce or plentiful it is in relation to some *target* for the amount we want. But the UK has only piecemeal environmental targets, and no established systematic process for setting them, testing their consistency, 'nesting' them between different spatial scales, or promoting them through the planning system.

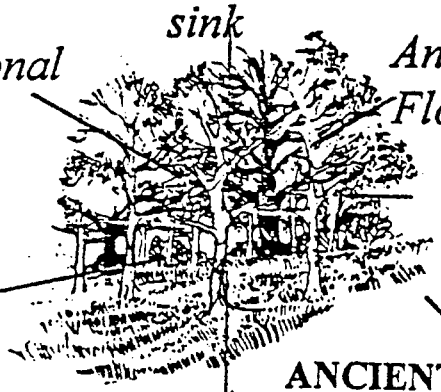
Finally, substitution. The new approach to environmental capital relies on a highly sophisticated concept of *environmental* substitution revolving around identifiable *attributes* each with different permissible replacements. This is quite different from *compensation* in the planning system, which requires compensation to be physically close to the site being compensated but not related to the attribute being damaged.

These problems are not *created* by the environmental capital methodology, but *revealed* by it. They need to be addressed if we are to respond adequately to the needs of environmental sustainability.

Conclusion

The new approach to environmental capital summarised in this paper is a *reconstruction* rather than a revolution. It validates, and makes systematic, a new way of thinking which many practitioners have already grasped intuitively. The agencies which commissioned it hope that it will help practitioners identify, defend and enhance those attributes of the environment which really matter for sustainability, and to reconcile - rather than trade off - environmental and development objectives.

The following diagram illustrates how the new approach might treat a patch of ancient woodland



ANCIENT WOODLAND

Carbon sink

- Global scale
- High importance
- Not enough
- Substitutable anywhere in the world

Recreational resource

- Local scale
- Medium importance
- Enough
- Substitutable locally

Ancient woodland Flora

- Regional scale
- High importance
- Not enough
- Not substitutable

Medieval Connection

- Regional scale
- High importance
- Not enough
- Not substitutable

Charcoal industry

- Local scale
- Low importance
- More than enough
- Substitutable with other local jobs

Folklore

- Local scale
- Medium importance
- Enough
- Not substitutable

Local landmark

- Local scale
- Medium importance
- Enough
- Possibly substitutable with landmark of equivalent local resonance

PART 1: THE NEW APPROACH

1. INTRODUCTION

1.1 This report

This report is a provisional guide to a new approach to assessing and managing environmental capital, based on the idea of characterisation. The new approach is intended to help policy makers and practitioners achieve an integrated, long term approach to environmental protection and enhancement in policy and planning processes including:

- preparation and appraisal of development plans and other statutory and nonstatutory plans;
- development control;
- forestry, agriculture and other sectoral policies.

It is also designed to support other management tools and processes including:

- environmental appraisal
- strategic environmental assessment
- environmental capacity studies
- sustainability indicators
- Local Agenda 21.

The new approach has been developed by CAG Consultants and Land Use Consultants for the Countryside Commission, English Nature, English Heritage and the Environment Agency, with extensive input from government departments, planning authorities and other organisations and individuals with relevant knowledge and experience.

The rest of this introduction explains why the new approach has been developed, and the main ideas behind it. (Appendix D gives more theoretical detail.) Part 1 of the report explains the new approach step by step with practical examples. Part 2 discusses how it can be applied, and some implications for the planning system and other environmental management tools and processes.

This report is written primarily for practitioners concerned with environmental and land use policies and decisions in local and central government and public agencies. **It is illustrative rather than prescriptive: seeking to introduce a new way of thinking about environmental assets and how they should be managed, and indicate how this *can* be applied, rather than to set out a rigid methodology.**

The client agencies, and the great majority of those consulted, believe this new approach offers a substantial and important advance. But they believe more practical experience and feedback will be needed before it can be crystallised into a standard set of procedures. This report is therefore being issued as a provisional guide, and to encourage practitioners to apply the new approach and comment on it to the relevant agencies. The approach set out in this guide will be tested during 1998 through several pilot exercises. The client agencies envisage publishing a more detailed guidance manual in the light of the results of the pilots and other comments received from practitioners.

1.2 Comments and questions

Comments or questions on the new approach should be addressed to:

- Roger Levett, CAG Consultants, Antonia House, 262 Holloway Road, London N7 6NE tel 0171 607 7017 fax 0171 700 7840 email hq@cagconsults.co.uk

- Lyndis Cole, Land Use Consultants, 43 Chalton Street, London NW1 1JB tel 0171 383 5784 fax 0171 383 4798

Comments specific to particular aspects of environmental capital can also be addressed to members of the project steering group:

- Rick Minter, Countryside Commission, John Dower house, Crescent Place, Cheltenham, GL50 3RA, tel 01242 521381 fax 01242 584270

- Richard Howell, The Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS12 4UD tel 01454 624400 fax 01454 624409

- Michael Coupe, English Heritage, 23 Savile Row, London W1X 1AB, tel 0171 973 3854 fax 0171 973 3001

- Greg Smith, English Nature, Northminster House, Peterborough PE1 1UA, tel 01733 340345 fax 01733 68834

1.3 Why a new approach?

The notion of 'environmental capital' has become very widely used and influential. The metaphor on which it rests - the idea of the environment as consisting of assets which can provide a stream of benefits or services so long as we take care not to damage them - seems to embody an important concept of sustainable development. The distinction usually made between 'critical', 'constant' and 'tradable' environmental capital reflects the intuition that some kinds of capital are more important than others, and that some are more easily substituted or compensated for than others.

However as theorists and practitioners have developed this metaphor into a tool for decision taking, contradictions and problems have come to light. Actual environmental assets often do not seem to fit neatly or convincingly into any one of the three categories. Even when they do, defining an asset as 'critical', 'constant' or 'tradable' often does not seem to provide much help in deciding how to manage it. Different organisations and agencies have codified and applied the concept in different ways, resulting in uncertainties and disputes which have reduced the credibility and influence of the concept. Appendix D discusses the difficulties from a theoretical viewpoint, and Appendix E summarises practitioner experience.

By 1996 the Countryside Commission, English Nature, English Heritage and the Environment Agency had recognised that environmental capital had outgrown the strength of its foundations, and required (as it were) further underpinning if it was to continue to be useful. The present project was commissioned to provide this.

1.4 The essence of the new approach

To date, the generally accepted approach to environmental capital has boiled down to asking:

'Is this object or place (which might mean a building, a townscape, a landscape, an area of habitat or whatever):

(1) 'critical natural capital', in which case it should be given the highest possible level of protection?;
(2) a 'constant natural asset', in which case its current level should be maintained?;
(3) 'tradable', in which case efforts should be made to retain it but not to the detriment of other benefits which may be more important to society.'

One key difference in the new characterisation-based approach is that it starts by standing back from environmental *things* or *features*, and considering their *attributes* or the *environmental functions* they perform, or the *services* that they provide. None of these terms - attribute, function, service - captures the concept intended exactly, although they are all close. Rather than try to invent a new technical term, this report uses them all, depending on context, as near-synonyms.

The other important difference is that the new approach asks a series of key questions about environmental capital, instead of simply asking whether it is critical, constant or tradable.

Box 1.1: Key questions asked by the new approach

(1) What are the *characteristics* or *attributes* of this object or place which matter for sustainability?;
(2) *How important* is each of these, to who, and for what reasons or purposes?;
(3) What (if anything) could replace or *substitute for* each of these benefits?;
(4) Do we expect to have *enough* of each of them (ie. are they likely to be over or under target)?
(5) What kinds of *management action* are needed to protect and/or enhance each of these attributes to the degree justified by its importance, degree of substitutability and scarcity / plentifulness?

1.5 Benefits of the new approach

This new way of thinking brings four important benefits.

(a) Integration

First, it brings recognition that a given feature may provide several different environmental benefits or 'services', each of which may be important in different ways and have different management implications. This enables the same capital assessment process to embrace all the different kinds of environmental interest including nature conservation, landscape, heritage, resource management and recreation. For example the same Georgian terrace might matter a great deal for historical and townscape reasons, quite a lot for nature conservation, and a little for informal recreation.

It also means the same process can be applied to all kinds of environmental assets or features. The new approach thus offers consistency *across* different environmental domains, and integration *between* different environmental interests - although as the next chapter explains, how far a particular application ranges depends on the purpose for which it is being done.

(b) Subtler response

Second, the new approach brings a wider and subtler range of management responses than the three tier gradation of 'critical', 'constant' and 'tradable'. For example the new approach could indicate that:

- the actual fabric of some of the buildings (in the last example) was of immense historical significance and should be given the highest possible degree of protection;
- the exterior appearance of the architectural *ensemble* was extremely valuable and should be protected, although the fabric could be reconstructed and the accommodation behind the facades rearranged without detracting from this;
- if any change damaged the nesting sites of certain birds under the parapets of the buildings, similar sites should be provided nearby to maintain their populations;
- increased public access would produce amenity gains to walkers, although these would not be important enough to justify compromising other objectives.

The 'profile' of management implications which can be built up in this way, where each attribute of the feature is discussed separately, can show in as much detail as is useful what sorts of positive and negative effects a possible change will have. This should be more informative and helpful to anyone making decisions about the management of such an asset - or the appropriate response to a development proposal - than simply designating it as 'critical' or 'constant' environmental capital.

This does not undermine or dilute arguments for very high levels of protection for the most 'special'. Indeed by defining more precisely which *attributes* warrant the highest protection, and why, and distinguishing these from attributes which can be managed more flexibly, the new approach should both strengthen the case for protection and make it easier to reconcile with development pressures.

(c) Enhancement

Third, by distinguishing the desired *level* of an attribute from its substitutability and importance the new approach can deal with *enhancement* - that is, increasing the quantity and quality of environmental stock - on exactly the same basis as the more familiar concern of resisting damage. (However some kinds of historical attribute, such as antiquity, clearly cannot be 'enhanced' - a point discussed in more detail later).

(d) Characterisation

'Characterisation' - the process of identifying and defining the particular characteristics which make each area distinctive - is rapidly emerging as the basis for a unified approach to describing and understanding the environment. The Countryside Commission / English Nature Joint Character Map is an important example. In taking characterisation as its starting point the new approach to environmental capital is thus consistent with, and further promotes, this unified approach.

This report does not aim to provide full guidance on how to 'do' characterisation, although it does discuss different approaches to characterisation in order to explain how they can provide a basis for an environmental capital assessment.

1.6 Using the new approach

(a) Connecting to development decisions

Ultimately, of course, this discussion of characteristics has to be brought back down to the management of physical things. A developer buys a piece of land, not a view or a biotope or a carbon sink or a place for children to play. Likewise a biodiversity action plan (or any other public agency plan) is ultimately concerned with physical management of environmental features or areas of land. To be useful in practice any approach to environmental capital must be able to turn its insights back into (for example) specific guidance on what a developer may or may not build on the land, and compensatory actions to be required, or the management actions to be taken on it. Moreover it must do this in a way that is systematic, transparent and defensible.

The new approach can do this. It moves away from the management of physical things in arguing that the sustainability significance of an object or place can only be properly understood *in terms of* its contribution to functions such as amenity, biodiversity, climate regulation and/or recreation. But this understanding then generates specific kinds of management constraints. For example:

(1) Preservation of amenity may require limits to shape and size of buildings or particular design standards;
(2) Loss of biodiversity in an area to be developed may be offset by enhanced management of the rest of the area;
(3) High energy efficiency standards could reduce the 'greenhouse' penalty of development;
(4) A developer might be required to provide an equivalent new play area in compensation.

The profile of management implications is, as it were, the 'product' of an environmental capital study. Part 2 of this report discusses how it can be used to influence - and improve - decisions about management of the environment.

(b) What's new?

The foregoing discussion may strike some practitioners as just a complicated way of restating the obvious. The authors freely acknowledge that a great deal of planning and conservation work already more or less explicitly uses the idea of identifying and managing *attributes* rather than *things*. The current report does not claim to contain anything that at least some practitioners have not already recognised and applied. It aims simply to make this explicit and systematic. In particular it seeks to show how an attribute-based assessment process can connect directly with decision processes without going through the intermediate stage of describing things as 'critical', 'constant' or 'tradable.'

1.7 Building on existing thinking within the agencies

The new approach builds on ideas in earlier guidance such as *Conservation Issues in Strategic Plans CCP 420* (1993) and *Conservation Issues in Local Plans CCP 485* (1996) produced by the Countryside Commission, English Heritage and English Nature and the recent English Heritage publication *Sustaining the historic Environment: New perspectives on the future* (1997). In particular it is an evolutionary development in the agencies' thinking in the following areas.

Concern for the whole environment

Designations cover only a small part of the environment. The agencies recognise that there is a need to look at the whole environment, not just the rare and unusual. Keeping the common common can be as important as preventing the rare from becoming extinct.

Characterisation

Linked to this concern with the whole environment has come increasing interest in what makes each area *different* - that is, with those features and characteristics which give local distinctiveness and sense of place. This characterisation approach started with landscape assessment promoted by the Countryside Commission over the 1980s but now also finds expression in the work of English Nature and English Heritage, culminating in the work of all three agencies in producing the *Joint Map of England* (1996) which combines the Countryside Commission's *Countryside Character Programme* (CCP) and English Nature's *Natural Areas.*

Characterisation permeates all aspects of the Countryside Commission's work from that with local communities, eg in the production of *Village Design Guides* to review of future planning as expressed, for example, in the 1996 consultation paper *England's Countryside: the role of the planning system CCP 496.* Within English Nature, in addition to *Natural Areas*, characterisation underlies much of the thinking behind *National* and *Local Biodiversity Action Plans (BAPs).* English Heritage too, have been active in developing character-based approaches to assessing and understanding the historic landscape.

Integration

The Joint Character Map is one result of growing awareness amongst the agencies of the need for integration between different environmental topic areas. Integration lies at the heart of the Environment Agency's activities: indeed it has a statutory duty to adopt an integrated approach to environmental protection and enhancement across all its functions, taking account of impacts on all environmental media and on natural resources.

Integration requires understanding of why individual features matter form a range of perspectives. With this in mind, LUC and CAG Consultants, in the technical Paper for English Heritage *Sustainability and the Historic environment;* (1996), suggested that thinking about the attributes or services that a feature provides rather than the feature itself can provide a more integrated appreciation of why things matter. This idea underpins the approach suggested in this guidance.

Public perceptions and values

All the agencies are contributing to Local Agenda 21, for example English Heritage, the Countryside Commission and English Nature's publication *Ideas into Action for Local*

Agenda 21 (1996). This is placing increasing emphasis on the need to understand and respond to the views and values of the public. This becomes particularly important at the local level where a purely professional view may fail to understand local values. The agencies recognise that this is a two-way process: finding mechanisms to help professionals reflect the concerns and values of the rest of society, and helping everyone appreciate the scientific or academic reason why certain assets are important.

Flexibility

The agencies recognise that environmental change and development are unavoidable and indeed often beneficial. Without change in the past, much that we value now would not have been created. An approach to environmental protection based solely on preservation and resistance to change is neither practicable nor desirable. Instead they seek to develop a more flexible approach which *guides* and *moulds* change to ensure that it does not come at the expense of environmental qualities which really matter. This requires a subtle as well as thorough understanding of the different aspects of the environment and the options for their management.

Enhancement

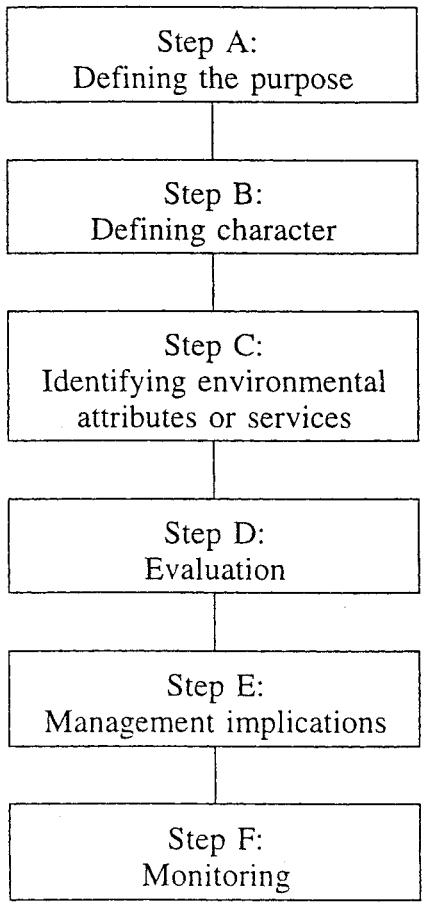
The past designation-driven approach to conservation tended to focus on conservation. The agencies, however are increasingly focusing on the need for environmental enhancement. This is reflected, for example, in objectives and targets set by the Environment Agency for air and water quality; in the targets for habitat extension and species enhancement in the national and local Biodiversity Action Plans, and by the objectives for Natural Areas and the Character Areas of the Countryside Character Programme. (Of course some kinds of historical attribute cannot be 'enhanced': this point is discussed later.)

2. SUMMARY OF THE NEW APPROACH

The rest of Part 1 of this report describes the approach in its most thorough and methodical form to demonstrate its full potential: to this extent it is referred to as a '*methodology*'. For many practical purposes, this level of elaboration will be quite unnecessary, and short cuts or much simpler subsets of the process will be sufficient. Some are suggested in Part 2 of this report. Again, the key emphasis is on providing a new way of thinking about environmental capital, thinking about attributes not things and focusing on the key questions outlined in Box 1.1 above.

The methodology has 6 steps, as shown in Figure 2.1 below. This section summarises them; the following chapters describes each in more detail. The technical terms used here are explained in the Glossary in Appendix A.

Figure 2.1: Flowchart showing steps in methodology



2.1 Step A: Defining the purpose

The first stage of any environmental capital assessment is to define the purpose of the exercise. This will help to clarify how the new approach should be applied. Particular points which will need to be defined include: the object(s) or spatial area(s) to be assessed; the level(s) at which the assessment should be made; the range of environmental issues and timescale which should be considered; and whether the emphasis should be on protection or

enhancement of environmental capital. It will also be helpful to consider what partner organisations should be involved and whose views need to be represented. Chapter 3 explores these issues in more detail.

2.2 Step B: Defining character

The next step is to define the character of the area or areas under consideration, identifying those physical features and broader characteristics which give the area its character. Understanding of the area's character can be deepened through fieldwork or public perception studies, to complement information from existing sources. Chapter 4 outlines a number of options for characterisation, depending on the availability of time and resources.

2.3 Step C: Identifying environmental attributes or services

The purpose of Step C is to say *why* the features and characteristics identified in Step B matter for sustainability. This means identifying the sustainability attributes or services which these features provide for society. Chapter 5 explores the range of attributes or services which might be considered, and puts forward criteria to help assess which should be included.

2.4 Step D: Evaluation

The next step is to evaluate each of the sustainability attributes or services in more detail. For each attribute or service identified in Step C, Step D asks:

(1) At what scale does this attribute or service matter?
(2) How important is it (at this scale)?
(3) What is the trend relative to target (in other words: do we anticipate having enough of it)?
(4) What (if any) substitutions are possible?

Chapter 6 discusses how these assessments and judgements may be made, and how they can be refined and substantiated over time as better information becomes available. This helps to build a picture of the relative importance of the different features and how they should be managed for sustainability.

2.5 Step E: Management implications

In this final step, the answers to the questions in Step D are used to define how each attribute or service should be managed for sustainability. The 'management implications' for each attribute are then brought together into a 'management profile' to show how the feature or area as a whole should be managed. Chapter 7 provides an example of how a management profile would be developed for a development control decision. Part 2 of the report discusses how management implications would be handled for a range of other purposes.

2.6 Step F: Monitoring

The final step discusses how the earlier analysis can assist in monitoring the sustainability of environmental capital over time.

3. STEP A: DEFINING THE PURPOSE

Assessment of environmental capital is a management tool, not an end in itself. It will nearly always be done as an input to some planning or decision process. As described in Part 2, the proposed approach has many potential applications. The methodology described here can be adapted according to the purpose for which environmental capital is being assessed. The first step is therefore to define the purpose of the exercise, considering questions such as:

- what are the boundaries or scope of the area(s) to be assessed?
- how should assessment at this level relate to any assessments of environmental capital at larger or smaller spatial scales?
- whether collaboration with others is needed to deal with issues which cross the geographic boundary?
- whether the primary aim focuses on protection of existing environmental capital, or includes the identification of opportunities for improved management or enhancement?
- what range of environmental issues should be considered?
- what timescale should be considered for trends and targets in environmental capital?
- whose views matter in assessing environmental capital?

These points are discussed briefly below.

3.1 Boundaries or scope of area to be assessed

Assessment of environmental capital will often focus on a particular geographic area. This will often be defined by the purpose of the exercise. For example, in producing a Structure or Local Plan the area to be assessed will be the respective County or District, and the assessment will largely be done at that level. For a development control decision, the assessment will focus on the area affected by the proposed development.

So far as possible, the area under consideration should be aligned to character areas such as those defined in the 'Joint Character Map' produced by English Nature and the Countryside Commission. Where the purpose of the assessment is related to a character area, for example as part of an AONB Management Plan or Local Environment Agency Plan, this requirement follows almost automatically.

In some cases, the methodology may be used to assess an environmental system which does not correspond simply to one place. For instance, it could be used to assess the habitat systems which support a particular species, including a number of nesting sites, foraging sites and roosting grounds across the country. In this case we should define a system, rather than spatial, boundary.

Alternatively, the methodology can be used to assess a set of environmental features which have similar characteristics but are geographically scattered and do not form part of an inter-related system (eg. English cathedrals or Kentish oast houses). In this case, it is important that each feature is considered in relation to its setting. If not, there is a risk that important

aspects of these features may be neglected.

3.2 Relationship to higher/lower spatial scales

At an early stage, it is important to define how the task in hand relates to assessment of environmental capital at higher (eg. global or national) or more local levels.

The importance of drawing on assessments of environmental capital at lower spatial scales will depend on the purpose of the exercise. In assessing environmental capital as an input to a Structure Plan, it will not be appropriate to look at site-specific issues. But they might be highly relevant to a county-wide Local Biodiversity Action Plan (BAP) or - clearly - to assessment of a particular development site. In all cases, local assessments of environmental capital may provide useful information on public perceptions which can be generalised to the level of study. For example, local views relating to specific sites may be relevant to preparation of a Structure Plan if they are broadly representative of public perceptions across the county as a whole.

In contrast, the context of environmental capital at higher spatial scales should always be taken into account. If global or national considerations are neglected, the analysis may be misleadingly skewed towards the parochial. Thus:

- characterisation and evaluation of environmental capital at any particular level should take account of judgements of importance from larger scales. For example species which are rare at larger spatial scales should be treated as rare even if they are common locally;

- the 'global commons' form a backdrop to *all* spatial scales. Any significant impacts on (for example) global climate, accumulative pollutants, globally rare or threatened species, habitats or landscapes should *always* be included.

Concern for both larger and smaller scales reflects the 'nesting' principle:

- Environmental objectives arise at all spatial scales;
- Management should wherever possible reconcile and integrate objectives from all scales;
- Where there is conflict, larger scale objectives will (generally) override smaller ones unless the latter are judged to be significantly more important than the former.

The presumption that larger scale objectives should dominate is based on the assumption that the interests of the many should generally take precedence over the interests of the few. There may be exceptions to this rule where, for example, an issue of great importance to local people (eg. public access to the only area of recreational green space within a 2 mile radius) is allowed to overrule a regional objective of moderate importance (eg. re-creation of a regionally rare habitat which would preclude public access to this area).

3.3 Cross-boundary issues

Where the area of study is defined in geographical terms, it will often form part of a wider system. Context beyond the character area will often be relevant. For example:

- for rivers, the context of the catchment is important (as recognised by catchment management plans);
- for a historic town, the appraisal should involve both the town and its setting.
- for a nature-reserve, the appraisal should include the reserve and its surrounding buffer zone.

Where the area of study is (or includes) part of a larger environmental 'character area', the methodology should consider significant effects of the part on the whole, and vice versa. Where character areas cross administrative boundaries the relevant organisations should ideally collaborate on the assessment of environmental capital.

3.4 Protection, management or enhancement

Certain aspects of the methodology will vary according to whether the exercise is primarily concerned with protection or with initiatives focused on achieving beneficial change.

If protection of existing environmental capital is the primary aim, then the methodology can be focused fairly tightly on existing characteristics of the environment. If improved management or enhancement of environmental capital is the aim, more thought may need to be given to potential characteristics of the environment - those which *could* be created even if they are not there already.

3.5 Range of environmental issues

The methodology encourages a holistic approach to environmental capital, covering all the different ways in which a particular area or feature may be important to the environment (eg. historical value, water conservation value, biodiversity value, landscape value and so on). While responsibility for these aspects of the environment may be assigned to different agencies or officers, management of a single feature requires integration of these different perspectives.

Where the methodology is being used to assess the environmental capital of a geographic area, for example for a statutory land use plan, it is recommended that the full range of environmental issues be considered. Otherwise, there is a risk of neglecting important characteristics of the area.

However, where the methodology is being applied for a particular purpose there may be some types of environmental issue which are clearly irrelevant. For example, the impact of an English cathedral on local water resource systems is unlikely to be relevant if environmental capital is being assessed for reasons related to conservation of the built environment, but they might be relevant if the assessment was being undertaken as an input to flood management plans for the area.

3.6 Timescale

The sustainable management of environmental capital requires a long-term perspective, beyond the typical time horizon of a statutory development plan. A time frame of at least 20 to 30 years should be used in reviewing trends and targets (as required in later stages of

the methodology). Depending on the purpose of the exercise, it may be appropriate to consider an even longer time frame (eg. 50 or 100 years).

3.7 Whose views matter?

At the outset, it is also useful to consider whose views need to be taken into account in assessing environmental capital. What are the main interest groups which have a stake in the area or topic under consideration, from an environmental, economic or social perspective? (For example, in assessing English cathedrals, relevant interest groups might include local residents, worshippers, visitors, foreign tourists, local businesses, council representatives and experts on different aspects of cathedral heritage).

3.8 Summary of Step A

The aim of Step A is to define the purpose of the environmental capital exercise . Answers to the questions above should guide application of the remaining steps in the methodology. The next step, Step B, aims to define the broad character of the area or topic under consideration.

4. STEP B: DEFINING CHARACTER

4.1 Scope

The aim of Step B is to define the character of the area or areas under consideration, identifying those physical features and broader characteristics which give the area its particular character. The subsequent step (Step C) provides for more detailed analysis of the environmental services or attributes associated with each feature. Step B can be omitted if the exercise is already focused on one particular feature or class of features (eg. a specific building and its setting).

The outputs from Step B should be:

(1) division of the defined area (as established in Step A above) into consistent 'character areas', where necessary;
(2) a systematic description of the character of each of these areas;
(3) identification, and justification, of the characteristics and features which give each area its distinctive sense of place;

Step B may also generate information on:

(4) how the extent of these features has changed over recent years (+ or -) and the main causes of these losses/gains;
(5) the current condition of these features and assessment of their vulnerability to change.

The initial sections of this chapter set out:

- *why* take an integrated approach to characterisation?
- *what* is a character area?
- *what* defines the character of an area?
- *how* to undertake characterisation - the options

The later sections of the chapter describe four options for undertaking characterisation in practice:

- Option 1: Collation of existing information
- Option 2: Professional multi-aspect characterisation
- Option 3: Public perception studies
- Option 4: Pragmatic approach - plugging the gaps

4.2 Why take an integrated approach to characterisation?

Characterisation is becoming a well-established methodology: a process of identifying what gives an area its distinctive character. Landscape assessment, promoted primarily by the Countryside Commission, is currently the commonest approach to characterisation. It has also been applied to historic cities, as in the case of the Chester capacity study (Arup, 1995), and is now being applied to public access: the Countryside Commission is currently experimenting with a methodology called 'Area Access Planning' which effectively characterises the recreational opportunities for particular areas, based on character areas of appropriate scale. Characterisation equally forms part of other ongoing initiatives (eg. preparation of local Biodiversity Action Plans, characterisation of Conservation Areas, Local Agenda 21 initiatives).

Characterisation exercises to date have tended to focus on particular aspects of the environment. This is appropriate for some purposes but does not provide a basis for integrated treatment of different environmental domains, which is one of the potential strengths of the new approach to environmental capital. To allow for this, step B therefore suggests a more integrated approach to characterisation, drawing together landscape, wildlife, cultural resources and access, as well as perceptual characteristics such as wildness and tranquillity.

4.3 What is a character area?

On this basis, a character area is one which has a relatively coherent character across a range of environmental topics. In some cases one environmental characteristic may be over-riding. In other cases there may be no clear pattern amongst any of the characterisation elements - but this in itself will be the 'character' of the area.

Nevertheless, there often turns out to be a congruence - possibly not previously recognised - between the different elements of characterisation. For example, the Surrey Heaths gain their distinctive character from:

- their open large-scale heathland character;
- their history as common land;
- their distinctive flora;
- their freedom of access; and
- their sense of wildness in an otherwise highly populated area.

Similarly, chalk downland has a distinctive character relating to:

- its open sweeping landscape where earth meets sky, punctuated by beach roundels and hangers;
- a strong association with pre-historic and Roman occupation;
- distinctive calcareous grasslands (now highly fragmented) and scarp-slope yews;
- ridgeway walks;
- a strong sense of expansive scale.

4.4 What defines the character of an area?

The character of an area is formed through a combination of:

(a) key environmental features (ie. physical things within the area which contribute to its character)
(b) area-wide characteristics (ie. general characteristics of the area as a whole).

Perceptions of what is distinctive about an area may change over time, so the features and characteristics which define the area's character may need to be reviewed periodically. It should also be remembered that *distinctive* does not necessarily mean *good*: change may mean improvement or damage, or be neutral.

(a) Key environmental features

Features are the physical things that contribute to the particular character of an area. For the purposes of this methodology, features generally take the form of *land cover* - that is to say,

what is physically there - rather than land use designation or ownership. Land use designations (eg. public open space or common land), designated sites (eg. SSSIs), land ownership (eg. ownership by a conservation body) or cultural associations (eg. battlefield sites) are not physical features in their own right but rather indications of the importance attached to the site. Importance is considered separately in Step D.

The number of features identified, and the level of detail in the characterisation process, will depend on the task in hand. If the methodology is being applied at regional or county level, features will be more generic and less detailed than if it is being applied at sub-district level. Examples of the types of features which could be identified at each level (eg. regional, county, district, local) are given in Appendix B. While this may seem a long list, generally only a few of them - perhaps between 10 and 30 - will be enough to describe individual character areas at a specific level.

Examples of features for specific land cover types are shown in Box 4.1.

Box 4.1: Examples of features

The key features of a river valley might be:

historic parkland
ancient woodland
mixed secondary woodland
amenity grassland
unimproved damp grassland
marsh/fen
grades 1 and 2 agricultural land
streams
natural river courses
man-made river channels
river flows
water table
lakes/pits
drainage ditches
hedgerows and hedgerow trees
archaeological remains below ground
farm buildings (traditional)
historic village cores
vernacular features (bridges, sluice mechanisms, eel traps etc.)
public footpaths
country lanes.

Alternatively for upland moorland the key features might be:

ancient woodland
stone walls (remnant)
acidic unimproved grassland
bracken scrub
heather moor
grass moor
streams
footpaths
archaeological remains above ground
farm buildings (traditional)
stone cairns, trig points etc

(b) Area-wide characteristics

Some aspects of character may not be associated with particular physical features. While area-wide characteristics may be intangible and elusive, they often contribute important aspects of the area's character. These include perceptual resources or aspects of character created through the interaction of a range of different elements.

There may also be some area-wide characteristics relating to a specific function performed by areas of land (or water). For example, there may be flood plains where the key

characteristic is flood storage capacity, or aquifer recharge zones where the key characteristic relates to water storage.

Box 4.2 lists possible area-wide characteristics for rural and urban areas.

Box 4.2: Examples of area-wide characteristics

Area-wide characteristics of a rural area might include such things as:

- tranquillity
- night skies
- diversity
- traditional character
- undeveloped character
- isolation/wildness
- integrity
- vistas/panoramas

In an urban area they might include:

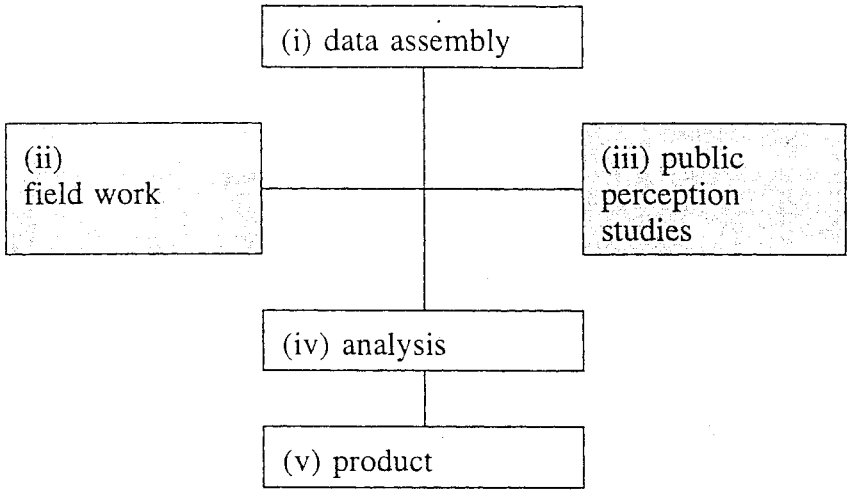
- architectural coherence
- range of traditional building materials
- vitality/excitement
- mixed uses
- traditional character/historic layout/distinctive street patterns
- intimacy/human scale
- connectivity (eg. on foot)
- compactness
- well-defined urban edge
- hierarchy of open spaces

4.5 How to undertake characterisation - the options

Emphasis has been placed above on defining integrated character areas. This may be done in a number of ways depending on available information, resources and time. These can be broadly described by the following options, combining some or all of the elements shown in Figure 4.1:

- Option 1: collation of existing information (elements (i), (iv), (v))
- Option 2: professional multi-aspect characterisation (Option 1 plus element (ii))
- Option 3: professional multi-aspect characterisation backed by public perception studies (Option 1 plus elements (ii) and (iii))
- Option 4. a pragmatic approach: plugging the gaps in existing information sources (Option 1 plus partial elements from (ii) and (iii))

Figure 4.1: Possible elements in characterisation process



Resource constraints will often limit the scope for new field work (Option 2) or consultations (Option 3). A re-appraisal of existing information can reveal much and may help focus attention on what additional information would be most valuable should time or money become available in the future. Where new studies are feasible, it will be useful to consider whether they can contribute also to Steps C and D. For example, as well as defining the character of an area, field work could assess trends in, and the quality of, different aspects of character (see points (4) and (5) in paragraph 4.1).

4.6 Option 1: Collation of existing information

This option relies on existing information and will be most appropriate where some form of characterisation has been undertaken (eg. a landscape assessment). It involves the compilation of existing knowledge (based on both expert judgement and local perceptions, where available) to make a first stab at identifying 'what is important' about the area. Useful sources of information will include:

(1) the Countryside Character Programme, Natural Areas and the Joint Character Map from these two programmes. These provide characterisation at a sub-regional level. The character areas so defined take account of landscape, nature and cultural history, and provide the framework for characterisation at the more local level. Many existing landscape assessments and historic landscape assessments have built, or are building, on this framework;

(2) AONB, county and district landscape assessments and historic landscape assessments, such as the Historic Landscape Assessment of Cornwall and that of the Isles of Scilly;

(3) any townscape assessments that have been carried out in support of Conservation Area designations, capacity studies and as background to townscape design guides;

(4) Community-generated or supported characterisation initiatives including Village Appraisals, Village Design Guides, Parish Maps and Townscape studies, such as that being promoted by the Peterborough Environment Trust and Mendip District Council;

(5) Local Biodiversity Action Plans (usually prepared at the county level), Nature Conservation and Rural Strategies which often provide information on the characteristic habitats of an area both now and in former times;

(6) Local Environment Agency Plans and Catchment Management Plans;

(7) Guidance from statutory agencies;

(8) Local State of the Environment Report or Sustainability Reporting;

(9) Statutory and local designations and listings - although these should be used as *prompts* to *consider* the features listed or designated for inclusion, not as *reasons* for inclusion in their own right. It may be convenient to use the names of designated areas to denote some of the *features* listed.

Where character assessments have been undertaken on specific topics (eg. landscape assessment; local Biodiversity Action Plans), the results of different assessments should be overlayed to try to define:

- common integrated character areas;
- the key features or characteristics which give each of these their special character.

Existing data may also provide information on:

- trends in, and quality of, these features;
- obvious information gaps which should be a priority should further funds become available for studies.

4.7 Option 2: Professional multi-aspect characterisation

Where there is little or no existing information on characterisation, an integrated approach provides the best starting point for identifying environmental capital if resources and time permit.

Emerging examples of broader characterisation studies which integrate different aspects of the environment include the Joint Character Map and the combined landscape and nature conservation characterisation commissioned by Torridge District Council (unpublished report by Chris Blandford Associates, 1995). Similarly, the historic landscape assessment of the Isles of Scilly, Cotswolds or the Peak District provide examples of an increasingly integrated approach.

A methodology for fully-integrated characterisation has yet to be developed and is beyond the scope of this report. The best approach will probably be to overlay the results of different assessments to define composite character areas. A potential outline of these assessments is included in Box 4.3.

Existing guidance on specific aspects of characterisation which may be helpful includes:

- Countryside Commission, 'Landscape Assessment Guidance', CCP 423, 1993;

- CPRE, 'Tranquil Areas in the North East' and 'Tranquil Areas in the South East', CPRE, 1993;

- CPRE/BAA, 'Starry Nights: How to Keep Sight of the Stars', 1994.

- Countryside Commission, 'Views from the Past - Historic Landscape Character in the English Countryside', 1994;

- ERM, 'Environmental Capital for the Countryside', A report to the Countryside Commission, 1995;

- Environment Agency, 'Environmental assessment: Scoping Handbook for Projects, HMSO, 1996;

- Countryside Commission, English Heritage & English Nature, 'Conservation Issues in Local Plans', English Heritage, 1996;

- Countryside Commission, 'Design in the Countryside Experiments', CCP 471, 1994;

- Countryside Commission, 'Views from the Past (CCWP04) 1996;

- English Heritage, 'The Monuments Protection Programme 1986-96 in retrospect' (which describes the SMR-based evaluation approach);

- ed G Fairclough, G Lambrick and A McNab, 'Yesterday's Landscape, Tomorrow's World', the English Heritage Historic Landscape Project (unpublished draft);

Ideally, the final character assessment should include public perceptions as well as professional judgement: approaches to involving the public are considered separately under Option 3.

Box 4.3: professional identification of the resource base

Landscape/ townscape: Landscape assessment following the guidance in CCP423 involves review of base data on topography, geology and soils; MAFF data on land classifications and any aerial photographs which help identify current land cover patterns and features.

This information is plotted as simple map overlays to help understand the current relationship between the physical characteristics of the area (topography, geology and soils) and land cover, resulting in the definition of rough landscape character areas which are then tested and refined through field survey. In urban areas, the need will be to understand current townscape qualities and sub-division into townscape character areas, as described for example in the Chester capacity study.

Historic environment: Through the Historic Landscapes Project, English Heritage has been investigating a range of methods for characterising historic landscapes and dividing them into historic landscape zones. The Cornwall study undertaken by the Cornwall Archaeological Unit is currently considered the most advanced at a county scale and is being refined both there and in the Peak District.

Historic landscape assessment is concerned with understanding the physical evidence of past human activity and the inter-relationship between human society and the environmental over time, recognising that their relationship may have been different in different periods of history. Sources of data include geology and landform, hydrology and drainage, palaeo-environmental evidence, archaeology, settlement and communications pattern, local history and vegetation cover. A key element in characterisation is plotting the coincidence of different historic features and periods in historic evolution and their contribution to historical patterns.

Nature conservation: Like cultural heritage, nature conservation has often been considered just as separate sites. Following the example of the Natural Areas approach, there is the opportunity to consider the existing and potential range of different habitat types typical of the area and how they contribute to the character of the area or could do so. The information for such an assessment would be based on the distribution of remnant habitats as revealed by any existing survey work, information on the historic distribution of these habitats (which will be closely related to any historic assessment as noted above) and information on underlying soils and geology.

Already there are a number of examples of strategies for individual habitats, such as the Heathland Strategy prepared for Nottinghamshire and the Heathland Strategy for the Brecklands. Such information is also being collected in the preparation of Biodiversity Action Plans. The output from this exercise would be the definition of discrete natural areas or natural character areas. In urban situations the main concern may be the inter-connectivity of habitats rather than their type.

Accessibility: Accessibility has not been a major consideration in the characterisation of areas yet the degree of public access can strongly influence the perceived character of an area. Compare, for example, the open access character of the heathlands of Surrey with the general lack of access associated with some Enclosure landscapes. By reference to the rights of way network and the distribution of open access land the aim would be to build up a picture of accessibility (both public open space and areas with de facto access).

Perceptual characteristics: There is now an established methodology for recognising tranquillity (CPRE, 1995). Some feel of other perceptual characteristics such as isolation and wildness can be gauged through an assessment of the position of the area relative to settlements and other human impacts. Different perceptual characteristics will be important in particular areas.

By overlaying (through sieve mapping or use of Geographical Information Systems) the different characterisations covering the topics outlined above, it should be possible to identify composite character areas and their key features or characteristics. These can then be tested and, if necessary, verified through further field surveys. The outputs from the integrated characterisation exercise would include:

- definition of integrated character areas;
- the key features or characteristics which give each of these their special character;
- trends in quantity and quality of these features.

4.8 Option 3: Public perception studies

Professional judgement should be supported by assessment of public perceptions of characteristics of the environment. This is particularly important at the local scale and, at all scales, in judging less tangible characteristics. Option 3 is not, therefore, an alternative but rather a complement to Option 2.

There are three main steps in developing a strategy to assess public perceptions of what matters in their environment:

(a) agreeing what level of public involvement is appropriate
(b) identifying who needs to be involved
(c) choosing appropriate tools and techniques.

Appendix C gives further background on techniques for public involvement including sources of further information.

(a) Level of public involvement

The choice of method will depend on the level of involvement which is appropriate. Until recently, most local authorities and public bodies have looked for methods of *consultation* rather than deeper involvement: listening to community views but retaining power to decide how to act on these views at the end of the day. Many authorities and other organisations are now realising that deeper involvement can help to increase the community's sense of ownership - and support - of emerging policies or plans. This means moving towards *participation*, in which members of the community work with the authority to develop the way forward.

Local Agenda 21 processes are seeking to develop ongoing *partnerships* in which decision-making power and responsibility for action are more explicitly shared between local authorities, businesses and different interest groups in the community. By involving people more deeply, participation and partnership processes can help in finding common ground between apparently divergent interests.

Questions which will be relevant in deciding what level of public involvement is appropriate in the short and longer term include:

- what ongoing processes or organisational structures can contribute to the assessment of environmental capital (eg. Local Agenda 21 working groups; student research projects)?
- how committed are different parts of the organisation to developing ongoing partnerships and taking a more open approach to decision-making?
- how interested are potential partners in becoming involved?
- what time and resources are available for new work, including the analysis of information emerging from the process?

Where possible, links should be made with Local Agenda 21 and related initiatives. For example, working groups set up under Local Agenda 21 may be concerned with certain aspects of the local environment or may be considering the sustainability of certain geographical areas. It may be particularly useful to identify any existing work on Sustainability Indicators, since this may have involved members of the community in identifying those aspects of the environment which they perceive to be most important for sustainability.

(b) Considering who might be involved

'The community' in fact consists of a diverse range of individuals and interests. At an early stage, it is useful to identify the range of interest groups or 'stakeholders' who might be involved. These may include people who have specific knowledge or information about different aspects of the environment, people who use or are affected by the environment in different ways or people who play a particular role in decision-making about the area. Stakeholders might include:

- people with specialist local knowledge or interests;
- parish or community representatives from different parts of the area;
- representatives of different age groups, gender, ethnicity, income levels and levels of mobility;
- representatives from the business community and voluntary groups as well as residents;
- local or parish councillors.

Techniques should be chosen for their effectiveness in reaching the identified stakeholder groups. While a door-to-door questionnaire survey may reach a statistically representative sample of the population, a public meeting may not. Targeted techniques such as focus groups may be needed to reach groups which are not normally represented, supplementing the views gathered from 'the usual suspects'.

(c) Choosing appropriate tools and techniques

Appendix C outlines a range of methods which can be used to seek public involvement in the process of assessing environmental capital, including:

- public meetings
- public opinion surveys and perception studies
- focus groups
- Village Design Statements, Village Appraisals and Parish Maps
- visioning conferences
- environmental fora or working groups
- Local Agenda 21 working groups

Depending on the scale of the area to be covered, these techniques could be used to cover the whole area or to assess public perceptions in a number of sample communities.

(d) Outputs from public perception studies

The techniques outlined above should help to explore public perceptions of environmental capital, defining or confirming the outputs for Step B:

- public perceptions of coherent 'character areas'
- public perceptions of what gives these areas their character (eg. key features; perceptual characteristics).

These techniques can also be used to explore further aspects of environmental capital which will be useful for Steps C and D such as:

- why are these features and characteristics felt to be important?
- what aspects of character matter most, and why?
- how acceptable is change to different aspects of character?

Depending on the level of involvement chosen, from 'consultation' to 'partnership', the outcomes of the public involvement process may be much more far reaching. Rather than just helping to define environmental capital, public involvement processes may lead to:

- participation of the community in resolving conflicts between environmental objectives and other local objectives (eg. social or economic considerations);

- community participation in developing management plans or planning policies for certain aspects of environmental capital;

- public/private/community partnerships in implementing management plans.

4.9 Option 4: Pragmatic approach - plugging the gaps

Where the time and resources needed for full characterisation are not available, it may still be possible to fill some of the gaps which are evident in information from existing sources (Option 1) through more specific, targeted studies. These could include:

- characterisation concentrating on aspects of the environment not covered by previous character assessment exercises, or areas of particular value, or which have changed greatly since the last characterisation exercise, or which are under particular threat;

- public perception studies focused on one or more specific issues which are expected to be contentious or important to local people (eg. through a series of focus groups);

- studies of representative samples of the area.

Understanding environmental character is an ongoing process, not a one-off event. A longer time-frame may permit more efficient ways of collecting information, particularly if studies can be integrated with ongoing activities of the council or the community. For instance, school children or geography students could be involved in projects to characterise their village or local area as part of their education; Local Agenda 21 groups or other voluntary organisations may be willing to help collect data on aspects of the local environment of particular concern to them. Similarly a local rambling group could report on the condition of rights of way and field boundaries.

4.10 Summary of Step B

The purpose of Step B is to define coherent character areas and identify the key features and characteristics which contribute to the character of each area. It may be possible to assess character from existing information alone (Option 1), but in many cases there will be some information gaps which need to be filled (Option 4). If time and resources permit, it is recommended that an integrated characterisation exercise is carried out, covering all aspects of environmental capital and drawing on both professional judgement (Option 2) and public perceptions (Option 3).

Having identified the features which give an area its character, the next step (Step C) is to explore why these features are important for environmental capital.

5. STEP C: IDENTIFYING ENVIRONMENTAL ATTRIBUTES OR SERVICES

5.1 Scope of Step C

Having defined the key characteristics and physical features of the area in Step B, the next step is to say *why* these characteristics or features matter for sustainability. This is done by identifying the sustainability *attributes* or *services* provided by these features, or *functions* they perform. None of the words 'attributes', 'services' or 'functions' quite captures the full range of reasons why a feature may matter for sustainability: this report will use the terms 'attributes' and 'services' to refer to the full range of reasons.

5.2 What is meant by a service or attribute?

Box 5.1 gives a checklist and explanation of the broad kinds of attribute or service which may matter for sustainability. Its headings are neither exhaustive nor mutually exclusive - they act only as checklist to ensure that users do not forget important attributes of the feature or characteristic being assessed.

The checklist includes 'benefits to the local economy'. These need not be included if a separate economic study is being made but may otherwise be worth including here to ensure that they are not overlooked.

Many of the physical features identified in Step B will have more than one significant service or attribute. However, some of the area-wide characteristics identified in Step B will not need further analysis in Step C, if they can already be interpreted as attributes for the area as a whole.

Box 5.1: Checklist for types of attributes/services

Health/survival covers attributes which support human life or protect health. This includes services provided by the physical and chemical environment such as the maintenance of global climate regulation, radiation protection, the water and carbon cycles and, in particular, the effects on climate and weather of emission and absorption of 'greenhouse' gases. More locally it includes air quality, water resources and quality (surface and groundwater; fresh and sea water), land and soil quality, local micro-climates, and the ability of natural elements to control hazards such as soil erosion, flooding etc.

Biodiversity is concerned with maintaining the diversity of habitats and species at all levels. In the context of defining environmental capital it also includes the earth sciences (ie. geological and geomorphological interests).

Appreciation of environment is concerned with characteristics which people care about. The public may appreciate and value creatures and habitats of little concern to conservation professionals, eg the blackbird singing in the back garden. People may also want to save whales or golden eagles they may never see, or know that the Lake District is still there even if they never visit it.

Sense of place is concerned with the qualities which give an area its particular character - including landscape/townscape qualities, associations, uses of places and buildings, and perceptual characteristics. These qualities may be informed both by professional landscape/townscape assessments and by local people's perceptions of their area.

Historical character is concerned with all aspects of heritage. Traditionally this has been interpreted primarily as archaeology, industrial archaeology, the built heritage and historic designed landscapes. It should also include human influence on landscape evolution (eg. evidence of Medieval field patterns, ridge and furrow cultivation etc), associations with past ways of life, historical events (eg. battlefields) and associations with important people in history.

Education is concerned with the area's use as a resource for both organised and informal study. This depends on the quality or exemplariness of the environmental features in the area (natural, human-made or combined) and their accessibility for study without damage.

Recreation covers the area's ability to accommodate both organised sport and informal recreational activities such as walking and cycling. Characteristics of a site or feature which make it suitable for recreational use may include rights of access and established use.

Value to the local economy is concerned with aspects of the environment which have potential to contribute to the local economy, for example as a visitor attraction or by supporting local employment such as farming or processing of forest products. This heading is included to recognise the conventional economic value of features which also have other sustainability attributes.

5.3 Which attributes need to be included?

The level of detail which is appropriate in analysing attributes or services for a particular feature depends on the purpose of the exercise as a whole (see Step A). For example, if the methodology is being used in the preparation of a development plan, and if one or two key attributes in themselves justify strong protection of the physical feature, identification of these attributes alone may be sufficient. Alternatively, if the methodology is being used to assess opportunities for enhancing the environment (eg. associated with expanding woodland cover), it may be important to identify a fuller range of attributes and services and to consider potential as well as existing attributes. This is explained further in Part 2.

In theory, any number of attributes or services could be included. In practice, for the exercise to remain manageable, attention will need to focus on the more important attributes. The criteria listed in Box 5.2 can be used to select those attributes and services which are important enough to be worth including. This list seems to be equally applicable to all types of environmental capital, be it historical or biological interest, and has been adapted and amalgamated from previous guidance including:

- NCC/Ratcliffe 1978. Nature conservation, site assessment and selection.
- NCC 1989. Guidelines for selection of biological SSSIs: Rationale and operational approach and criteria;
- JNCC 1995. The habitat directive - how it will apply in great Britain;
- EN 1995 Establishing criteria for identifying critical natural capital in the terrestrial

environment - A discussion paper;

- JNCC 1996. An introduction to the geological conservation review;
- criteria used in the recognition of sites of community importance for nature conservation (e.g. by the London Ecology Unit and Birmingham MBC);
- Countryside Commission 1993. landscape assessment guidance CCP 423;
- ERM 1995. Countryside capital for the Countryside. Countryside Commission;
- Ancient monuments. 1967. Antiquity;
- LUC/CAG 1995 Sustainability and the historic environment. English Heritage.

Box 5.2: Criteria for selecting important attributes

Rarity: For nature conservation there are established listings of nationally and regionally rare species and habitats (e.g. Red Data Book Species) and agreed scales for recording rarity (e.g. rare, scarce, common). Rarity is less well defined for many other environmental characteristics but the same concepts should be applied.

Typicalness/representativeness: An attribute may be representative of a particular type, for example:

- a phase or stage in historical development or architecture
- a phase in landscape evolution, such as flood plain water meadows
- features, events and processes essential to the understanding of geological history.
- characteristic assemblages of species conforming to established classifications such as the National Vegetation Classification.

Distinctiveness and role in creating local character and sense of place: these may be physical or perceptual attributes. Commonness, prominence (as in landmarks) and quirky or unusual character can all matter. In local BAPs habitats and species may be recognised as important for local distinctiveness because they are characteristic of an area or of special cultural or historical significance.

Quality: There are now established measures for air and water quality. In the case of other environmental attributes quality will usually be additive to other criteria and will relate to such considerations as unspoilt character, naturalness (in the case of habitats), size (the larger the size usually the greater the ability of the attribute to withstand pressures) and continuity of appropriate management. It will also relate to aesthetic appeal.

Setting/context: Features which provide the setting or context for an important area or feature may themselves be important, even if they have little intrinsic value. This can include the setting of historic buildings, towns and designed landscapes; buffer land surrounding important habitats (reference: PPG 9); and a protected margin around geological exposures to allow management of a slowly retreating rock face. It can also include the setting to valued landscapes such as National Parks and AONBs. There is also need to take account of the interaction between features. Interlinked habitats and open spaces and clustering of historical features will often have greater value than those that are isolated - the whole may be greater than the sum of the parts.

Historical continuity and recorded history: Areas which have been under a similar vegetation cover for 500 - 1000 years are usually much more species-rich than habitats which have only developed recently, and are generally impossible to re-create as the circumstances in which they developed no longer exist and would be impossible to simulate. Even if an attempt were successful in replacing an ancient habitat or artefact within (say) 500 years, in 500 years it would be only 500 years old rather than a 1000 years old. In this context recorded history is also important. The existence of a historical or scientific record for a site or feature adds considerable research and education value.

Accessibility: This includes closeness to the population served, transport connections (especially public transport, cycle and footpaths); and visual access where the need is just to know that something is there rather than actually having to visit it. The most valuable attributes in this context will be those serving the largest and most diverse range of people.

Ownership: This is concerned with both actual ownership which reflects particular values (such as ownership by conservation organisations) and a sense of community or communal ownership, as in sites over which the community feel they have a special claim because of established traditions of use and enjoyment.

Popularity: This may be reflected by visitor numbers, references in literature or in the media or as indicated by polls and other measures.

5.4 How to identify services or attributes?

For some types of attributes, such as health/survival and biodiversity, the knowledge and judgement of technical or professional experts is the only or main source of information. For others such as recreation and appreciation of the environment, the expressed views (or revealed behaviour) of ordinary people is the main yardstick. But many attributes involve a combination of expert and lay views.

Where public involvement is needed to assess the services or attributes generated by a particular feature, it may be convenient to incorporate relevant questions into the public perception studies undertaken for Step B.

5.5 Example of attributes

The list of attributes or services is most easily explained by giving an example (see the following table). This looks at one feature (mixed woodland) at progressively smaller scales. This would be appropriate if the purpose of the exercise was to assess a particular site or a specific tree. However an attributes list produced for a development plan would generally analyse a range of features at the same spatial scale. The numbers refer to the explanatory notes below.

Table 5.1: Sample list of attributes

Feature (1)	Attribute
Whole rural area (2)	Tranquillity (3) *(appreciation of environment)*
Mixed woodland (in general)	Carbon sink *(health / survival)* Insect ecology *(biodiversity)* Range of tree species *(appreciation)* Skyline characteristic of hill copses *(sense of place)* Some areas open for recreation (4) *(recreation)* Coppice charcoal industry *(local economy)*
Remnant ancient woodland	[As for mixed woodland] (5) Habitat rare at UK level although common locally *(biodiversity)* Key landscape feature in many areas *(sense of place)* History of the charcoal industry *(cultural history)*
Gallows Wood, Rooktown	Only tranquil area accessible to 3000 residents *(appreciation, recreation)* School orienteering ground *(recreation)* (6) Damaged remains of Saxon burial mound *(education)* (7)
Hang-man's Stream	A thriving freshwater habitat, which feeds a trout farm downstream *(biodiversity, local economy)*
The Gallows Tree	One of the oldest living trees in southern England; unusually rich and continuous habitat *(biodiversity)* Famous, figures in the town's coat of arms, central to local identity *(sense of place, cultural history)* Site of a famous lynching *(cultural history)* Visitor attraction bringing £250,000 to the town *(Local economy)*

Notes to Table 5.1:

(1) The left hand column lists physical things (or groups of things) such as 'ancient woodland' or 'the village church'.

(2) It will generally be convenient to start with the largest scale - for example the whole defined area or the larger 'character areas' within it - and (where appropriate) work down to progressively smaller or more specific features within each of these.

(3) In the right hand column each line specifies a separate *attribute* or *service* - that is, a *quality* or *characteristic* of the environmental feature listed to the left.

(4) Many patches of mixed woodland will have recreational uses. But they will each do so in different ways and in different places. This attribute is therefore flagged at county level but specified in more detail for each (relevant) individual patch of woodland, at the more local levels.

(5) Attributes which have been identified at a higher scale should, where appropriate, be inherited downwards to the current level of investigation

(6) There may be more than one separate attribute of the same general type, for example two here under recreation. (Remember the headings are only a broad checklist of categories.)

(7) The table may be very 'sparse': many features will only matter for one or two reasons. If a feature does not matter for *any* reason, it should not be included in the listing! The point of the matrix is to pinpoint only those attributes of those features which *do* matter.

5.6 Summary of Step C

While Step B identifies the features and area-wide characteristics which contribute to the character of the area under study, Step C identifies what environmental attributes and services these characteristics and features provide for society. The integrated criteria set out in Step C can help to identify which attributes are worth including at this stage. The next step is to evaluate each attribute or service in more detail.

6. STEP D: EVALUATION

6.1 Scope of Step D

The purpose of Step D is to evaluate in more detail each attribute or service identified in Step C. For each attribute in turn, Step D asks:

(1) At what scale does this attribute or service matter?
(2) How important is it (at this scale)?
(3) What is the trend relative to target (ie. do we anticipate having enough of it)?
(4) What (if any) substitutions are possible?

The third of these questions ('What is the trend relative to target?') requires an assessment of whether the attribute is currently meeting, and likely to continue meeting, sustainability targets in terms of both quantity and quality. Approaches to answering this and the other three questions are outlined in Sections 6.4 to 6.7 below.

6.2 Why evaluate?

This is a crucial step. We cannot (and would not want to) preserve everything to the extent that change is not allowed. Neither do we want to see steady erosion of our environmental capital; indeed, we want 'capital growth' rather than erosion. But to achieve this we need to see how to prioritise different assets for protection and enhancement, and to distinguish between beneficial, harmless and damaging kinds of change. In particular we need to understand how environmental capital is changing over time, so as to relate current policy and management decisions to longer term aims.

6.3 How to evaluate the attributes?

Evaluation involves asking the above four questions about each attribute identified in Step C. The questions, and how to answer them, are discussed in turn. (The answers can conveniently be noted in four columns alongside a list of the attributes identified. Table 7.3 in Chapter 7 illustrates this. Its last column is explained in Chapter 7.)

The 'systems' model of sustainability (Clayton and Radcliffe, 1996) provides the theoretical basis for most of these questions: how close is the system under study to a significant or irreversible change? A systems approach could in principle provide a rigorous basis for answering many of these questions, although judgements will always be required in the *interpretation* and *application* of even the 'hardest' science).

In general it is currently beyond the resources of planning authorities to apply systems methods in a direct quantitative way. This stage in the methodology therefore largely relies on expert judgement to 'second guess' (for example) environmental capacities, thresholds and opportunities for substitution rather than seeking to quantify the real things. Data on these may be hoped to improve over the coming years; but in any case *thinking* in systems terms will help integrate consideration of different areas and issues.

Taking each of the four evaluation questions in turn:

6.4 Question (1): At what scale does this attribute matter?

The first question is about the geographical scale at which the attribute or service matters (eg. global, international, national, regional, county, district or more local). To clarify the scale at which an attribute or service matters, it may help to ask who it matters to.

The scale at which the attribute matters is not the same as the scale of the attribute itself. For example the historical documentary value of a very small archaeological site or habitat may be nationally or internationally important. Conversely, access to a large continuous landscape may matter only for local aesthetic and recreational reasons - albeit to a large number of local communities.

If an attribute appears to matter at more than one scale, this means that it amalgamates more than one attribute. For instance, a habitat which supports a rare bird species may appear to be important to both national experts and local people for nature conservation reasons: closer consideration may reveal that it is nationally important for 'biodiversity' but locally important in contributing to people's 'appreciation of the environment' or their local 'sense of place'. These attributes should be considered separately, so that each attribute matters at only one scale. If an attribute still appears to matter at more than one scale, the answer to question (1) will generally be the *highest* scale at which this attribute matters.

6.5 Question (2): How important is this attribute (at this scale)?

Assessment of importance inevitably involves judgement. For some attributes, such as those of a Ramsar site, this judgement may have already been made by relevant experts at the national or international level. In other cases, particularly where an attribute is more locally important, the subjectivity of the judgement may be more evident.

To aid the assessment of importance, it is suggested that the criteria presented in Box 5.2, Chapter 5, are used. As already noted, these are integrated criteria which should be equally applicable to all forms of capital.

At this stage of analysis, importance should be described as high, medium or low, with supporting justification. In general, using scales with more points ('extremely important', 'very important', 'quite important' etc) will create spurious rather than real precision. 'Low importance' does not mean 'does not matter at all': any attributes that belong in the 'no matter' category should be knocked out. It will be important not to describe everything as 'important': 'if you prioritise everything, you prioritise nothing'.

The level of confidence attached to the judgement of importance, and the robustness of this judgement to outside scrutiny, will obviously depend on the supporting evidence which is available. Depending on the nature of the attribute in question, assessment of importance may be primarily a matter for professional judgement (eg. health/survival, biodiversity), for public perceptions (eg. appreciation of natural environment) or a combination of the two (eg. sense of place, cultural history). The types of processes which might be used to assess public perceptions are outlined in Chapter 4 and Appendix C.

The subjectivity of assessing importance should be seen as an inherent characteristic of environmental management, rather than a weakness of this methodology. Indeed the methodology at least requires the question to be addressed explicitly, and thus opens the answer to discussion and negotiation. This is an improvement on previous approaches to environmental capital, which have tended to *assume* that importance is correlated to irreplaceability, non-substitutability and rarity, thus providing no basis for prioritising *between* features which are equally irreplaceable, non-substitutable and rare.

6.6 Question (3): What is the trend relative to target?

This questions asks whether we anticipate having *enough* of this attribute or service, in terms of quality or quantity. In other words, it asks how close the attribute or service is to the threshold of acceptable change, where this is known.

To answer this questions, three elements need to be considered - the *target level* for this attribute or service, its *current level*, and the *trend* in its level. These elements are combined into a single measure of whether (in current circumstances) the level can be expected to reach, exceed or fall short of the target. The targets and trends may relate to the quality or quantity of the service or attribute. In answering question (3), it is important to look far enough into the future, taking into account the time frame chosen in Step A. This time frame is likely to extend well beyond the timescale of the statutory planning process.

(a) Targets

The target is the desired quality or quantity for the attribute or service in question, taking sustainability considerations into account: it may be higher or lower than the current level. The target should relate to the scale identified in question (1) of this step: if the attribute or service is nationally important then the target would be inherited from the national level; if it is locally important then the target should be set locally.

Target levels should ideally be based on:

(1) 'systems' modelling of relevant environmental carrying capacities and thresholds (eg. critical loads mapping for sulphur dioxide deposition);

(2) community deliberations - at the appropriate scale - about perceived current quality of life and future objectives (informed by realistic understanding of the decisions and trade-offs required).

In practice these two bases are only available in certain fields. Understanding of environmental capacities and thresholds is fairly well-developed for air and water quality issues. International and national targets have been set for many aspects of the air and water environment, for example through water and air quality objectives. Understanding of natural systems is similarly well developed for biodiversity: local Biodiversity Action Plans will be setting objectives and targets for natural areas at the sub-regional level.

However, in many other fields, neither targets nor the bases for setting them are well developed. Environmental information and modelling is improving, and Local Agenda 21 participative processes are gaining in coverage. But at present thresholds are often not well understood, so the answer to question (3) may have to depend largely on trend data and expert judgement.

Even where scientific knowledge and/or community deliberation is well developed, the decision on what target to set - indeed the decision to set an official target at all - is inescapably judgemental and political. For example international and national greenhouse gas targets are based more on economic and political consequences than on the scientific consensus, which would support much tougher targets. If 'official' targets like these were taken uncritically into the environmental capital process, it would become simply a tool for testing the consistency of practice with declared government policy. This would not necessarily promote sustainability.

On the other hand, consistency with 'official' targets can obviously increase the acceptability and potential influence of an environmental capital study. Depending on the circumstances it may therefore be tactically best to take all relevant 'official' targets as *minimum* targets, and set higher ones wherever there is a scientific case and/or a clear public mandate (at the appropriate scale) to do so.

Trends may, in themselves, provide strong indication of what type of target is needed. Where there is clear evidence that a limit is being approached or breached (eg greenhouse gases at global levels, water abstraction in parts of England, collapse of species populations), targets should be set to *halt* or *reverse* the relevant trend rather than simply slow it down.

Targets should not be set only for the scarce or rare, but also for maintaining adequate levels of features whose value consists partly in their *not* being so rare that they must be specially sought out or treated selfconsciously as 'special'. Part of the value of London's garden squares is that they are part of the normal fabric of the city, experienced by thousands of people every day in the course of their normal lives, and available for anyone to stroll through for the price of a bus ticket. This 'background' environmental enrichment would be lost if only one or two squares remained and had to be specially visited - however lovingly they were then preserved. Targets should therefore be as much about protecting or enhancing ordinary things which we value, as about protecting or enhancing the rare.

This suggests an approach based on identifying a series of thresholds of step changes to increasingly undesirable states. This may also help guard against another pitfall of targets which set limits to undesirable change. This is that they can be interpreted as sanctioning adverse change *right up to* the target, instead of directing change to stay *as far as possible away from* the target level as possible.

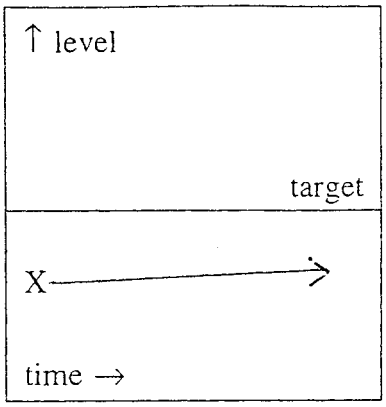
(b) Trends

The assessment required under this question is whether this attribute is in a situation of 'undershoot', 'overshoot' or is roughly 'on target'. For the purposes of this guidance, it is assumed that the attribute is positively defined (eg. species survival) so that the target sets a minimum acceptable level: undershooting the target is therefore undesirable. If an attribute was defined negatively (eg. pollution) then the converse would apply.

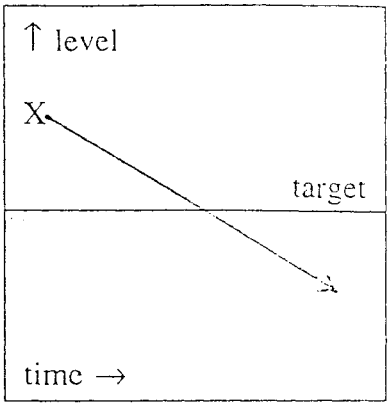
This assessment is based on how the target level (however it is derived) compares with current trends.

Undershoot is diagnosed if the current trend falls below, or is likely to fall below, the target level. The diagrams below illustrate two possible cases of 'undershoot': the current level is indicated by X.

Current undershoot

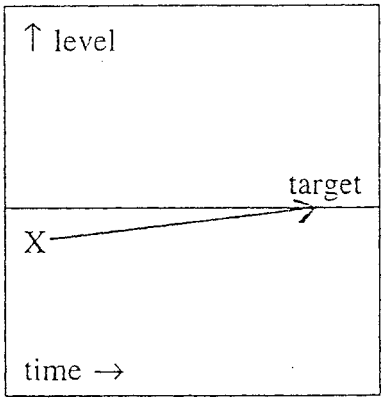


Predicted undershoot

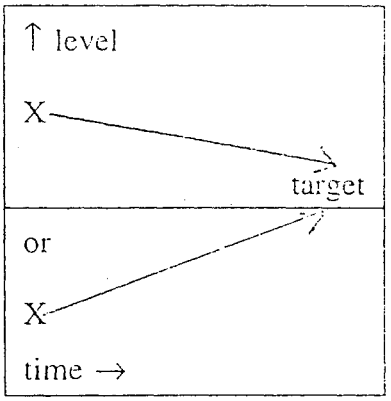


The attribute or service is described as *'on target'* if the trend is likely to meet the target within an acceptable time frame. The diagrams below illustrate possible 'on target' situations: the current level is indicated by 'X'.

Currently on target

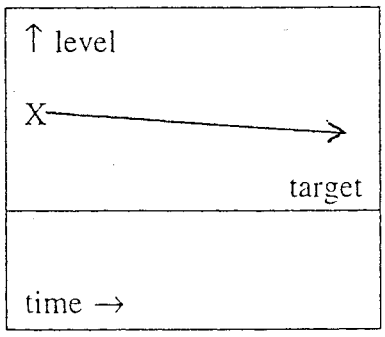


Predicted to be on target

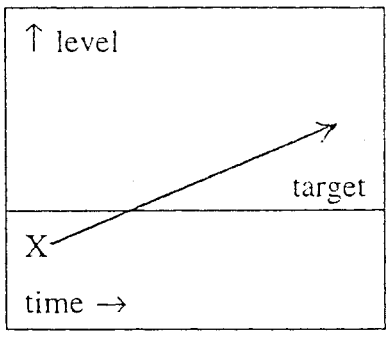


'Overshoot' is diagnosed if the trend already exceeds the target and is likely to continue to do so, or is predicted to overshoot the target shortly. The diagrams below illustrate possible 'overshoot' situations.

Current overshoot



Predicted overshoot



A strong and reliable upward trend could justify predicting an overshoot even if current levels are below target. Conversely an undershoot should be predicted, even if current levels are above target, if changes which will reduce the level are likely. As the asymmetry of this wording suggests, the precautionary principle requires us to take a cautious approach. Assumption of positive trends requires more evidence than negative.

6.7 Question (4): What (if any) substitutions are possible?

Substitution means replacement of a loss with something that provides the same benefits. In the context of this question, loss relates to the service or attribute in question, rather than to the feature as a whole. Partial losses may leave certain attributes intact: for example, loss of some historic fabric from a building may not significantly affect its overall historic value.

'Substitution' and other important terms used here are defined in the Glossary in Appendix A. If the methodology is being applied at district level or above (ie. not site-specific), it is quite adequate to consider whether substitution is possible in principle rather than in practice. The feasibility of particular substitution projects can only be done on a site-specific basis (eg. by assessing whether suitable land is available locally to re-create a locally important attribute).

For features which matter for ecological reasons, substitution will usually mean creation of a new site or habitat with the same ecological quality, services or attributes. For features which matter for quality of life reasons, it will mean providing the same quality of life benefits - which may be by the same or other means. The preferred means of substituting these benefits will depend on the values, habits and preferences of the people involved.

Considering *attributes* rather than *things* helps clarify the possibility and range of substitution. In the example given in Table 5.1, the *historical* attributes of the tree are (virtually by definition) not substitutable at all, whereas the habitat attributes could (in time) be substituted by other trees in the same area, and its carbon sink qualities could be substituted by a sufficient quantity of *any* new planting *anywhere* in the world, or even by an offsetting reduction in local car traffic, or replacement of some energy - wasteful buildings with an energy-efficient one. The tree's *economic* attributes - for example its performance as a tourist 'draw' - could, unlike any of the others, be substituted in money, in handouts to traders who lose business as a result of its loss or development of another equally lucrative tourist attraction - which would not necessarily have to be remotely like the tree.

Only a minority of attributes will be strictly, literally impossible to substitute. (And only some of these will also be important!) However for many more, the permissible 'family' for substitutions will be so tightly constrained as to make substitution infeasible in practice - particularly where, as in the case of the ancient tree, several *different* compensatory projects might be necessary to substitute all the different attributes of a single environmental feature.

6.8 Summary of Step D

For each attribute or service identified in Steps B and C, Step D has attempted to evaluate the following questions:

(1) At what scale does this attribute or service matter?
(2) How important is it (at this scale)?
(3) What is the trend relative to target (ie. do we anticipate having enough of it)?
(4) What (if any) substitutions are possible?

The answers to these questions have implications for management of the feature or area concerned in step E.

7. STEP E: MANAGEMENT IMPLICATIONS

7.1 Scope of Step E

This step brings the exploration of *attributes* back down to messages about how environmental *features* - actual physical things such as parks, historic buildings, bogs and areas of landscape - should be planned and managed. The basic idea is that the evaluation of each attribute - described in the previous section - yields a *management implication* for that attribute. Putting together the management implication for each attribute of a given feature produces the *management profile* for that feature. This is a complete statement of the aims which sustainability implies for the management of that feature.

These management implications should be used as inputs into any policy, planning, management or development decisions affecting the feature. It must be stressed that they do not *determine* how the feature is managed. In the past, appraisals of 'environmental capital' have always been *inputs* into the normal operation of the planning system and other management processes, and this remains the case. Other objectives, notably development, may take precedence over the environmental objectives implied by the environmental capital process.

7.2 Management implications

The statement in the first paragraph (above) that there will be '*a* management implication' for each attribute is a slight oversimplification. In fact there may be zero, one or two aims for each attribute:

(1) There will be *no* management implication - that is, no messages about how the attribute should be managed - where the attribute is of low importance and is in overshoot relative to its target level - in ordinary language, where there is plenty of something that doesn't matter very much.

(2) There will be *one* management implication in all other cases where the attribute is on target (in quantity and quality) or in overshoot - that is, where the attribute matters more than a little, or where it doesn't matter very much but there is only just as much of it as we want. This management implication will be a 'defensive' one, concerned with avoiding loss or diminution of the attribute (in quantity or quality) or seeking relevant substitution for it.

(3) Where the attribute is in undershoot, or on target but important - in other words, we have less than we want or only just enough of something that we value highly - there will be *two* management implications - a 'defensive' one of the kind just described *and* an 'enhancement' or 'increase' aim: one concerned with specifying how, and with what degree of priority, the attribute should be improved in quality or its quantity increased.

(a) Defensive implications

The defensive management implication for each attribute can be deduced pretty obviously from the answers to the substitution, importance and trend-relative-to-target questions asked in the previous step. The management implications for non-substitutable and substitutable attributes are set out in Tables 7.1 and 7.2 respectively. Defensive implications are shown in normal type while enhancement implications, where applicable, are added in bold.

It might be argued that attributes with no management implications should simply be omitted. If the attribute is totally unimportant this is right - indeed it should have been screened out earlier. But if it has *any* value, the precautionary principle means it should still be listed, in case in future it *becomes* scarcer and triggers a management implication.

If an attribute appears to have more than one defensive and one enhancement implication, it is more than one attribute!

(b) Enhancement implications

The 'enhancement' implications are stated separately for the following reasons:

(1) To give more emphasis and prominence to enhancement, and move away from the perception that management of environmental capital is a purely obstructive and 'nay-saying' activity;

(2) To clarify the priorities for enhancement;

(3) Because 'enhancement' will often happen in different places, and be achieved through different policy and management processes, from the current attribute;

(4) To make sense of the otherwise contradictory cases where we treat an attribute as *non*-substitutable for defensive purposes because replacement, though possible, will take an extremely long time, but still want to encourage action to increase the quality now or the quantity, even if only in the distant future. An example would be the biodiversity attribute of ancient woodland. We treat this as non-substitutable because it would take centuries to reestablish. But we still want to encourage appropriate management of the current stock (the quality issue) and encourage action which will *eventually* increase it (the quantity issue).

(5) To make sense of the even more puzzling cases where an *attribute* is genuinely and literally non-substitutable - for example because it is historic - and yet there seems to be a perfectly straightforward sense in which we can still seek enhancement. For example it is senseless to have an aim to increase the quantity of Georgian townscape because part of that attribute is to have been built more than 160 years ago. However it makes perfect sense to have an enhancement implication of trying to improve management of the existing resource and create *new* top quality durable urban ambience. This would not be substitutable with, and need not even be much like, Georgian Clifton or Regency Cheltenham. But - if we're good enough - we might hope that people in 2200 might cherish it as much, and for the same reasons, as *we* cherish *them* now. We will use the term *emulation* to describe this creation of new attributes which, as it were, will offer the same *service* as the existing ones while remaining different.

Table 7.1: Management implications for non-substitutable attributes

Importance	Trend relative to target		
	Undershoot	On target	Overshoot
High	**Proactively promote emulation or improvements in quality as a high priority in all relevant policy and planning processes.** Highest possible protection.	**Seek emulation or improvements in quality.** High protection. Loss only justified by overriding need.	Can be affected if strong need and high compensation.
Med	**Proactively promote emulation or improvements in quality.** High protection	**Take opportunities for emulation or quality improvements which present themselves.** Can be affected if need and compensation.	Not a priority
Low	**Seek emulation or improvements in quality.** Loss must be justified by need	Not a priority	Not a priority

Table 7.2: Management implications for substitutable attributes

Importance	Trend relative to target		
	Undershoot	On target	Overshoot
High	**Proactively promote enhancement (in quality and/or quantity) as a high priority in all relevant policy and planning processes.** Loss must be substituted at greater than 1:1	**Seek enhancement (in quality and/or quantity).** Loss must be substituted at 1:1 (and preferably higher)	Loss must be justified by need
Med	**Proactively promote enhancement (in quality and/or quantity).** Loss should be substituted at greater than 1:1	**Take opportunities for enhancement (in quality and/or quantity)** which present themselves Loss should be substituted at 1:1 (and preferably higher)	Loss should be justified by need
Low	**Seek enhancement of quality and/or quantity.** Loss should be substituted where practicable	Not a priority	Not a priority

(c) Discussion of management implications

As is intuitively plausible, the greater the importance and worse the trend relative to target, the tougher the management implication, defensive or enhancement, becomes. For non-substitutable attributes toughness takes the form of increasing resistance to loss or damage and more energetic pursuit of emulation or of positive management of the existing attribute. For substitutable ones it takes the form of stricter requirements for, and higher ratios of, substitution, and more energetic pursuit of enhancement.

The management implications advocate the 'highest possible protection' for highly important, non-substitutable attributes which are undershooting desired targets. The methodology recognises that such protection may not be 'absolute', since environmental objectives in the management profile have yet to be reconciled with society's other objectives (see discussion in Part 2). However, in practice such protection is likely to overrule other economic or social objectives. For example, the historic attributes of Westminster Abbey do not have absolute protection under the planning system, but it is difficult to envisage approval of a road scheme which would lead to loss or serious damage to the nationally important, irreplaceable historic fabric of the Abbey.

Four extra points should be made:

(1) 'Substitution', 'enhancement' and 'emulation' are meant - and should be applied - with the strict technical meanings defined in this paper (see Glossary in Appendix A);

(2) The categories of low, medium and high importance, and undershoot, on target and overshoot, are obviously very broad. It would be difficult to give more precise meanings in the abstract. But in practical application it may be possible, and necessary, to make more subtle gradations;

(3) The ratios for substitution - 1:1 and so on - refer to the result achieved. Often a greater *quantity* of substitute feature - for example new habitat - will be needed to offset its lower *quality* - at least in earlier years;

(4) The lowest rankings in the tables do not mean the attributes concerned should not be protected or enhanced. The tables seek to offer a gradation in the *minimum* levels of management attention for different attributes as an aid to planning and decision processes which have to prioritise between competing demands for limited resources. *Any* increase or improvement in environmental assets is a good thing.

7.3 Relation to 'critical, constant, tradable'

Tables 7.1 and 7.2 show how the new methodology parallels the traditional approach to environmental capital:

(1) The upper left corner of table 7.1 - that is, highly important non-substitutable attributes in undershoot relative to target - corresponds quite closely to 'critical environmental capital' as generally understood;

(2) The upper left corner of table 7.2 - that is, highly important substitutable attributes in undershoot relative to target - corresponds quite closely to 'constant natural assets' as generally understood;

(3) The lower right corners of both tables - that is, attributes which are less importance and at least on target - correspond more roughly to 'tradable assets' as generally understood.

However the remainder of each table - the cells on the diagonals top right to bottom left, covering attributes which are *either* important *or* below target - provide a more subtle differentiation of attributes, and management implications, than is offered by the traditional approach. Thus the new approach accommodates the previous threefold distinction within a more comprehensive classification.

Moreover as the following discussion makes clear, the classification of *attributes* rather than *features* also greatly increases the discriminatory power of the new approach.

7.4 Management profile

The *management profile* for each feature (or group of features) is produced by bringing together the evaluation answers and management implication for each attribute of that feature (or features). As with Step C this is most easily recorded, and explained, in a table. The examples in Table 7.3 are selected from the attributes set out in Table 5.1.

Table 7.3: Evaluation and management implications for an area of mixed woodland

Feature[1]	Attribute[2]	Reason it matters/ to whom	Answers to evaluation questions				Management implication
			Scale at which it matters	Importance	Trend relative to target	Substitutability	
Mixed woodland (in general)	Carbon sink	Climate regulation	Global	High	Undershoot	'Greenhouse' sink or reduction	**Proactive 'greenhouse' policies.** Require better than 1:1 substitution
	Mixed age supports range of species	Biodiversity	Regional	Medium	Undershoot	Mixed woodland in S England	**Improve quality of mixed woodland and plant more wherever the opportunity arises.** Seek 1:1 substitution[3]
	Supports coppice charcoal industry	Employment	Local	Low[4]	Overshoot[5]	Equivalent local jobs	Don't worry[6]
Gallows Wood	Tranquil area	Recreation for residents	Local	High	On target	Quiet woodland within 300m of Rooktown centre	**Improve quality of quiet recreational areas and create more wherever possible.** Require 1:1 substitution
Hangman's Stream	Freshwater habitat	Biodiversity	Regional	Medium	Undershoot	Equivalent habitat in S. England	**Improve quality of stream habitat and/or recreate habitat wherever the opportunity arises.** Seek 1:1 substitution[7]
	Supplies trout farm downstream	Employment	Local	Medium	Undershoot	Local business generating equivalent employment	**Develop more local employment opportunities.** Seek substitution.
The Gallows Tree	Site of historic lynching	Historians	National	High[8]	On target	None	Strongest possible protection[9]. Manage tree to increase longevity.
	Visitor attraction	Tourists	Local (Travel-to-work area)	Medium	Undershoot	Attraction bringing equivalent revenue	**Develop more local employment opportunities.**[10] Seek substitution

Notes:

(1),(2) These will be the same features and attributes as in the attributes list produced in step B. In fact the attributes list can form the basis of this table. However for some uses only part of the attributes list will be relevant.

(3) 'Substitution' must always be in the terms specified in the adjacent column. This will usually be different for each attribute. The more attributes a development damages, the more elaborate full substitution becomes.

(4) On basis of small number of jobs

(5) Because current and prospective employment well below environmental capacity of the woodlands

(6) Because of both low importance and overshoot

(7) Assuming the lynching was of more than minor folkloric significance

(8) It's hard to specify an 'emulation' aim (more lynchings? more contemporary folklore?!).

(9) It may well be felt that this aim, though desirable and implied by the logic of the approach, does not conveniently belong in an *environmental* capital process. This can be decided as a matter of convenience in the circumstances of each process.

7.5 Using the management profile

The product of Step E, the management profile, provides the basis for setting priorities for proactive environmental improvement and responding in a rational, consistent and defensible way to all proposals or decisions which could potentially affect environmental capital in the defined area. A 'decision' could be anything from the adoption of overall objectives or broad policies in a land use plan to the detail of a development control application.

The following section gives one illustration of a 'responsive' use of the management profile, in response to a development control decision for a particular site. Part 2 of this report discusses how the management profile can be used in a range of contexts, both proactive and responsive.

For this particular 'threat response' example, there are four stages to applying the management profile. They are discussed in turn below.

1. Identify applicable management implications

For a 'threat response', this is often a process of drastic elimination. First, the *features* listed are scanned to identify ones potentially affected by the decision. Second, the *attributes* of each of those features are considered to see if the decision actually affects them. It may be possible to eliminate whole features at this stage if the decision does not happen to affect any of the attributes listed as significant. Likewise any attributes not affected can be removed.

The management implications for the remaining attributes are those relevant to the decision.

2. Rank applicable management implications

These management implications can now be ranked by:

(1) Spatial scale at which the attribute is important
(2) Whether the aim is for *protection* (ie for a non-substitutable attribute) or *substitution* (ie for a substitutable attribute).
(3) Strength of the aim (for example 'require' is higher than 'seek'; 1:1 substitution higher than substitution with no ratio set.)

This provides something similar to traditional environmental capital approaches. As a 'rule of thumb', the level of protection to be given to a feature or group of features is determined by the strongest management implication for any of its attributes in this ranking. In case of any conflict or inconsistency, larger spatial scales will generally take precedence. Weaker and smaller scale management implications disappear in the 'shadow' of the stronger and larger scale ones.

However the apparently 'overshadowed' management implications may still be very important. If the decision is changed to meet the strongest management implication - or if this strongest aim is simply overridden by factors outside planning control such as the trunk road programme - the other aims 'come out of its shadow' and should be addressed as further refinements - or in mitigation. This is explained further in the next stage.

3. Apply the strongest management implication to the decision

For example suppose a developer proposes to build a superstore, nibbling into the edge of the Gallows Wood in the previous example and close enough to the Gallows Tree to interfere with its sunlight, roots and drainage. Run-off from the superstore site might also affect Hangman's Stream. The strongest applicable management implication will be the highest possible protection of the tree. This would provide a basis for opposing the development, regardless of any of the weaker management implications. However it will generally be more productive to encourage developers to *improve* or *redirect* development than simply to oppose it.

4. Cascade down the management implications to improve the decision

In the example the developer might well respond by changing the proposal to avoid any ecological impact on the tree itself. In this case the strongest management implication ceases to be 'applicable' and drops out of the debate, and several further attributes - and their corresponding aims - might then come into play. For example:

(1) The superstore might not significantly reduce the area of the woods available for walkers. There would therefore be no justification for *requiring* a compensatory addition to the area of *this* wood for recreational purposes, although since this attribute is important and only 'on target' such an addition should be welcomed;

(2) However since the quantity of mixed woodland more generally is in undershoot relative to target there *would* be a justification for seeking an increase in mixed woodland. This substitution could be made anywhere in the south of England - for example on a site in Surrey or Hertfordshire owned by the same superstore company;

(3) The 'carbon sink' role of all woodland lies in the background of all decisions affecting specific bits of woodland. Either of the substitutions mentioned in the previous

sections could address this too (provided their carbon fixing rates matched the woodland lost, which will not necessarily be the case just because they substitute adequately for other attributes such as local recreation or regional biodiversity). Since carbon fixing is important and in undershoot, it would be justified to require carbon fixing rates of all substitutions to at least match what was lost. However the valid range of substitutions for this attribute is broader than for the previous two. Substitution would not need to be limited to - or even include - woodland in the south of England: replanted rainforest, or a reduction in fossil fuel use through more people walking and busing to the superstore than to the one it replaces, would be equally valid;

(4) Storm water run-off from the site might pose a periodic risk to the ecological balance in Hangman's Stream and might cause damage to the trout farm downstream. Appropriate drainage measures could be specified in the planning brief to minimise these risks, thus minimising the likelihood of substitution or compensation measures being required.

(5) The development might interfere with the visual amenity of the woods for walkers. This would probably be best dealt with through requiring suitable high quality design in the planning brief;

(6) If the superstore was likely to reduce tourist visitors to the tree (for example by making access less convenient) there would be a case for seeking a substitute contribution to the local economy. (The superstore might, of course, already provide this - but a judgement would have to be made as to how far retail activity compensates for tourism activity;

(7) A slight reduction in convenience of casual access would not significantly reduce the tree's availability to historians and 'serious' visitors. This attribute can therefore be disregarded. (This would be different if the development threatened to cut the tree off from any visitors who did not make special arrangements in advance).

7.6 Summary of Step E

From the answers to key questions in Step D, Step E derives a set of management implications for each attribute or service, relating both to enhancement and protection of the attribute. These are compiled into a management profile for the feature or area as a whole. The management profile can be used to inform proactive management plans and to assist in responding to potential changes or threats. While the example given in this Chapter illustrates use of the management profile in responding to a development 'threat', Part 2 of the report discusses a wider range of possible applications.

8. STEP F: MONITORING

8.1 Monitoring environmental capital

Monitoring is needed to track whether environmental capital is being managed sustainably. Are changes moving in desirable directions, or at least remaining within acceptable limits? If not, do strategies and plans need to be changed to protect and promote sustainability?

Periodic monitoring is also important to detect changes in underlying perceptions about environmental capital. Environmental capital is a social construct, and public perceptions of 'what matters' are likely to change over time. Attributes initially considered to be less important, or on target, may become more important or more threatened over time.

A summary table (such as Table 7.3) can bring together the results of steps A to E to guide monitoring:

(1) The attributes listed are, clearly, the things which should be measured;
(2) The possible substitutions show which apparently different things can be aggregated for monitoring purposes;
(3) The strength of the management implications provide a rough indication of priorities for monitoring - the stronger the aim the higher priority;
(4) The targets and trends (from which the 'trend relative to target' entries were compiled) provide a baseline for comparing actual monitoring information with both the *desired* (target) and *expected* (trend) levels.

Meaningful monitoring requires judgements about the *quality* of the attributes, especially where significant change may be in quality rather than quantity. For example it would be misleading for monitoring to report that the area of mixed woodland in Sussex was being maintained if its quality was declining in terms of age profile, health of individual trees, diversity of vegetation, soil condition and so on.

8.2 Monitoring of underlying changes

Monitoring of trends in the quality and quantity of priority attributes will provide information on the *state* of environmental capital: is the stock of capital being maintained, or is it improving or declining? A separate question is *why* trends are being observed: what are the *pressures* which are eroding the quality or quantity of these attributes, and how are these pressures changing? Without an understanding of the forces behind observed trends, it is difficult to be confident of that management or policy *responses* are appropriate.

To explore the causal factors underlying changes to environmental capital, and determine appropriate responses to promote sustainability, monitoring needs to provide three types of information:

(1) information on the *state* of the features and attributes which constitute environmental capital (eg. trends in the number and quality of habitats for a particular species);
(2) information on *pressures* affecting these trends (eg. traffic levels, development pressures);
(3) information on *responses* to these pressures (eg. management policies adopted or actions taken).

This framework suggests that three different types of indicators are needed if the dynamics of change are to be fully understood: state, pressure and response indicators. The relationships between these indicators help to refine the management response: how can we know that management responses are appropriate if we do not monitor their effectiveness in reducing pressures? How do we know that we are tackling the right pressures unless we monitor the effect of these pressures on the state of the environment? In practice, *response* and *pressure* indicators are likely to be simpler to define and monitor than indicators of the condition or *state* of environmental capital, but all three need to be considered if monitoring is to provide useful feedback for the management of environmental capital.

PART 2: APPLICATION OF THE NEW APPROACH

9. INTRODUCTION

The approach to environmental capital set out in Part 1 is designed to improve the basis for decision-taking by providing a consistent, systematic, transparent framework for relating and evaluating information on the impacts on the environment of various decisions and actions. This approach to environmental capital does not make any decisions itself. Instead it provides inputs to plans, policies, management programmes and development decisions.

The main elements and benefits of the new approach are summarised in Box 9.1. These summarise points made in Part 1 of this report. Part 2 of the report focuses on how the new approach can be adapted for different applications. The examples provided in the chapters which follow are neither exhaustive nor complete, but are provided to stimulate thinking on the wider applicability of the suggested approach.

Box 9.1: Summary of new approach to environmental capital

The new approach:

- focuses on the environmental *attributes* or *services* which physical features provide, rather than the *features* themselves
- asks a series of questions to assess why and how these attributes matter for sustainability:
  - at what scale is this attribute important?
  - how important is it (at this scale)?
  - do we anticipate having enough of it (in quality or quantity)?
  - what (if anything) could replace or substitute for these attributes?
  - what are the management implications of the importance, degree of substitutability and scarcity/plentifulness of this attribute?

Benefits of the approach are that:

- it recognises that a given feature may provide several different environmental benefits or services, embracing all the different kinds of environmental issues;
- it allows a wider and subtler range of management responses than the three-tier gradation of 'critical', 'constant' and 'tradable';
- it recognises the need for enhancement of certain attributes, where the desired level is higher than the current level (and where enhancement is possible);
- it fits with, and builds on, the process of characterisation which is increasingly being used to identify the particular characteristics which make each area distinctive.

9.1 Selection

Chapters 3 to 8 of Part 1 give a generalised description of the full, detailed process of assessing environmental capital for an area. It is worth remembering that this is the full rigorous implementation of a set of basically simple and intuitive steps described in Chapter 1 (and summarised in Box 9.1 above). The new approach is primarily a new way of thinking - a flexible tool rather than a firm methodology. For many purposes the process can focus on a subset of issues. For example:

- For *statutory land use plans* it will only be necessary to identify the most important attributes at the scale of the plan, particularly those which are below target, and reflect their management implications in the plan;

- For *development control and similar decisions* the assessment can focus solely on attributes which are affected by the proposed development, and can be used to define the desirable forms of compensation and/or mitigation;

- For *biodiversity/nature conservation strategies and other initiatives* aiming to *improve* some aspect of the environment, *potential* attributes - those which *could* be created in the area even if they are not there already - also need to be considered. The scope of the analysis can be restricted to the topic of the strategy (eg biodiversity or recreation); however a broader focus will help the strategy integrate multiple objectives.

The final comment illustrates a broader point. The complete environmental capital methodology does take time and resources (although the spread of characterisation-based studies will make it easier). But it will help ensure that decisions in each specialist field or topic also help promote broader sustainability objectives. This integration is one of the key challenges of sustainability - one of the main barriers is the difficulty involved in justifying the extra care and expense which integration requires within specialist areas (for the sake of the broader public good)!

The thought process set out - especially the distinguishing of *attributes* and the systematic deduction of *management implications* - help ensure that all relevant issues are considered.

Potential uses for, and implications of, the methodology are outlined in the following chapters:

10 The land use planning system
11 Other areas of environmental policy
12 Links with other management tools and processes
13 Implications for the national policy framework.

The rest of this chapter explores some key questions about the new approach:

(1) how objectives emerging from this approach to environmental capital can be reconciled with society's other needs
(2) questions and answers on other aspects of environmental capital

9.2 Reconciling environmental capital objectives with society's other needs

The new approach to environmental capital does not take decisions in itself: it provides a systematic analysis of what matters in the environment so that decision-takers are more fully aware of the impact of their decisions on sustainability. This should help to make decisions more transparent and better informed.

This still leaves to decision-takers the task of reconciling environmental objectives with eachother and with society's social and economic objectives. The new approach may indicate that a particular attribute should be given 'highest possible protection' on environmental grounds. But in certain circumstances this may be overruled by other strong needs in society. Some rules of thumb can be developed to guide decision-making:

- environmental objectives for a given attribute should only be overruled by social or economic considerations which are more important, or equally important but at a larger spatial scale;

- decision processes should so far as possible represent the range of viewpoints and interest affected.

As suggested by the latter point, these decisions inherently involve reconciliation of conflicting needs and views. Different interest groups will often have different perspectives on the desired outcome. Traditional democratic processes and structures are not always perceived to be effective in reaching a fair consensus between these groups, since they:

- tend to encourage an adversarial - rather than consensus building - approach;

- may be open to distortion in favour of the most vocal interest groups,

- may not be transparent in their decision-making.

A number of alternative tools and techniques are emerging which help to build consensus between conflicting interest groups. These 'consensus building processes' can be used to guide decisions taken through conventional routes or - alternatively - decision-making power can be delegated to them. Appendix C describes a number of public involvement processes which are particularly relevant to conflict resolution and consensus building, including:

- Village Design Statements

- visioning conferences

- ongoing fora or working groups

- Local Agenda 21 initiatives.

A common feature of these tools and techniques is that their effectiveness depends on their being used as part of a carefully considered process of public involvement, not just as once-off events. Chapter 4 of Part 1 explores some of the questions which may be relevant in agreeing such a process and presents a list of further sources of information on consensus building.

9.3 Questions and answers

As a 'curtain raiser' the rest of this chapter offers answers to other important questions about the new approach which have been raised by practitioners during its development.

(a) Is this methodology still 'environmental capital'?

Yes and no. 'Yes' in that:

(1) Its purpose is the same as previous approaches to 'environmental capital': to understand and classify those aspects of the environment which matter for sustainability, and explain how we should manage them to achieve - or at least approach - sustainability;

(2) It is based on the idea that environmental assets should be protected for the sake of the services or benefits they provide;

(3) It defines - and justifies - a series of levels of importance and hence of desirable protection.

'No' in that:

(1) It does not depend for its intellectual basis on the *financial* metaphor of 'capital';

(2) Its analysis is based on the *attributes* of environmental things, or the services they provide, rather than the things themselves;

(3) It does not use the categories of 'critical, constant and tradable' - although some of its levels of importance and protection are not far removed from these.

(b) So shouldn't we call it something different?

If we were starting from scratch, probably yes. But the name has been kept to convey the message that this *does the same job* that earlier 'environmental capital' methods do, and should be *used for the same purposes.* This is important because the term 'environmental capital' is used in *Sustainable Development: the UK Strategy* and in government guidance to the Environment Agency.

(c) Does it weaken or jeopardise the protection which the old concept of 'critical natural capital' provides?

On the face of it this is a risk because the new approach does not support a simple, unambiguous demand for absolute protection in the way 'critical environmental capital' was understood to do.

However the sponsoring agencies believe the new approach will actually provide *stronger* protection where this is needed and justified, for the following three reasons.

First, Government and development interests have never accepted the claim that 'critical natural capital' should be given absolute protection. The new approach makes clear *what it is* about particular places, buildings, habitats or whatever - in other words, which *attributes* - that warrant the highest available degree of protection. By focusing the protection demand more narrowly, the new approach increases the chance for conflicting pressures - for example development demands - to fit around what really matters.

Second, securing adequate recognition of the very best environmental assets is now less of a problem than the steady erosion of characteristics and attributes throughout the environment. By focusing on attributes and placing weight on trend relative to target, the new approach should help tackle this problem.

Third, the new approach also helps define those parts of the context - for example 'buffer zones' - which contribute to the maintenance or appreciation of very special attributes. This will often increase the benefits derived from their protection.

(d) Does it throw away what we have learned from earlier environmental capital approaches?

No. As the last section of Chapter 7 shows, the new approach consolidates and provides a more robust basis for the distinctions already learned from the 'critical / constant / tradable' approach.

(e) So does it really change anything?

It does not revolutionise environmental practice. Nor should it: the aim was to consolidate and underpin previous work, not to overthrow it.

However it is hoped that it will turn out to be a significant evolutionary improvement to the 'toolkit'. In particular it should lead to more intelligent and focused conservation demands, better able to achieve their aims without conflicting with development, and enhancement on the same footing. It benefits from, and in turn supports, better integration between management of different environmental domains.

Many practitioners have already been working on similar lines. This should be no surprise. If the key step - considering *attributes* - is as sensible as this methodology claims, it is to be expected that practitioners will have intuitively discovered and worked with it already. This guide simply codifies it, makes it explicit, and generalises its applicability.

(f) Does the mechanical process of management implications preempt judgements and planning processes?

No. The environmental capital process provides an *input* into these decision processes. It is hoped that by making clear precisely *which* aspects of the environment warrant the greatest care, and *how* they should ideally be managed it will *influence* these processes. But it is only one input among many. It cannot determine how much weight environmental aims should be given as against other values and considerations.

(g) Can we really deliver what the 'management implications' call for?

Not necessarily, for the reason given in the last answer. It is not the purpose of this methodology to *achieve* sustainable decisions, but only to *show what sustainability would entail* in various decision processes. If these processes do not - or can not - fully respond,

it will be a matter for broader political debate whether they need to be changed. The final chapter points to some examples. This methodology should clarify the issues. It can not preempt the outcome.

(h) Isn't this just a long way round to obvious answers?

If it is obvious from the start that a decision will be dominated by one environmental consideration - for example the need to protect a unique medieval church - there is no need to go through all the steps set out here to 'rediscover' this fact! The methodology set out here is only a tool. It should only be used where it is helpful - for example where:

- It is not obvious from the start that one consideration must dominate the decision: several need to be investigated and weighed (even if the *result* is to identify a single dominant consideration);
- There is a need - or a potential - for more complex and subtle management decisions than simply the protection of one feature in isolation;
- Even if the 'answer' is obvious to the 'experts' there is a need to demonstrate to others - the local community, or the promoter of a development - that the issues have been considered systematically;
- There *is* a single dominant consideration but it may not be satisfied, so it is worth clarifying the possible 'fallback' positions, mitigations and opportunities to achieve at least secondary objectives;
- The decision is so big and important (or contentious) that it is worth using the approach as a double check that nothing has been forgotten.

(i) Can it be simplified?

Yes, in many ways, depending on the context and the purpose. Some examples are discussed in Part 2. However one of the main virtues of the methodology is that it brings together a range of different environmental considerations. Every implication or omission runs the risk of missing some potential problem or opportunity.

(j) Does it require lots of extra information collection?

The process can work with whatever level of information is available. The three main steps where information is needed - the definition of character areas, listing of attributes and judgements about trends relative to targets - can all be done as quick desk exercises.

However the quality and reliability of the judgements coming *out* will only be as good as the information going *in*. (The old computer programmers' saying 'garbage in, garbage out' is highly relevant!) Inadequacy of available information has been a major concern of people trying out this approach. However this does not mean that the methodology makes unreasonable data demands, but rather that in many cases *we do not have the information needed to support reliable decisions about environmental sustainability.* The methodology *reveals* the problem (as if it was not already known!) rather than *causing* it.

Processes such as local Sustainability Reporting, sustainability indicators, resource accounts and in particular the Joint Character Map and other characterisation-based studies at different scales are increasing the availability of relevant information. (The environmental capital

methodology *uses* this information, but does not *collect* it.) In turn the environmental capital methodology itself can help clarify what these various tools and processes should concentrate on.

(k) Can it reflect ecocentric rather than anthropocentric views of why the environment matters?

Yes. All that this requires is the replacement of the sorts of attributes or services specified in Chapter 5, which are derived from *human* needs, values and preferences, with ones based on the environment's own needs. Of course it is hard to say what services the environment in itself 'requires' or 'needs'. But this is not a problem of the environmental capital methodology, but a reflection of a problem of ecocentric worldviews: the difficulty of ascribing aims, preferences or values - basically anthropocentric concepts - to 'the environment'.

The methodology has little to offer an extreme ecocentric viewpoint which seeks to resist all human intervention in the environment. But this is tautological. The purpose of the environmental methodology is to help reconcile environmental and other pressures by distinguishing environmental attributes which should be protected from those which can be changed. If the environment automatically takes precedence over all other aims, such a methodology is unnecessary.

10. THE LAND USE PLANNING SYSTEM

10.1 Overview

The 'nesting' of features and significant attributes in the management implications provides a basis for inputs at all spatial levels of the planning system.

Features and attributes which are important at national and regional levels provide a basis for overall objectives and policies in plans, such as:

(1) Aims to reduce 'greenhouse gas' intensity
(2) Policies to maintain or increase the levels of particular features across the plan area

In so far as 'systems' modelling and data can support quantified targets for attributes, these can also be used as quantified objectives in plans. But as already discussed this is rarely yet possible.

More local - scale features listed can provide the basis for local plan policies on where particular kinds of development would or would not be welcome, while the attributes connected with these can be translated into conditions to be attached to such developments in the local plan. The characterisation approach therefore provides positive messages about the conditions under which development would be welcome, and not just warnings about where it would be unwelcome.

The most detailed attributes and their management implications provide a basis for planning briefs for particular sites or kinds of development. Here again the characterisation approach will often enable protection of what matters to be maintained or even strengthened while relaxing restrictions on types of change or development which do not interfere with the attributes that matter.

The specification of possible substitutions provides - at all scales - guidance on environmentally acceptable compensation projects. These should form the basis of compensation and mitigation measures as far as possible. However, the current statutory basis for compensation does not provide a full or satisfactory basis for *environmental* substitution as called for in this methodology. This point is taken up further in Chapter 13.

The full profile of management implications provides a clear and detailed picture of where, and under what conditions, different kinds of development would be welcome. To exploit its potential for influencing the pattern of development and avoiding unnecessary conflict it should be made readily and conveniently available to developers, investors, interest groups, residents, landowners and anyone else with an interest in development and its management.

10.2 Statutory plans

The following steps indicate how the environmental capital approach can be used as background to Structure Plan, Local Plan and Unitary Development Plan preparation. The same reasoning would equally apply to Minerals and Waste Local Plans. Regional Planning Guidance notes (RPGs) may also be more generally informed by this approach since they are increasingly drawing on any relevant information supplied by others to build up a picture of the environmental character of the region. For example:

(1) The current RPG for the South West Region includes reference to the landscape character of the South West drawing on the New Map of England - the pilot for the Countryside Character Programme;

(2) In their revision of the Regional Plan for the South East, SERPLAN are intending to make reference to environmental character as set out in the Joint Character Map and are keen to understand the environmental concerns of all the various conservation agencies, not least those of the Environment Agency.

(a) Step A: Defining the purpose

For the purpose of statutory plans, guidance on the elements of this step is as follows:

- *Purpose:* To help define the level of protection to be afforded to different types of environmental capital (as far as this is covered by the statutory planning system) and to seek the integration of development in a way that does not compromise the environment.

- *Area of study:* The administrative boundaries of the region/county/district, although it is hoped that within these there is a breakdown into character areas.

- *Scale:* Each level of guidance and plan is concerned with things important at its own or higher scales - regional or larger scale importance in RPGs, County and larger for Structure Plans, district-wide for Local Plans. Provided larger-scale plans take proper account of environmental capital, the standard 'nesting' of plans will ensure that higher level issues are taken into account at lower planning levels. Local plans should also take account of more specific concerns, for example as raised through village appraisals. Although these latter concerns may not necessarily influence key policy areas, they may influence policy criteria against which individual developments are considered.

- *Cross-boundary issues:* where obvious character areas cross administrative boundaries, authorities should strive for a consistency of policy across the whole character area.

- *Protection, management and enhancement*: statutory planning will be primarily concerned with the conservation, and in some respects enhancement, of *existing* environmental features and attributes.

- *Range of environmental issues*: equal consideration needs to be given to all aspects of the environment (eg. landscape, nature conservation, access, historical and cultural issues and the media of air, water and soil).

- *Whose view matters*: characterisation is likely to be based primarily on professional judgement, although wherever possible and appropriate links should be made to community views (eg. those expressed through Local Agenda 21 processes).

(b) Step B: Defining character

Guidance for application of this step to the preparation of statutory plans is as follows:

- *Characterisation:* At the regional level characterisation is likely to be based on the assembly of existing information potentially using the Joint Character Map as a base. At the County and District levels characterisation can be based on the assembly of existing information but will be improved by an integrated characterisation which identifies discrete local character areas, potentially building on the Joint Character Map and any existing landscape assessment.

- *Features:* The detail of features identified will increase as planning becomes more local. At the regional level no more than a dozen or so generic features may be identified. These may be subdivided at the county level, and again (if helpful) at the local level, as shown in Table 10.1. Area-wide characteristics such as tranquillity and variety should also be included.

Table 10.1: Example of 'woodland' features at progressively smaller scales

	Region	County	District
Feature	- woodland cover	- ancient woodland	- ancient woodland (standing) - ancient woodland (replanted)
		- secondary woodland	- secondary broadleaved woodland - secondary coniferous woodland - secondary mixed woodland

(c) Step C: Identifying environmental attributes or services

- *Attributes:* The identification of the positive attributes or environmental services relating to each feature is a very important step within development plans in that it helps make explicit why individual features matter.

(d) Step D: Evaluation

- *Scope of evaluation:* This should concentrate on only the most important positive attributes. If a *feature* receives the right order of protection to conserve its most important attribute(s), this will generally - although not always - protect the other less important services or attributes which the feature provides.

- *Trends and targets:* Where trend data is not available for the particular attribute, trend data relating to the quality and quantity of the feature itself may be a useful surrogate, although care must be taken to ensure that this is a reliable proxy for the attribute being considered. For example *extent* of public open space is a poor proxy for

tranquillity since this is affected by distant air and road traffic. Likewise, a constant area of habitat may not provide the same biodiversity service if it is becoming more fragmented, even if the quality remains high.

- Setting targets will normally lie outside the plan-making process, but plan preparation can provide a useful nudge for the setting of targets. Targets should consider conservation of the 'ordinary' or 'common' as well as improvement of the 'rare'.

- Where specific targets have not been set, trend data relative to broader objectives such as those set in plans can be used as a proxy.

- *Substitution:* At the plan level, the approach is concerned with whether substitution is possible in principle rather than feasible in practice.

(e) Step E: management implications

The strongest management implications at the highest spatial scale should inform principles/objectives at the highest level in the plan; lower management implications should be incorporated as ordinary plan policies.

Management implications will indicate:

(1) The level of protection implied for the feature. This will need to be set against the threats posed to that feature (and any potential future threats) to arrive at the appropriate policy for protection.

(2) The desired level for enhancement. Although enhancement objectives cannot be linked to development control policy they can be incorporated as useful objectives in the plan. They provide developers with an indication of the types of environmental improvements that are sought;

(3) The compensatory requirements if the feature is lost for any reason. These can usefully be linked to any policies relating to environmental compensation and indications given of how these compensations will be sought.

Many enhancement aims will require tools which extend beyond the land use planning system. Options which might be considered include management agreements, acquisition of a feature or area by an organisation with enhancement aims and so on.

There will be many cases where management implications go beyond the powers of planning authorities in development plans. In these cases:

(1) The plan itself should follow the management implications as far as possible;

(2) Supplementary planning guidance, non-statutory indicative planning frameworks etc should be used to the full (eg. guidance can encourage out of area substitution where this cannot be formally *required*, but can still be *offered* by developers);

(3) The authority should undertake a Sustainability Appraisal of the plan to check it has gone as far as legally possible towards what management implications for environmental capital would require.

10.3 Non-statutory plans and supplementary planning guidance

Non-statutory plans and strategies offer full scope to the potentials of the methodology. Unlike statutory development plans they are free to address management and enhancement as well as environmental protection. Here emphasis is on management plans but the methodology has equal applicability to many other forms of non-statutory planning.

There are a wide range of management plans which can feed in to the statutory planning process from AONB management plans to management plans for historic town centres and World Heritage Sites. In particular, what the methodology can do for management plans is:

- help set priorities for management ie. highlighting those attributes which are very important, are showing an undershoot of trend relative to target and are non-recreatable;

- help set priorities for enhancement;

- highlight issues of quality as well as quantity;

- help reinforce the multi-faceted nature of the environmental services offered by individual features, thereby encouraging multi-purpose management. This may well indicate the need for more flexible management grant structures (like that offered under Countryside Stewardship);

- at the same time, where features are very fragile or sensitive to change, understanding of the environmental services provided may allow the feature to be managed for those attributes which are non-substitutable, with assets which are substitutable potentially being re-created elsewhere, so relieving pressure on the basic resource. This particularly relates to sensitive habitats and historic features under pressure from public enjoyment and education.

The purpose of the management plan must be decided at the outset as this will govern the level of detail that follows. Usually management plans will need to take account of things (features and their attributes) at all scales of importance that relate to the area under consideration, although in the case of strategic management plans (an AONB management plan for example) site specific issues may not be relevant.

As one example, the application of the approach to a management plan for an *historic town* is outlined below.

(a) Step A: Defining the purpose

The study area will need to be the town and its setting. The exercise will need to take account of things (features and their attributes) at all spatial scales within this area.

(b) Step B: Defining character

- *Characterisation:* Although emphasis is likely to be placed on townscape and historical evolution, the characterisation will greatly benefit from a fully integrated approach which also considers: connectivity and access; nature conservation; air and water; and the place of the town in its broader landscape setting. As emphasised by the Chester study (Arup, 1995), both professional judgement and community views will be very important in defining character.

- *Features*: The features which are identified as giving the town its particular character are likely to be a combination of:
  - specific things (eg. the Abbey, the town hall)
  - generic features (eg. Georgian terraces, Victorian squares)
  - area-wide characteristics (eg. traditional character, intimacy)

- In this analysis, perceptual characteristics will be as important as physical things.

(c) Step C: Identifying environmental attributes or services

If the management plan is to be holistic, all attributes should be considered. Recognising that a management plan provides an ideal vehicle for enhancement, it may well be beneficial to identify both existing (positive) attributes and potential attributes: ie. those which do not currently exist but which are needed.

Table 10.2 illustrates the types of attributes which might be identified for the medieval abbey, which for the purposes of this exercise now sits in the middle of a major traffic gyratory system.

Table 10.2: Examples of attributes for (hypothetical) medieval abbey

Feature	Existing attributes	Potential attributes
medieval abbey	Only example of this type of architecture in England (historical character) Important for medieval research (education) Ancient brasses important for brass rubbing (recreation) Bats in the belfry (biodiversity)	Tranquillity as a place of worship (currently lacking) Appropriate setting (currently lacking)

(d) Step D: Evaluation:

The management plan will benefit if there is full evaluation of all attributes identified. Potential attributes should be included in the evaluation, as far as possible, so that there is some indication of their priority.

For the historic environment, there is often very little information on trends and targets. At the very least evaluation should involve asking questions about 'how much of a particular characteristic is required to achieve the desired character of the area'? This means looking at both quality and quantity (eg. the benefit of retaining 'x' number of Georgian terraces is greatly diminished if there is no control on the maintenance of their facades through changes in window styles or addition of satellite dishes).

(e) Step E: Management implications

The key steps in applying the management profile arising from Step E will be to:

(1) *rank the management implications:* with the most important attributes generally being those which are:
- important at the national level
- non-substitutable
- undershooting relevant targets (if known)

(2) *subdivide the ranking* according to whether the issue is primarily one of conservation/protection or enhancement. In the case of enhancement, this may be one of three types:

- enhancement in quality of the existing resource
- enhancement in quantity of the existing resource (where it can be substituted or emulated)
- provision of new resources to fulfil identified potential attributes.

(3) *prioritise actions according to their ranking:* as part of this process, it may be important to identify if there are any particular threats which affect the order in which issues are tackled.

(4) *check that higher order management implications do not adversely affect lower order concerns*, and if they do, check whether this matters.

As far as possible, the aim will be to maximise environmental benefits. Taking the medieval Abbey again as an example, the key priority will be to conserve/protect this nationally unique architectural monument. At the same time, trend data may indicate that the quality of the architecture is threatened by crumbling foundations caused by traffic vibrations. One of two courses of action is available: *either* the foundations should be underpinned *or* the traffic pressure could be reduced through traffic management. In environmental capital terms, the advantage of the latter is that traffic management would also help provide the potential attributes of tranquillity and improved setting which work to the foundations would not.

10.4 Planning briefs, individual planning proposals and after-use options

At the site-specific level the proposed approach provides a comprehensive way of assessing the likely environmental impacts of a proposed development (ie. it provides an effective threat-response tool, as already outlined at the end of Chapter 7). It can equally be used to assess the relative merits between alternative development sites or between different developments on the same development site. At this level of investigation the approach should:

- ideally, be informed by an integrated characterisation;
- be based on the identification of site- specific rather than generic features and characteristics;
- address all potential attributes/services of each feature/characteristic;.
- deduce trends and targets from higher order levels where they are not available at the scale in question..

For large or controversial developments, the proposed approach provides a useful adjunct to Strategic Environmental Assessment and Environmental Appraisal, as outlined in Chapter 12. It may also be used to help define planning briefs and appropriate *after-uses* for mineral workings and similar sites.

In the past there has frequently been a tendency to plan after-uses on a site by site basis, often to the virtual exclusion of more strategic concerns. The proposed approach which, as argued elsewhere, is based on the 'nest of dolls' principle, with higher order environmental concerns cascading downwards, encourages broader thinking.

To take the example of *mineral workings*, the steps which could be followed to establish an appropriate after use are:

(1) Using the proposed approach to establish the environmental capital of the development area;

(2) Undertaking a more general scoping exercise across the character area in which the development site sits, to identify those environmental attributes in greatest need of enhancement. Ideally this would be based on an environmental capital exercise which has already been undertaken at this larger scale. Alternatively it may have to rely on environmental objectives and targets, where they have been established.

(3) Using the evaluation of environmental capital to assess the relative worth of the existing environmental capital of the area of potential mineral activity compared to that of the remainder of the character area (derived from the scoping exercise);

(4) Assessing whether the after-use of the site could help meet the primary enhancement needs identifies under (2), even if these are not currently present on the proposed site.

So, for example, potential mineral activity may threaten an area in the flood plain of high grade agricultural land which, through agricultural improvement and drainage, has few other features of environmental interest remaining. Analysis of the surrounding area may indicate that the once common flood plain water-dependent habitats have all but been displaced by agricultural improvement, and those habitats which remain are fragmented and threatened by a falling water-table.

Review of the site characteristics might suggest that it is possible to emulate these flood plain habitats as part of after-use proposals and, in so doing, improve the water table conditions to and the connectivity between the remaining water dependent habitats beyond the site. It then remains a political decision whether the conservation of one type of environmental capital, which is non-substitutable but on target, should take precedence over proposals which seek to improve the quality of existing non-substitutable attributes, as well as increase their extent through emulation.

11. OTHER AREAS OF ENVIRONMENTAL POLICY

Attention has focused so far on aspects of planning which are largely, although not exclusively, within the realm of local authorities. Equally there may be other areas of policy where the approach may have applications.

11.1 Forestry policy

One topical example of this is forestry policy, given the aspirational target in the Rural White Paper (1995) of doubling the area of woodland cover in England over the next 50 years.

As a first step, the Forestry and Countryside Commissions issued a Discussion Paper in Autumn 1996 '*Woodland creation: needs and opportunities in the English countryside*'. A strong view which emerged from these consultation responses is that any future woodland/forestry expansion should be guided by Regional Forestry Strategies. It is in this context that the proposed methodology might be of particular assistance.

New woodland/forestry planting is environmental capital offering a wide range of environmental services. Equally woodland/forestry planting is a form of development. There are circumstances where it is not welcome. Constraints are needed to protect other forms of environmental capital.

The proposed environmental capital approach can assist in identifying these opportunities and constraints for woodland creation, through the following steps:

(1) *By recognising the range of services that woodlands can provide:* A generic list can be built up, perhaps by the Forestry Commission, setting out all the environmental services that different types of woodland can provide.

(2) *By seeing to what extent these services will help meet environmental objectives for the area:* Through a rapid scan of existing plans and policies for the area an initial assessment can be made of the extent to which new woodland can help meet established objectives and targets for the area.

(3) *By identifying specific constraints and opportunities.* The proposed approach can be used both to identify the existing environmental capital which may act as a constraint on planting, and to investigate in more detail the environmental services that the area is lacking and woodland could provide (see Table 11.1).

(4) *By confirming the role of new woodland planting:* Having examined existing and potential attributes, the management profile arising from the approach can focus on what woodland planting can do to maintain and enhance the environmental capital of the area.

Table 11.1: Examples of features of woodland planting

Feature	Existing attribute (Potential constraint on woodland planting)	Potential attribute (Positive service that woodland planting may be able to provide)
Derelict land	• industrial archaeological associations with mining past • areas of very high botanical importance associated with limestone wastes • important rock exposures of earth science significance	• filtration of polluted run-off into adjacent water courses • reduction in leachate outflow from waste tips • reduction in windblow of surface pollutants • landscape enhancement • improved recreational opportunities close to people's homes etc.

The following steps discuss in more detail how the new approach to environmental capital could be applied in this case.

(a) Step A: Defining the purpose

The purpose will be to identify where and what type of new woodland planting can bring greatest benefit while minimising conflicts. For a regional strategy it should be based on character areas taken from the Joint Character Map and should be concerned with things of importance at the character-area level and above, giving equal consideration to all aspects of the environment. The study should take a long term perspective (at least 50 years) recognising the time it takes for woodlands to mature.

(b) Step B: Defining character

Characterisation: Based on the characterisations given in the Joint Character Map but informed by any other characterisations which have been done at the county level. Information on the water environment must be included, especially in relation to acidification and over abstraction.

Features: This should include: all land cover types which could be affected either directly or indirectly by woodland planting; all existing features (e.g. hedgerows, woodlands) and area-wide characteristics which give the area its particular character; and other area-wide features such as aquifer replenishment zones which could be affected by woodland planting.

(c) Step C: Identifying environmental attributes and services

Attributes: The exercise will focus on both existing positive attributes (which may act as a constraint on woodland planting) and potential attributes (ie. environmental services which the area needs and which could be delivered through woodland planting).

(d) Step D: Evaluation

Scope of evaluation: The evaluation of positive attributes/services will proceed as described in Part 1. In the case of potential attributes, substitutability will not be an issue. But it will still be important to think about importance and trends to help prioritise any action for their reinstatement.

(e) Step E: Management implications

Here the focus will be on woodland planting. The management profile should clarify:

(1) The constraints imposed by existing environmental capital, and the potential objectives to enhance this capital (e.g. woodland planting will not be welcomed in areas set aside for the expansion of chalk grassland).

(2) Areas where woodland planting can complement existing environmental capital.

(3) Areas where it can provide new environmental services currently missing in the area.

Different types of woodland have different types of impact and provide different types of service. Some types of woodland may be wholly inappropriate in one context while other types may bring positive benefits. The management profile should help the development of realistic targets for different types of woodland within the region.

This approach could equally be developed more generally at a national level, as part of a national forestry strategy, and at a much more local level to guide implementation on the ground. In this way a clear hierarchy of woodland policy could be developed.

11.2 Agriculture

Other policy areast, such as agriculture, may benefit from a similar approach. Like forestry, agriculture is both development and the provider of environmental services (as in traditional agricultural landscapes).

Existing agri-environment schemes such as Environmentally Sensitive Areas (ESAs) and Countryside Stewardship, are helping halt the further loss of key features and habitats and ensure their appropriate management. But the total area these schemes influence is small. Under the forthcoming CAP reform it has been suggested that all farms should be eligible to join appropriate environmental enhancement schemes. Environmental capital assessments could help focus these schemes to bring maximum benefit in an integrated way. For example:

(1) Multi-aspect characterisation can identify the features which characterise each agricultural environment;

(2) Environmental capital assessments can, particularly if periodically repeated, throw light on the way agriculture has affected and is affecting attributes such as sense of place, biodiversity, historic character, water and soils and the local economy.

(3) The evaluation stage should provide clear indications of priorities for conservation and enhancement, and a basis for judging appropriate substitutions both within and between agricultural areas.

Obviously the insights of environmental capital need to be combined with an understanding of the social and economic pressures acting on farmers in the design of appropriate management responses. Aspects of the approach could be used at the regional and more local level to highlight where new agri-environment schemes can bring greatest benefit.

11.3 Environment Agency : Regional Strategies and LEAPS

The suggested approach to environmental capital can also be applied to the work of the Environment Agency, both at the strategic level in the preparation of regional strategies and at the more local level in the preparation of LEAPS (Local Environment Agency Plans).

Particular aspects of the approach which may help are:

(1) *Emphasis on an integrated approach to characterisation* helps set the particular concerns of the Agency in their proper context - for example, how water and air relate to quality of life, sense of place, biodiversity, the historic environment etc. Strategies and LEAPS can make use of the Joint Character Map and any other relevant characterisations. For LEAPS, where a catchment shows great variety or where there is a lack of existing relevant data, a catchment-specific characterisation could be of great value.

For LEAPS, the community view on character and the part that air and water play in this will be very important.

(2) *Distinguishing the environmental resources from the services that they provide* helps unravel the full environmental importance of air and water. For example, surface water may service any combination of aquatic biodiversity, fish biomass, visual amenity, access, water sports, potable water and so on.

(3) *Identifying which service requires the most stringent quality or quantity targets* helps in the setting of targets for air and water quality and quantity. For example each of the services in the last indent may require different water quality objectives. It is important therefore that the targets set reflect the needs of the most important service or combination of services identified.

The Environment Agency already has an established range of targets at various levels of activity. The approach advocated for environmental capital helps ensure that these targets are explicitly linked to the maintenance and enhancement of environmental character in all its facets.

Critically, the approach can help identify which are the most important environmental features and attributes of an area to protect/enhance from a sustainability perspective. This can then provide the basis for prioritising very different environmental protection or enhancement programmes supported by the Agency (e.g. should water companies spend more in a particular area on improving sewage treatment or on leakage reduction). In this sense the approach is an important decision-making tool.

12. LINKS WITH OTHER MANAGEMENT TOOLS AND PROCESSES

This chapter seeks to show how the proposed approach to environmental capital can provide a strong and useful input to a range of management tools and policy processes, including:

- environmental appraisal and assessment
- environmental capacity
- designations
- natural resource accounts
- State of the Environment Reports (or Sustainability Reporting)
- sustainability indicators
- environmental management systems
- Local Agenda 21

12.1 Environmental Appraisal and Strategic Environmental Assessment

The proposed methodology can provide a basis for both project Environmental Appraisal (EA) and Strategic Environmental Assessment (SEA). At project level the new approach has the benefits of bringing effects beyond the development site into the analysis and thus allowing comparison of different options - two areas often weak in traditional EA.

The methodology should be particularly relevant to Strategic Environmental Assessment (SEA) of plans and policies, which is likely to become much more widely required as a result of the proposed EU directive. The new approach to environmental capital provides a tool for assessment of the 'baseline' condition of the environment in SEA. It should help to ensure that the SEA process considers the full range of environmental topics in a consistent way.

Overall, the proposed methodology should:

- provide a common language for identifying environmental context, stock or capital which is the starting point for all forms of environmental assessment and appraisal;

- provide a transparent framework for assessing the relative importance of different aspects of the environmental stock or capital;

- help fully understand the likely effects of alternative development options on the environmental resource;

- make explicit the needs for substitution and compensation in response to a policy, action or development, ensuring that all the services offered by a feature are recognised in any decision.

The application of the approach to EA and SEA is illustrated by reference to *transport policy:*

(1) *First, at the most detailed level,* every creation or alteration of a piece of transport infrastructure - for example a road, car park, rail line, runway, terminal or cycle route - is a development which affects land use. The methodology proposed will show which environmental attributes will be affected by any such proposals and what substitutions would be required for an individual project not to reduce sustainability.

(2) *At the slightly more strategic level,* this will help compare the effects of different project options, for example different road alignments or enhancing rail instead of road capacity. The new approaches treatment of attributes at different scales could improve the sensitivity of transport project decisions to broader considerations. Emphasis on characterisation should also ensure that previously disregarded attributes such as tranquillity are properly addressed.

(3) *Finally, the proposed approach could inform SEA of national transport policy.* As recognised by the DoE's Good Practice Guide on the 'Environmental Appraisal of Development Plans' (1993), the global ecosystem is the highest spatial scale for environmental capital. Regulation of the global climate system is arguably the most important of the ecosystem's attributes (for human health and survival). Successive Intergovernmental Panel on Climate Change reports have confirmed that the trend in this attribute is 'undershoot relative to target' (even the relatively fatalistic target of keeping climate change within acceptable limits). This leads to a management implication of a national transport policy which promotes improvements in - and at the very least for no net worsening of - the 'greenhouse gas' balance.

12.2 Environmental capacity

'Environmental capacity' studies are increasingly being carried out at various spatial scales. They investigate how much change, of what kinds, the environment can absorb without unacceptable damage or loss of quality. In the 1970s, the primary emphasis was on the ability of different habitats to absorb visitor pressure, leading to a range of studies on recreational carrying capacities in sensitive areas, such as the National Parks. These in turn led to visitor (or tourism) capacity studies of historic sites and towns.

Currently the emphasis is on the environmental capacity of areas to absorb further development, mainly housing, as explored in some detail in CPRE's discussion paper by Michael Jacobs *Making Sense of Environmental Capacity* (1997). Such capacity studies can relate to:

- an area (eg. a county), such as the recently completed capacity study of West Sussex; or
- a city, town or village, as in the Chester capacity study; or
- an environmental resource such as air or water, as in critical load mapping and air/water quality objectives. This last point has already received particular focus under the new incoming government.

What the proposed approach to environmental capital can bring to these capacity studies is a consistent and integrated way of defining environmental constraints:

(1) As for EA and SEA, it provides a common language for identifying environmental context, stock or capital, and for identifying the relative importance of this capital. This provides the basis for identifying capacity.

(2) A particular strength is that it takes account of current trends in environmental quality and quantity, and enables capacity to be discussed in terms of target future states - which may require enhancement over the current condition - rather than simply relating capacity to the current state (which may already be degraded).

The application of the approach to environmental capacity is illustrated here in the context of the *water environment.* Here, the approach can help to focus attention on:

- what are the important, water-dependent attributes of the area which matter for sustainability?
- what is their current state in quality and quantity?
- what will be their likely future condition?
- what level of enhancement is needed to achieve sustainability objectives?

In other words, taking the environmental capital approach, certain capacity conditions would need to be fulfilled before further water abstraction from the same sources could be considered. Possible capacity conditions would be:

- sufficient water to maintain remaining important water-dependent attributes;
- sufficient water to meet enhancement objectives for important water-dependent attributes;
- sufficient spare capacity to ensure that the above can be achieved while making allowance for the effects of global warming and - subject to demand management measures - predictions for increased water consumption per household (even without additional development).

The latter two points are particularly important in the context of the South East where in 1990 13 rivers were already recognised as suffering from severe low flow problems arising over abstraction. As noted in the 'Regional Planning Guidance for the South East' RPG9, published in May 1994 (para 4.37):

> *'Local planning authorities should, therefore, ensure through consultation with the National Rivers Authority and the water industry, that proposals in their development plans are realistic in terms of the likely availability of adequate water supply and sewerage infrastructure,* ***and will not compromise environmental objectives.'***

12.3 Designations

There is already considerable overlap between various designations and environmental capital. The 'characterisation' approach will strengthen the connections between 'environmental capital' and designations which combine characterisation (in some form) with explicit evaluation of importance and substitutability. ('Character areas', which *avoid* evaluation, are therefore not directly correlated to environmental capital, although as discussed in Chapter 4 they provide a useful basis for classifying the environmental features of an area.)

The methodology set out here should also help develop management practices for designated features which preserve what matters but increase flexibility for more benign development. (This is already a main aim of LUC/CAG's work on sustainability for English Heritage, LUC/CAG, 1996).

Local planning authorities currently often treat designations as proxies for environmental capital. But as is evident from the proposed approach, environmental capital is very much more than this. For the time being, it is appropriate for designations and environmental capital to sit side by side. This reflects thinking in PPG7 (February 1997) which chimes with much that the proposed approach to environmental capital is trying to achieve:

'Since the Second World War conservation efforts have concentrated on designating and protecting those areas of countryside which are most important for landscaping and wildlife. The priority now is to find new ways of enriching the quality of the whole countryside whilst accommodating appropriate development, in order to complement the protection which designations offer.' (PPG7 para 2.14)

In the longer term it would be very convenient for planners if the basis of designation was altered so that it more directly reflects the assessment of environmental capital. Whether this is practicable or desirable would need to be considered by each agency in the light of the full range of purposes served by each designation.

12.4 Natural resource accounts

Natural resource accounts attempt to monitor the stock of environmental resources over time, drawing their name from analogies with national accounting of economic and financial measures. As well as presenting indicators of environmental stocks, these accounts generally attempt to present indicators of changes in stock levels. These gains or losses are generally known as 'flows'. The draft Environmental Accounts for the UK, published by HMSO in 1996, present results of the government's attempts to date to create a national set of natural resource accounts.

University of Nottingham researchers working on the Countryside Survey 1990 observed that monitoring simply the change in quantity of a resource over time can mask important trends. For example broadleaf woodland cover in England increased by 3% between 1984 and 1990. However 7.4% of the 1984 stock had been lost over this period. Thus what looked like a small but welcome increase concealed a dramatic turnover of resource, and probably - since woodland gains biomass, biodiversity and scenic and recreational quality with age - a loss of quality.

In response, more detailed natural resource accounts are being developed. These describe both the stock and change in different types of land cover, and in particular record the transfer of land between cover categories. More detailed natural resource accounts, which allow more analysis of quality as well as quantity, should provide a clearer understanding of trends in environmental capital. These will provide better information to inform target-setting on different aspects of environmental capital, particularly at national and regional level. A better hierarchy of targets at these levels will, in turn, assist the task of local authorities and others who are assessing priorities for environmental capital at a more local level.

12.5 State of the Environment Reports or Sustainability Reporting

State of the Environment Reports (SoERs) are increasingly being prepared at national, regional and local authority levels. These all-embracing reports can be very resource intensive to prepare, difficult to keep regularly updated, and of limited use. The Local Government Management Board's report *Sustainability reporting: a Practical Guide for UK Local Authorities* (July 1996) advocated a tighter focus on those aspects of the environment which are of greatest concern for sustainability in the area under consideration.

The proposed approach to environmental capital, supports this:

- the characterisation of the environment can help highlight those features and environmental services which are of greatest importance to the area and so can help focus data collection;

- the approach places strong emphasis on assessing trends (in both quantity and quality) in evaluating environmental capital;

- the approach also places strong emphasis on the use of targets. Some SoERs now set targets for the condition of the environment itself, or for management of pressures on the environment. Where targets have been set they can help inform the methodology. In turn the new approach provides a sound framework for revising any existing targets and showing where new ones are most needed.

12.6 Sustainability indicators

A significant number of local authorities, regional and national bodies, including the government and the Countryside Commission, have attempted to develop sets of sustainability indicators. These initiatives have generally aimed to achieve one or more of the following objectives:

- to present a clear, meaningful picture of whether society is becoming more or less sustainable;

- to raise awareness of sustainability issues amongst the public;

- to deepen understanding of trends in the environment, so that policies can be adjusted accordingly.

- to provide feedback on the effectiveness of sustainability action plans.

- to involve the public in defining what sustainability means to them.

There is a two-way relationship between sustainability indicators and the new approach to environmental capital. Sustainability indicators will feed into the process of identifying and evaluating environmental capital in a number of ways:

- sustainability indicators can provide a focus for involving members of the public in defining what matters for them in the environment, providing information about public perceptions of environmental capital;

- the indicators themselves provide information on trends in different aspects of the environment, which can feed into the assessment of 'trends relative to targets' for environmental capital.

But the process of evaluating environmental capital will also indicate priorities for sustainability indicators by:

- identifying those aspects of capital which are most important or most at risk;

- highlighting the pressures which are influencing these aspects of capital.

Successive iterations of the methodology should help to refine and target the selection of sustainability indicators so that they home in on priorities for monitoring environmental capital emerging from Step F of the new approach.

12.7 Local authority environmental management systems (including EMAS)

The proposed methodology for environmental capital would, again, provide a baseline for local authorities' own efforts to manage and influence the environment. It would inform priorities for the management of the impacts of local authority plans and services (known as 'service effects') under the Eco-Management and Audit Scheme (EMAS), and would highlight aspects of environmental capital which should be priorities for monitoring.

EMAS, and other environmental management systems, can help to ensure that targets for environmental capital - and for management actions related to environmental capital - are incorporated into an authority's mainstream strategies, plans and budgeting processes.

12.8 Local Agenda 21

There is potential to establish strong links between Local Agenda 21 initiatives and the process of identifying, analysing and managing environmental capital. Local Agenda 21 can be used as a means of drawing a wider circle of community representatives into the process of identifying and prioritising environmental capital, particularly in relation to public perceptions.

Schools, community groups and working groups involved in Local Agenda 21 can help collect information on the local environment. Local Agenda 21 initiatives, based on the principle of partnership between the community, business sector and the local authority, may also provide a framework for progressing management implications which lie beyond the scope of any one party. This will particularly apply to the enhancement of aspects of environmental capital which require proactive management with the support and involvement of the local community.

13. IMPLICATIONS FOR NATIONAL POLICY

It has been emphasised throughout this report that environmental capital is simply a tool for assessing how parts of the environment would need to be managed in order to achieve sustainability (or at least avoid increasing unsustainability). An environmental capital assessment is just one among many inputs to management and decision processes such as the land use planning system.

It is obviously outside the scope of the environmental capital methodology to judge whether, *case by case*, environmental capital is given sufficient weight compared to other inputs to decision processes. However this is different from the question whether these processes are *in principle* capable of dealing adequately with environmental capital, or whether there are *institutional* barriers to the integration of environmental sustainability into decision taking.

This final chapter briefly identifies a few such barriers and offers suggestions for how they could be removed. This would not give environmental capital automatic priority over other aims or values, but only achieve the far more modest goal of avoiding automatic downgrading or exclusion of environmental considerations.

13.1 National and regional planning

The environmental capital methodology reflects the spatial 'nest of dolls' principle. The joint character map now gives the UK a basis for characterisation at subregional level. But there is no national character map depicting in simple terms what makes England or the British Isles distinct in environmental character from the rest of Europe. Currently our national and international designations do not add up to a clear statement of national distinctiveness. This means there is no agreed, consistent basis on which the environmental capital methodology can be used to maintain character and capital at the national level.

The articulation of character is also weak at regional level. To have real bite, objectives relating to the maintenance of regional character and regional environmental capital would need to be included within regional planning guidance. This takes regional planning guidance a step closer to regional strategic planning, with obvious implications for the need for accountability and transparency in its production.

13.2 Trends and targets

The methodology depends strongly on setting targets for environmental attributes, and on knowing how trends compare with those targets. Both activities are poorly developed in the UK.

Early local authority State of the Environment Reports (SoERs) were of very limited policy relevance. The latest generation of SoER and Sustainability Reporting work, and some local indicators projects, have started to focus on identifying and measuring those factors which matter for sustainability. These can provide valuable inputs to environmental capital studies. But coverage is still patchy and inconsistent. Very few local authorities are even aspiring to the kind of systematic ecological studies that would provide reliable data on environmental thresholds and limits.

However, as already pointed out, target setting is an inescapably political process even when

based on scientific data. In the absence of data the political, subjective inputs take higher priority. Some local authority environment strategies have set targets. Local Agenda 21 strategies often include both objectives and targets. However so far these are rarely either specific enough in content or legitimated by a large enough body of opinion to be really useful in environmental capital.

If we really care about the environment and want policy to follow it, we need to give much more systematic attention to measuring and understanding what is going on, and deciding in the light of this what our priorities are. It would also help improve the internal consistency and integration of environmental policy if targets were more consistently nested from national through regional to local levels. Currently this is done quite systematically for some environmental *pressures* such as land for housing or minerals extraction, but not for *conservation* targets such as increased forest cover.

Targets should also be set over much longer timescales than the 10 years typical of development plans. Environmental capital should both challenge the policy process to think about longer range targets and provide a mechanism for translating them into decisions here and now.

13.3 Objectives-led planning

The land use planning system is currently designed to *balance* different demands placed on land. Since it operates through constraining development it inevitably operates in a reactive, defensive mode, trying to prevent or minimise environmental damage. The environmental capital methodology calls for a far more proactive process of defining desired environmental states and guiding development to deliver them. This chimes with the 'objectives led' approach to planning called for by various agencies including the Countryside Commission and being explored by some planning authorities. This approach would give the planning system a much greater role in improving environmental quality.

13.4 Substitution

The new approach to environmental capital relies on a highly sophisticated concept of *environmental* substitution revolving around identifiable *attributes* each with different permissible replacements. As explained above, relevant substitution often need not take place anywhere near the location of the loss being substituted. Indeed there may be benefits in providing substitutions in other locations in greater need of enhancement.

This is quite different from the concept of *compensation* enshrined in the British planning system, notably Section 106. This requires compensation to be physically close to the site being compensated but does not make any reference to the idea of using compensation to maintain or enhance the quantity or quality of an environmental attribute.

The lack of a mechanism to negotiate and enforce environmental substitution - and the risk that attempts to do so would be treated as misuse of the provisions for compensation - is a serious barrier to the implementation of the new approach to environmental capital through the planning system. British practice could perhaps learn from some overseas approaches to compensation which are closer to that implied by the new environmental capital approach:

(1) The Berlin government has rules for 'like-for-like' substitution which take care to match the *attribute* and *quantity* but are unconcerned about *location* (except in so far as location is *part of* the attribute;

(2) In the USA 'mitigation banks' have been developed. Under this approach a public agency undertakes a major enhancement scheme or mitigation bank. When a development comes forward requiring mitigation/compensation, the development buys shares in the mitigation bank and the money is used to extend the enhancement. In this way development can contribute to a comprehensive enhancement scheme rather than providing a scatter of mini compensations. Also investment can be concentrated where it is most needed.

APPENDIX A: GLOSSARY

Defined terms in **bold.** Cross reference in *italic.*

Attribute Characteristic or quality of an environmental *feature* which matters for sustainable development because it serves some ecological purpose or provides some *service* or benefit to humankind. Example a scent garden in a park is a feature which may have all the following attributes: providing visual delight for sighted people, olfactory delight for blind people, the source of honey for a local wholefood business and a habitat for insects. The core idea of the approach set out in this report is that one feature may have many different attributes, each of which provides a different service, each of which needs to be managed in a different way. Explained in Chapter 5.

Characterisation Identifying the different components or characteristics which make up the nature of one place, and distinguish one place from another. A process which can be recorded in character maps and help identify *attributes.*

Compensation Providing some benefit (in cash or kind) to offset environmental damage. Example: a Section 106 planning agreement in which a developer provides some social housing together with a speculative high cost housing development. *Substitution* is a special case of compensation.

Emulation A special form of *enhancement,* which aims to create a new attribute which provides the same service or benefit as a non-substitutable asset. Example: creating new high-quality townscape.

Enhancement Improvement in the quality or increase in the quantity, of an environmental *attribute.* Example: increasing the biodiversity of a river by reducing pollution, or creating new public open space in a city.

Feature An environmental thing or place. Example: a park, a building, a landscape, a mountain.

Flow A loss or gain in the stock of environmental capital (see *stock* below), measured over a specified period of time.

Management implication The aim for an attribute implied by the environmental capital process. Example: to secure full substitution for the tranquil recreational attribute of a park threatened by a relief road.

Management profile The management implications for all the attributes of a feature. Example: the recreational aim given in the previous example plus the aim to secure substitution for the park's function of providing a nesting site for birds, plus the aims related to any other attributes of the park.

Pressure A threat or pressure which is affecting the state of some aspect of the environment (eg. traffic levels). Forms part of the *state-pressure-response* model for environmental indicators.

Response A management action or policy response aimed at reducing or eliminating an environmental pressure. Forms part of the *state-pressure-response* model for environmental indicators.

Service Any function or benefit provided to humankind by an environmental attribute. (The terms 'service', 'attribute' and 'function' are all very close to the concept used in this report, but none of them is an exact fit. This is why they are defined partly in terms of each other, and used as near-synonyms in the text!)

State The state of the environment is the current condition of the environment, including all the different features and attributes associated with environmental capital. Forms part of the *state-pressure-response* model for environmental indicators.

Stock In the context of environmental capital, 'capital stock' refers to the environmental resource itself, measured as a snapshot at a particular point in time. Measurement would not generally be in monetary terms but in terms of the attributes associated with this resource.

Substitution Replacement of an environmental *attribute* with one which serves the same ecological purpose, or provides the same service or benefit to humankind. Example: building a windfarm to reduce CO_2 emissions sufficiently to offset the loss of a carbon-capturing woodland to development. Illustrates the point that substitution in this special sense does not have to be the same sort of thing, or anywhere near, what is being substituted.

Target Desired level of an attribute. May be based on (estimate of) an environmental 'carrying capacity' or on a human need or want.

Trend relative to target Whether the quantity of an attribute is predicted to undershoot, meet, or overshoot (exceed) a *target*.

APPENDIX B: FEATURES

The features which may be identified as being important in defining the character of an area are many and various. As a guide, suggested features are listed in the following table for different scales. Features of urban and rural areas have been separated into two different lists, recognising the different features and methods of characterisation used for these two types of area.

For urban and rural areas the features break down into two main groups:

Area-wide characteristics which are concerned with the overall character and quality of an area and cover such aspects as tranquillity, diversity and vitality: and

Specific features such as land cover types and individual features and elements, which contribute to the particular character of an area.

RURAL AREAS

International	National	Regional/County	District/Parish
A. land cover features			
-	historic parks	historic parks	historic parks
			orchards (old)
SPAs	SSSIs	ancient woodland	ancient woodland:standing
			replanted
SACs	NNRs	secondary woodland:	secondary broadleaved woodland
			secondary coniferous woodland
			secondary mixed woodland
		unimproved/semi improved grassland	acidic grassland: unimproved
			semi-improved
			neutral grassland: unimproved
			semi-improved
			calcareous grassland:
			unimproved
			semi-improved
			amenity grassland
		wetland communities	damp grassland:
			unimproved
			semi-unimproved
			marsh/fen
			swamp
		bracken/scrub	bracken/scrub
		heathland	damp heath
			dry heath
			heathland mosaic
		moorland	heath moor
			grass moor
			bog
		inter-tidal habitats	saltmarsh
			mudflats
			rock
		beaches/foreshore	sand beach
			pebble beach
			sand dunes

International	National	Regional/County	District/Parish
B. Earth science features			
	SSSI (earth science)	exposures	cliffs/rocks faces surface exposures (eg.rock pavements) mineralogical wastes
		geomorphological features	geomorphological features
		underground features (caves/mines)	underground features (caves/mines)
	Grades 1,2,3 A agricultural land	grades 1,2,3 A agricultural land	grades 1,2,3 A agricultural land
C. Natural elements			
air	air	air	air
		river courses (inc. flows)	streams (inç, flows) natural river courses improved river channels man-made river channels
		canals	canals
		aquifers/groundwater	aquifers/groundwater resources water table
		estuaries	estuaries
		open water	reservoirs lakes/wet pits ponds
		drainage ditches	drainage ditches
		sea water	sea water
D. Cultural features			
		field patters/means of enclosure	hedgerows/hedgerows trees stone walls field trees
		archaeological	archaeological remains
World Heritage Sites	SAMs	remains	- above ground - below ground
			industrial archaeology
	Listed buildings	vernacular buildings	farm buildings (traditional) residential buildings (traditional) churches/community buildings
	Conservation Areas	historic villages	historic villages
			vernacular features e.g: - trig points - milestones - stiles - signposts - bridges etc.
		public rights of way network	footpaths bridleways
		country lanes	country lanes

URBAN AREAS

International	National	Regional/County	District/Parish
A. Features			
World Heritage Site	Conservation Area	Townscape	streetscape: Roman Medieval Georgian Victorian
	Listed Buildings	Important buildings	churches other important buildings important structures (eg. bridges) characteristics vernacular features
	SAMS	archaeological remains	archaeological remains - above ground - below ground
		skyline	skyline views/vistas
	SSSIs	urban open land	natural green space derelict land green corridors designed parks and gardens (public) private gardens architectural open space - square, crescents etc. street trees pedestrian/cycle routes
	SSSIs (earth science)	earth science features	geological exposures mineralogical waste
		beaches/foreshore	sand beach pebble beach cliffs
B. Natural elements			
air	air	air	air
		river courses (inc. flows)	streams (inc. flows) natural river courses improved river channels man-made river channels
		canals	canals
		aquifers/groundwater	aquifers/groundwater water table
		estuaries	estuaries
		open water	lakes/pits ponds
		sea water	sea water

APPENDIX C: TECHNIQUES FOR PUBLIC INVOLVEMENT

This appendix outlines a number of tools and techniques for public involvement. Each of the techniques is categorised in terms of the level of involvement for which it is appropriate. These terms are based on Shelley Arnstein's 'continuum of involvement':

- community control
- delegated power
- partnership (acting together)
- community involvement (deciding together)
- consultation
- information
- education (informing)
- manipulation (influencing)

None of these are right or wrong, but a process of involvement will work more smoothly if everyone is clear from the outset about how much decision-making power is being shared or delegated. Different levels of involvement may be appropriate at different stages in the process: for example, information actions may be highly appropriate before and after a deeper community involvement process: eg. distribution of leaflets or media coverage to let people know that the process will be happening, and - later - to share the outcome of the process.

Public meetings *(involvement/ consultation/ information)*- the classic tool for consultation, public meetings have a number of serious drawbacks. While they have the advantage of being 'open to all comers', the varied audience can make it difficult to pitch a presentation. The format tends to create a feeling of 'them' and 'us' which is not effective in developing consensus or joint decision-making. Public meetings work best when the aims and format are very clear. Work in small groups can help to increase people's involvement in the process. Informal pre-meetings may also increase the effectiveness of the main meeting.

Surveys and perception studies *(partnership/ involvement/ consultation)*: questionnaire surveys are an 'arms length' tool which need to be carefully designed and targeted. They tend to involve the community in information gathering but not in the analysis or identification of solutions, so they are not good at creating a sense of involvement or ownership of the outcome of a study. Nor are they good at developing common ground between interest groups, since different individuals and groups rarely have a chance to hear or respond to each others' views. If not carefully designed and targeted, they can generate large quantities of data which requires extensive analysis but produces no clear conclusions. Postal questionnaires may not even generate much data, since response rates are notoriously poor and samples unrepresentative. A further difficulty with questionnaires is that questions and answers are often misinterpreted. Questionnaire surveys work best as consultation tools if they are tightly focused on specific issues and targeted at relatively small communities. Local groups should be involved at different stages of the survey - design, collection and analysis - if its conclusions are to bear weight. The perception studies and surveys undertaken for the environmental capacity study of the City of Chester provide a good example of effective consultation using these techniques.

Focus groups *(involvement/ consultation)*- discussion groups involving particular interest groups can be useful in providing an in-depth understanding of people's views and of the issues at stake. Participants are invited and are often paid a small attendance allowance. Focus groups can reach a more statistically-representative sample of the population than public meetings, while allowing deeper exploration of issues than is normally achieved by questionnaires. They can be used on their own, can complement survey work or can be used to reach particular groups of people who tend not to be represented at public meetings (eg. youth, ethnic minorities). Local community groups and voluntary organisations can help to identify appropriate representatives of different interest groups as participants.

Village Design Statements *(community control/ delegated power/ partnership)*: the Countryside Commission has pioneered work to help village communities develop guidelines for developments in their area. These guidelines, which have the status of 'supplementary planning guidance', are developed by representatives of the village themselves, in consultation with local authority officers and local developers. Village Design Statements involve identification of what is distinctive and important about a village - its features, style of building or layout. This provides a basis for guidance about what types of change would, or would not, be acceptable to the local community. The participation of local residents, council officers and developers helps to develop common ground between these different interest groups. The concept of locally-developed guidelines could be extended to other aspects of environmental capital.

Village Appraisals *(community control/ delegated power/ partnership)*- these are broad exercises to assess the issues facing a particular community. They are usually initiated and undertaken by the community itself and often run by the local parish, town or community council. Typically, a village appraisal would involve a public meeting to agree what issues the appraisal should examine and what information is needed from local residents. Often, a questionnaire would be used to survey the views of all residents, and the implications of the findings would be discussed at a further public meeting. Village appraisals are a good way of canvassing opinion within the community. It may not be feasible to undertake an appraisal of every village, given the resources involved, but appraisals of sample villages can provide useful information on perceptions of environmental capital in and around these villages.

Parish Maps *(community control/ delegated power/ partnership)*: the development of visual or arts-based parish map is a good way of identifying what people value in a community and what they feel is distinctive about their area. The process of creating the map provides a 'hook' for involving schools, parents, interest and hobby groups. The 'map' may involve active performances as well as visual images. Parish maps are widely promoted by Common Ground as a means of identifying 'local distinctiveness'. They can be complemented by a more formal village appraisal. Again, they might be used to assess perceptions from a sample of parishes or areas.

Participatory Rural Appraisal *(partnership/ involvement/ consultation):* developed in the context of overseas development work, participatory rural appraisal techniques involve the community in characterising the community itself, and in defining and prioritising the issues faced by different sub-groups within the community. The techniques tend to be visual and highly participatory. PRA techniques can also be used to involve the community in at different stages in the project cycle (eg. monitoring).

Visioning conferences *(delegated power/partnership/involvement/consultation)*: visioning or 'future search' conferences involving a wide cross-section of people from the community, typically around 60-70 people. They are much more intensive than public meetings, lasting for 1-2 days. As with focus groups, participants are normally invited so that all important interest groups are represented. The aim of such a conference is to develop a strategic vision of some aspect of the future of the community in the medium to long term. This requires the identification of common ground and shared concerns between different interest groups in the community. While such conferences require a great deal of preparation and management, usually over a period of 6 months, they can be powerful tools for breaking deadlocks between different interest groups and developing the consensus required for a new strategy on particular aspects of environmental capital. It is important to decide from the outset how much power the conference will have to define strategy, set priorities and influence policy. A conference is likely to be most effective if planned by a steering group drawn from the relevant interest groups.

Ongoing environmental fora or working groups *(community control/ delegated power/ partnership/ involvement/ consultation)*: fora, roundtables or working groups may be established to tackle particular issues over a limited period, or to advise a local authority on an ongoing basis. Membership of such groups should be limited to about 15 people, selected on the basis of their specialism, their influence or their representation of particular interest groups. To work effectively, such groups need to have a clear purpose and agenda, a good chair, some resources and administrative support to back them up. Again, there needs to be clarity on whether the forum or roundtable has an advisory role on council strategy, a decision-making role or a role in developing and implementing initiatives. Although such groups may be initiated by the local authority, they tend to be most effective if independent. There is a fairly thin line to tread between being 'co-opted' by the council (losing independence) and becoming marginalised in the political process (losing influence). To maintain momentum, these groups need to achieve a balance between talk and action. They may need to set up smaller task groups to develop actions on particular issues.

Local Agenda 21 initiatives: Local Agenda 21 is a far-reaching initiative which aims to develop local strategies for sustainability. Local people's perceptions about their quality of life are usually central to Local Agenda 21, so there are clear links to the process of assessing local environmental capital. However, Local Agenda 21 is also relevant to the later stages of developing and implementing management plans for particular aspects of capital. Local Agenda 21 processes generally involves a wide range of actors in the community, requiring the development of partnerships between community groups, businesses and the local authority. All of the tools outlined above have a role to play in developing these partnerships and in deciding and implementing action plans for Local Agenda 21.

Further guidance can be found in:

- a range of publications from Common Ground, including 'Parish Maps' (1987) and 'Holding Your Ground - An Action Guide to Local Conservation';

- 'Making it happen: a users' guide to the Neighbourhood Action Packs'; Neighbourhood Initiatives Foundation; (guide to about 40 packs produced by NIF, covering Planning for Real and other techniques);

- 'Mendip Local Agenda 21 Programme 92-94'; R.Allen; A report to the Countryside Commission;

- 'Creating Involvement - a handbook of tools and techniques for effective community involvement'; Local Government Management Board/Environment Trust Associates; April 1994;

- 'Ideas into Action for Local Agenda 21' (a manual for local community groups); Countryside Commission with English Heritage and English Nature, CCX 37, 1996;

- 'Local Agenda 21 Principles and Processes - A Step by Step Guide', LGMB, 1993.

Further publications which provide useful guidance on deeper levels of public involvement (eg. developing consensus and involving community groups in planning processes) include:

- 'The Guide to Effective Participation'; David Wilcox; prepared for Joseph Rowntree Foundation; published by Partnership Books, 1994;

- 'Consensus building'; Andrew Floyer Acland, The Environment Council, 1992;

- 'Future Search - an action guide to finding common ground in organisations and communities'; Marvin Weisbord and Sandra Janoff; Berrett-Koehler Publishers, San Francisco, 1995;

- Resource Pack for community visioning (including briefings on Future Search and guided visualisation techniques) from the Centre for Community Visions, New Economics Foundation, London, 1997.

APPENDIX D: THE CONCEPT

The issue

The concept of 'environmental capital' has been developed rapidly over the last few years to help answer three questions which continually face anybody concerned with environmental protection:

- The *definition* question: *which* environmental entities, features, qualities (and so on) are important and should be protected, enhanced, or otherwise taken into account in decisions - and why these particular ones?

- The *evaluation* question: *how much* do these matter - and in particular, how much weight can we justify giving to environmental considerations when they conflict with other policy aims or potential benefits such as economic development?

- The *management* question: what kinds of *protection or management* would be needed to retain and where possible enhance whatever is special about environmental features?

'Environmental capital' has become very popular and influential by offering a simple and intuitively plausible way to define three different levels of environmental feature, each with its own level of importance and rules for management. However it has become clear that the original theoretical foundation of the idea is unable to bear the weight now being placed on it. Practitioners are finding apparently simple concepts surprisingly difficult to apply to real cases - and to justify and defend. Different organisations are applying ostensibly the same ideas differently and inconsistently, and often there is no clear way to say which interpretation is 'right'.

Environmental issues are always negotiated and contested between different interests, and it would be a mistake to expect any environmental capital methodology to settle all questions conclusively. However the client agencies believe the new approach developed in this project is a considerable step forward.

The basic metaphor

'Environmental capital' is a *metaphor*. The basic idea, borrowed from finance, is that the environment is a collection of *assets* which can provide a stream of *benefits* so long as they are not themselves depleted. For example a patch of mixed woodland can provide humans with a steady flow of coppice wood, fruits, game birds, amenity and recreation benefits and occasional large trees indefinitely, in just the same way that a savings account can provide a steady stream of interest - provided the 'capital' is kept intact.

According to this metaphor environmental stocks and flows are like capital and interest. Cutting down trees faster than new ones grow, or taking any of the 'forest products' faster than the woodland regenerates them, is just like withdrawing more than interest each year from a savings account. Environmental capacities are (as it were) ecological 'interest rates'.

The metaphor can be extended from environmental 'sources' to 'sinks'. For example a river's ability to assimilate pollution, or the atmosphere's ability to assimilate 'greenhouse' gases, can be seen as the environmental resource's ability to 'finance' environmental 'expenditure' in the form of stress from pollution or waste.

'Critical', 'constant' and 'tradable'

Any metaphor can become misleading if pushed too far or used out of context. The 'environmental capital' idea in its simplest form brings the unwelcome implication that all forms of environmental capital, like human-made capital, can be exchanged through the medium of money. This would mean that:

- Destruction of one environmental asset (say a rare wetland) could be compensated by creating a completely different sort of asset, say a formal rose garden;

- Environmental 'capital' could be substituted for human-made capital so there would be no objection in principle to running down natural assets in order to build up manufactured ones;

- Environmental assets could be valued in cash, and conventional cost-benefit calculations used to decide, case by case, whether an environmental asset (for example an ancient woodland) would be 'worth' more or less than the economic benefits which it could be traded for (for example the savings in motorists' time which could be made by building a motorway across it).

To get round this problem, environmental capital is commonly divided into three categories: 'critical', 'constant' and 'tradable':

- 'Critical environmental capital' consists of assets which are important, irreplaceable and cannot be substituted by anything else, and which should therefore be given the highest possible - some would say 'absolute' - protection;

- 'Constant environmental assets' are those kinds of environmental capital which are not individually unique and irreplaceable but where it is necessary or desirable to maintain the total stock at or above a given 'threshold' level;

- 'Tradable environmental assets' are those for which there is no minimum necessary level and which can therefore quite legitimately be traded for non-environmental gains, for example the economic benefits of development.

Practical problems with 'critical / constant / tradable'

This threefold distinction has proved immensely influential. Indeed 'environmental capital' is now rarely used without it. But it has raised a lot of questions for practitioners. For example:

- There does not seem to be any consistent, objective basis for deciding which sort of 'capital' a given thing is. Designations of 'critical' and 'constant' are frequently contested, and seem unavoidably to require subjective judgements;

- This raises the question of *who* should make these judgements, and how;

- The use of 'lines on the map' to identify and protect areas of high environmental value brings the risk of neglecting the character and value of 'ordinary' areas, and does not help maintain the context necessary to keep the special;

- There is a risk that the identification of specific features, assets or areas as wholly 'critical' or 'constant' environmental capital may block change rather than encouraging those types of change which are consistent with sustainability;

- Existing designations such as SSSIs, AONBs do not relate clearly or consistently to the categories of 'critical' and 'constant' environmental capital.

Some 'hard cases' may help illustrate both the usefulness of the critical/ constant/ tradable idea and the questions it raises:

- *Bath* is designated a World Heritage Site. Calling it 'critical environmental capital' clearly helps articulate the idea that it is very special and should be cherished and managed very carefully. However Bath's special character depends on people continuing to live and work in it. But this involves continual change to the fabric of the city. Managing Bath (or any other city which is both historic and living) involves distinguishing the kinds of change which might erode its special character from those which are harmless or even necessary to its continuation. For example refurbishing building interiors to meet the IT needs of a new generation of businesses might be necessary to help keep Bath a 'real' working city rather than a museum or theme park. The concept of 'critical environmental capital' as it is currently widely used does not provide much help with this. 'Capital' is too static to capture the idea of something which is constantly changing but in some ways continuing; 'critical' too strong to help with understanding acceptable change.

- *Green Belt:* A number of planning authorities are grappling with the question of whether sustainability is best served by rigid protection of green belt. It has been argued that releasing (non-special) green belt for development in some places (eg on existing transport corridors) can be beneficial provided it is compensated with creating more protected and enhanced green belt land elsewhere. If Green Belts are 'critical' environmental capital this question cannot be explored at all. This seems to give more force than is justified to designations made some decades ago in response to a particular set of development threats, patterns of life and prevailing assumptions and

values all of which have since changed very fundamentally. But if green belt is 'constant' natural capital clear rules are needed for *which* bits are legitimately tradable for *what* - and the concept of 'constant' does not itself provide them.

- *Designated areas* such as National Nature Reserves, National Parks, scheduled historical monuments, listed buildings and Sites of Special Scientific Interest are widely felt to include 'critical environmental capital' (even though they are generally not designated on this basis, a point discussed later). However such sites are not infrequently destroyed, damaged or eroded by development. Even the top level of international designations, for example Ramsar and World Heritage sites, are not in practice given absolute protection from development pressures. A simple, unqualified demand for 'absolute protection' for the top category of assets will often prove too stark and rigid to be useful. An approach which shows which *kinds* of changes to an asset are contrary to sustainability, for what reasons, and whether any compensation for the unsustainable effect is possible, would have a better chance of avoiding or minimising damage.

- *The global atmosphere* as a whole is 'critical' in the sense that, once damaged, we would not be able to replace it, and *also* in the sense that this would be disastrous for human life. However an increase in carbon dioxide production in one part of the globe could, in theory, be substituted by a reduction in carbon dioxide production (or an increase in carbon dioxide absorption) elsewhere - so molecules within the atmosphere could be regarded as a collection of substitutable 'constant' assets. Similarly, the ways we affect the environment are highly substitutable - 'global warming potential' provides a basis for comparing, and even trading, a large number of alternative approaches including increases in domestic energy efficiency, reductions in car use, development of wind, hydro or biomass energy sources. So the atmosphere would seem to be both 'critical' *and* 'constant' - and also to a certain degree 'tradable' in that some of these potential substitutions are for human-made capital. (Indeed current policy, based on determining the *amount* of climate change that is 'acceptable' in return for the economic benefits of greenhouse gas overload, treats the atmosphere as more 'tradable' still!)

Conceptual problems

In all these cases there seems to be a need for a more subtle and complex categorisation than just the three headings of 'critical', 'constant' and tradable. There are some clear conceptual reasons for this.

First, *every* environmental asset is 'critical' in the narrow literal sense that it could not be *exactly* replaced. No replacement tree would grow with exactly the same pattern of branches; no old building could be rebuilt with exactly the same pattern of uneven settlement and finishes resulting from years of subsidence, dry rot attacks, alterations and redecorations. But it would be absurd to use this fact to argue that no tree or old building should ever be lost. We need to decide which irreplaceable assets (or features of assets) are also *important* enough to justify a specially high degree of protection. But this means that 'critical' is not a *scientific* category capable of objective discovery but a *social* construct dependent on judgements and values.

The same issue crops up with constant assets. Maintaining a level of assets by substitution requires us to be able to define and measure each kind of asset. This involves questions of *quality* as well as *quantity*. For example whether restoring a stretch of concreted river bank to a semi-natural state compensates for culverting a different stretch depends on the precise nature of the ecosystems to be lost and gained - it may be that twice the 'new' length is needed to provide equivalent habitat to that lost for one species, or even that some features of the length to be lost could only be replicated in a different river.

In many cases these will involve social as well as environmental factors. Whether laying out a new park to replace one a supermarket wants to build on would maintain 'urban open space' at the same level will depend on how conveniently the displaced users can access the new one, and not just on its area and quality of planting. Any environmental asset has a myriad of distinct qualities or characteristics: which are the ones that matter, and which are the ones which we require to be compensated or replaced?

Secondly, what is the *right* level of a 'constant' asset? If the current level is near, or clearly below, some sustainability threshold, we should be arguing for increase or enhancement rather than just like-for-like replacement to maintain the current level. But if the current level is well over the threshold, why should the asset not be tradable - at least until so much has been lost that it is in danger of approaching a threshold? The commonly accepted 'rule of thumb' for management of 'constant' assets - that any loss should be exactly compensated by some corresponding gain - would only seem to be theoretically justified in the few cases where the current level of an asset happens to be exactly the optimum, or minimum acceptable, level.

Thirdly, what *are* the thresholds that matter? Until now, policy has concentrated on 'critical' transitions - for example from rarity to extinction. This has led to criticism that environmental designations and management processes have failed to register, let alone prevent, a steady slide of many assets from 'common' to 'rare', which is arguably just as unsustainable as the more prominent crises of disappearance or extinction. But defining the level of (for example) mixed woodland, or Georgian streetscape, or urban open space below which they would move from being part of the taken-for-granted richness of ordinary life into becoming something special, needing to be deliberately sought out and self-consciously appreciated - and saying how important these transitions are - is clearly a matter for judgement rather than science.

In fact it seems that behind the three ostensibly simple and mutually exclusive categories of 'critical', 'constant' and 'tradability' lies a rather more complex relationship of at least five concepts:

(a) reversibility or irreversibility of loss or change (or re-creatability of the feature)
(b) scarcity (in relation to some desired level)
(c) importance
(d) substitutability (in the sense of whether any other feature could meet the same needs or provide the same benefits)
(e) spatial scale at which the feature is important.

These are logically independent of each other. A feature may be impossible to re-create but quite easy to substitute - for example an urban 'pocket park'. Or vice versa - for example the crumbling end wall of a key building in a village. Any kind of feature may be rare or common - but rare features are not automatically important (for example eutrophied ponds), or common ones unimportant (for example healthy small streams). Features such as species populations can become more or less plentiful over time - but without necessarily becoming either more or less important as a result.

The 'critical / constant / tradable' split achieves its simplicity at the price of ignoring these distinctions. 'Critical' conflates the 'systems' (see 'Theoretical basis: the systems view' below) sense of nearness to a decisive step change, and the ordinary language sense of 'important', and assumes that non-substitutable features are also not re-creatable, scarce *and* highly important. 'Constant assets' likewise assumes that fairly important features are also not scarce but at risk of becoming so, are substitutable within defined limits, and reversible, while 'Tradable' assets are common, unimportant *and* widely substitutable.

To add to the complexity, these are all *continuous* scales rather than simple 'yes/no' questions, and they all amalgamate scientific / objective and social / subjective elements. Environmental features may be important to humans for a range of reasons including survival, health, cultural identity, aesthetic enjoyment, recreation and economic return. For example the appropriate 'target level' for greenhouse gas emissions depends partly on our understanding of the science of climate change and its effects on human survival and health - but also on essentially moral or political judgements about how much climate change we regard as acceptable, the weight we give now to future risks and uncertainties, how far better-off nations and groups are willing to constrain their behaviour for the sake of protecting the worse off, whether we have a duty to protect the environment 'for its own sake' and not only for the benefit, however indirect, of humankind - and so on. The target level for urban open space depends on social norms and the preferences of the people of the area in question.

These problems recede if the 'critical / constant / tradable' distinction is treated simply as a way of expressing a gradation in importance. But this only detaches the question of how relative importance is decided - and justified - from the 'capital' metaphor. Either way it still needs to be answered.

Theoretical basis: the 'systems' view

This report proposes a solution to these problems based on the 'systems' view of sustainability set out by Clayton and Radcliffe (*'Sustainability: a Systems Approach', Earthscan, London 1996*). The key insight of this work is that sustainability is ultimately about whether the whole system can maintain itself within broad limits and assimilate external

pressures without collapse or wild transitions. Carrying capacity limits are the 'thresholds' in flows or pressures at which change becomes discontinuous and irreversible. Critical environmental features are the ones in which small changes may take the whole system over such thresholds.

This basic idea helps illuminate the idea of environmental capital and clarify its relationship with several other connected concepts:

- First, it provides a rigorous scientific basis for the interrelation of 'stocks' and 'flows' already noted. This helps us bring into a single management framework both locally valued environmental features such as buildings, woods, views which are naturally thought of in 'stock' terms and emissions of global pollutants such as CO_2, or assimilation of local ones such as Biological Oxygen Demand (BOD) which are more easily thought of in 'flow' terms.

- Second, this makes clear the distinction between the *reversibility* and *magnitude* of a systems change, which are matters for scientific investigation, and its human *importance* which is a matter of values. Human management of environmental capital is *only* concerned with those changes which matter for people, *particularly* where such changes are also pervasive or irreversible.

- Third, it provides a basis for understanding the relationship between different spatial scales. Something which is critical with respect to a small area may be unimportant at a larger scale. The loss of a small area of a particular habitat will (almost by definition) constitute a step change for the area in question. However this will not be critical at a larger spatial scale if there is plenty more of the same habitat.

- It also provides a rigorous basis for discussing environmental substitution and compensation. Assets or flows *which affect the same carrying capacity* are, in systems terms, interchangeable. For some assets - a species nearing extinction or a famous medieval cathedral - no substitution is possible. For others, such as greenhouse gas emissions discussed above, substitution may be straightforward. For others - for example particular unusual habitats - substitution is in principle possible but may be prohibitively expensive, difficult or slow in practice. Systems thinking tells us what would count as a substitution for any given change. How far policy and management should seek to *secure* such compensation - or to resist uncompensated change - depends on how *important* the asset is, an example of the second point above.

- Further, this resolves - or dissolves - the old argument about whether 'natural' and 'human' assets are interchangeable. They are if and only if the natural and human asset address the same carrying capacity limit. The primary energy used in making a wind turbine or a roll of insulation can be directly compensated by the energy it will generate (or save); the landscape impact of a wind farm cannot.

- Finally, this allows us to distinguish between the *substitutability* of an asset and its appropriate *level*. The concept of 'constant' assets tends to bring the assumption that the current level is the desirable minimum. In fact the 'threshold' or desirable level

may be higher or lower. This allows us to apply the substitutability more actively to target assets where *enhancement* is most needed, and define and measure it.

This systems view is used as the intellectual foundation for the approach to environmental capital rather than as an operational model. Few 'carrying capacity' limits have actually been measured and we are generally a long way from being able to apply this approach in practice. This report proposes a characterisation - based method as an admittedly imprecise but practicable and affordable way to apply the systems insights.

The proposed solution: the characterisation-based approach

The solution proposed in this methodology is to take a step back from allocating physical environmental *objects or places* to one of three categories, which each imply a particular management approach. Instead it looks at the *qualities, attributes or characteristics* of these physical environmental things which matter for sustainability -or the *services* which they provide.

APPENDIX E: EXPERIENCE APPLYING ENVIRONMENTAL CAPITAL

As part of this study, 66 local authorities, agencies, consultancies, voluntary organisations and academics (54 UK, 12 overseas) have been asked about their experiences in applying environmental capital and related concepts. These responses are summarised below.

Uses

To date the concept of environmental capital has primarily been used in relation to development planning (Structure and Local Plans, including some Minerals Plans) and with regard to capacity studies, such as the Chester Environmental Capacity Study and the recently completed capacity study of West Sussex. In many cases it is a concept which has underpinned recent non-statutory designation systems (particularly those relating to nature conservation resources) which have then been fed into the statutory planning process. To take one example, in Hampshire, all non-recreatable habitats have been defined as critical natural capital and designated as SINCs, to which specific polices relate in the County Structure Plan.

Conversely, environmental capital is not a concept which has been used regularly so far in non-statutory strategies and management plans, although there are exceptions. For example, Poole Borough Council has used the concept in the detailed survey and management plan for Poole Harbour to promote the sustainability aspects of planning and policy formulation.

Some developers feel the concept of environmental capital should not be used to determine absolute limits to development at a strategic level but should have a bearing on local decisions relating to the siting and design of development, and its avoidance of damage to key resources. (A systems approach to sustainability actually implies the opposite view: that public policy should be concerned primarily with maintaining those *aggregate* levels of environmental capital necessary for sustainability, but that within this local ups and downs can be accepted!)

How has environmental capital been defined?

Building on existing guidance, current application of the concept of environmental capital has been based around the three tier definition of critical, constant and tradable capital (paragraph 2.8) although there are considerable variations around this theme. In some cases the key emphasis has been placed on defining critical capital. In the Chester study the critical environmental capital of the city was defined as *'those key resources that are fundamental to the fabric and character of the city whose protection and upkeep are of primary concern'.*

The more common approach though, is a two or three tier gradation. The Berkshire Structure Plan environmental capacity study, which fed in to the Examination in Public(EIP) of the structure plan, refers to 'critical capital' and 'compensatable environmental capital'. Similarly the Tonbridge and Malling Local Plan includes a policy which seeks to protect 'critical assets' and requires compensation for the loss of any 'other assets', while the draft revised Hertfordshire Structure Plan refers to the protection of 'critical environmental assets' and the cumulative impacts on 'environmental stocks'.

In other cases the categories have been further subdivided. So, in the Peterborough Natural Environmental Audit, for example, (now adopted as Supplementary Planning Guidance) the natural environment has been subdivided into: critical natural capital; supportive capital (defined as adjacent areas needed to sustain the viability of capital); constant natural assets; and priority enhancement zones.

Amongst local authorities the notion of 'tradable' assets is increasingly seen as too weak and, while there is a strong desire for simplicity, many believe that capital should be seen as a continuum with a considerably greater range of weightings.

What is capital?

Amongst local authorities to date, designations have been widely used to define environmental capital although this was not, of course, their original purpose. (As noted earlier, English Nature now draws a clear distinction between critical capital and designations.) National designations have usually been considered to be critical environmental capital. Local or regional designations have variously been treated as critical capital or constant assets depending on the view of the authority concerned. For example, Hertfordshire County Council has included as 'critical environmental assets' AONBs, SSSIs, LNRs, areas of semi-natural importance, SAMs and other archaeological sites of both national and local importance, landscapes of historic value, listed buildings, conservation areas, agricultural land of Grades 1 and 2, and the aquifer.

Thus - following the designation-led approach - environmental capital may be areas (e.g. AONBs or Green Belts), sites (e.g. SSSIs) or features (listed buildings or SAMs).

But there is hot debate about what should be considered as capital. As questioned by Bedfordshire County Council:

- *what is critical? should only global environmental issues be included?*
- *what are the consistent and definable criteria used to define assets?*
- *should County designations receive the same weight as national?*
- *should Green Belt be included as an environmental asset?*
- *is it right to break down the environment into individual assets? Such an approach masks the influence of the grouping of assets on their perceived value.*

These questions have caused many practitioners, especially in the field of nature conservation, to focus on non-recreatability as a key criterion in defining critical capital. In the *'Kent Thames Gateway Environment Framework'*, ecological resources have been subdivided into:

- valuable ecological resources i.e. habitat that cannot be re-created or substituted because of their antiquity, complexity, specialisation or ecological function, or for reasons of practicality;

- replaceable ecological assets (long term): i.e. habitats which can be re-created or replaced within roughly 25 years (one human generation);

- replaceable ecological assets (short term): i.e. areas recorded by the Wildlife Habitats survey which are often found on disturbed ground or are intensively managed.

Thus, following this approach, categories are largely separated on the basis of timescale required for replacement, with anything taking more than one generation to re-create (such as secondary woodland) falling into the category of 'valuable'. Clearly, as acknowledged by the Gateway report, this scale is a continuum, with some habitats falling close to the dividing line which is in any case somewhat arbitrary. This emphasises that re-creatability cannot be seen in isolation of timescale - re-creatable over *what* timescale becomes the key question.

To date the primary emphasis has been on recreatability within one generation. To quote English Nature's Discussion Paper number 141 on 'Establishing Criteria for Identifying Critical Natural Capital in the Terrestrial Environment': *'This Common Inheritance' (HMSO, 1990) suggests that 25 years (a human generation span) is an appropriate time scale within which to judge environmental sustainability'.*

Topic areas and their integration

In most cases the definition of 'environmental capital' has been restricted to physical features and characteristics. Wider sustainability issues such as health and non-site-specific environmental media such as air have not generally been addressed. Yet some of these issues are closer to being strictly critical (in the sense that human survival depends on them) than the areas where environmental capital has traditionally been applied. Leicestershire tried to address social assets but found it unworkable. In consequence the concept of environmental capital is currently most frequently applied to nature conservation and landscape features, the historic environment, high quality agricultural land and the water environment.

Following the Countryside Commission's publication on *'Countryside Capital'*, there has been growing awareness of the importance of intangible resources such as tranquillity and vitality. Attempts are now being made to define the extent of such characteristics but so far they have not generally been integrated into the language of environmental capital. There has also been little attempt to integrate the assessment of different environmental topic areas, such as landscape or nature conservation. Each topic area tends to be assessed individually, often using separate criteria or designations derived from independently established criteria.

The amount of progress in using environmental capital as a conceptual tool is more advanced for some topic areas than others. The overall impression is that is has been most widely used, and analysis is most advanced, in relation to habitats and species. Conversely, approaches towards townscapes and archaeology are relatively less well developed, are usually site specific and rely largely on established designations.

While recognising the benefits of a single topic approach, many interviewees saw the need to integrate topic areas but were unsure how this could be achieved. They therefore welcomed the lead being taken by the agencies.

Importance and scale

There was general agreement amongst those consulted that it is vital to define at what scale something is important - local, regional, national, international. There was also recognition that values vary with scale. Something that is highly valued at the local level may have no value at the regional or national level and vice versa. In Bedfordshire the great crested newt is locally common but is internationally rare, being listed in Annex II of the EC Habitats and Species Directive. Likewise heathland is a nationally rare habitat but locally common in Dorset and Surrey. For these reasons environmental groups are concerned that regional and national concerns must be fully addressed when local decisions are bring taken.

Characterisation

Amongst those consulted there was growing support for the characterisation approach, as promoted through the Joint Character Map and as endorsed by central government. To date, this has primarily found expression in the increasing use of landscape assessment at the County and District level, with the results being used to inform the development plan process.

There is appreciation, however, that landscape assessment does not provide an integrated approach to characterisation and that other topics (particularly nature conservation and history) need to be clearly brought into the same process to give a fuller understanding of environmental character.

Other than as a means of defining local landscape designations, characterisation has not yet been much used for defining environmental capital. An interesting exception is the Chester Capacity Study which, using a combination of assessment techniques (including guidance by the Countryside Commission and English Heritage), site survey and public perception studies, defined the critical capital of Chester as: the well defined edge of the urban area; the compact nature of the city; green corridors and river valleys; historic buildings and monuments; townscape (the way in which the historic fabric, urban spaces, green spaces, gateways, street patterns combine); archaeological deposits (below ground); and shopping.

Two interesting points about the Chester exercise are:

- Environmental capital may be as much about special characteristics (such as compactness or edge) as it may be about specific features or sites;

- Most of the factors discussed matter for social and cultural reasons rather than scientific reasons associated with health and human survival.

In the case of the Environment Agency's areas of interest, Local Environment Agency Plans (LEAPs) provide the basic building blocks for characterisation. It is on the basis of this characterisation that objectives are set for air and water quality, for example.

Top-down versus bottom-up approaches

Most authorities and other professional organisations have defined and applied the concept of environmental capital 'top down'. Scrutiny through public consultation and examination (for example at EIP) provides some 'bottom up' correction, but there is growing concern that bottom-up views should be given sufficient weight, appropriate to the scale of the review.

The Chester methodology recommends holding group discussions and panel meetings to verify and refine 'top down' judgements. The Peterborough Environmental Audit is designed so that much of the survey work is undertaken by local people. For example in the Built Environment Audit a survey pack leads people through the process of identifying the key attributes of the Townscape and its main negative features. This method has achieved 90% consistency in results.

APPENDIX F: BIBLIOGRAPHY

ARUP BDP Breheny, M., (1995) *Environmental Capacity. A Methodology for Historic Cities - Final Report.* Cheshire County Council, Chester City Council, Department of the Environment, English Heritage

Barton, H. Davis, G. & Guise, R. (1995) *Sustainable Settlements - A Guide for Planners, Designers and Developers.* University of the West of England, Local Agenda 21 UK, The Local Government Management Board

Buckley, P. (1995) Critical Natural Capital: Operational Flaws in a Valid Concept. *ECOS* **16** (3/4)

Clayton, A M H and Radcliffe, N (1996) *Sustainability: a Systems Approach,* Earthscan, London

Countryside Commission (1993) *Sustainability and the English Countryside - Position Statement.*

Countryside Commission (1995) *Quality of Countryside: Quality of Life, the Countryside Commission's Prospectus into the Next Century - Consultation Paper.* Countryside Commission Postal Sales.

Countryside Commission, English Heritage, English Nature (1996) *England's Countryside: The Role of the Planning System - Consultation Paper.* Countryside Commission Postal Sales.

Land Use Consultants (1996) *Conservation Issues in Local Plans.*

CPRE (1993) *Preparing for the Future - A Response by the CPRE to the Consultation Paper on the UK Strategy for Sustainable Development*

Department of the Environment (1993) *Environmental Appraisal of Development Plans - A Good Practice Guide.* HMSO: London.

Environment Agency (1996) *The Environment Agency and Sustainable Development - Statutory Guidance - Draft.*

Environmental Resources Management (1995) *Environmental Capital for the Countryside - Final Report.* Countryside Commission.

Fielding, T. (1996) *The people, where will they go? - A TCPA Inquiry into Housing Need and Provision in England.* Regional Paper, East Anglia, Greater London and the South East, Town and Country Planning Association.

Friends of the Earth Europe (1996) *Report on Roundtable on Sustainability Indicators.* FoE, European Environment Agency.

Garrard, N.R. (no date) *The Poole Local Plan, Project Briefs.* Poole Borough Council.

Garrard, N.R., (1994) *Poole Local Plan, Environmental Appraisal.* Poole Borough Council.

Garrard, N.R., (1994) *Poole Local Plan, The Natural Environment Topic Paper.* Poole Borough Council.

Gillespie, J. & Shepherd, P. (1995) *Establishing Criteria for Identifying Critical Natural Capital in the Terrestrial Environment - A Discussion Paper.* English Nature Research Reports, No 141

Gillespie, J. & Shepherd, P. (1996) *Developing Definitions of Natural Capital for Use within the Uplands of England.* English Nature Research Report, No. 197.

Grigson, W.S. (199?) *The Limits of Environmental Capacity.* The Barton Wilmore Partnership,

House Builders Federation.

Hertfordshire County Council (1994) *Hertfordshire County Structure Plan Review. Future Directions. Environmental Appraisal. Stage 1: Appraisal of Consultation Document.*

Huggett, D. (1996) *Developing a No Net Loss Policy for Coastal Wetlands.* RSPB, paper presented to the 31st conference of river and coastal engineers.

Jacobs, M. (for CAG Consultants) (1993) *Sense and Sustainability - Land Use Planning and Environmentally Sustainable Development.* CPRE.

Jacobs, M (1997) *Making Sense of Environmental Capacity.* CPRE.

Kilford, J. (1996) *West Sussex Structure Plan, Third Review - Urban Capacity in West Sussex, Technical Report.* West Sussex County Council.

Land Use Consultants and CAG Consultants (1996) *Sustainability and the Historic Environment - Revised Draft of Position Statement.* English Heritage.

Masters, D. & Gee, K. (1995) *Criteria for Identifying the Critical Environmental Capital of the Maritime Zone: A Discussion Paper.* English Nature Research Reports, No. 136.

Minter, R. (ed) (1995) Sustainability - A Guide for the Perplexed. *ECOS*, **16**, Issue No 3/4

Owens, S (1994) Land, Limits and Sustainability: A Conceptual Framework and Some Dilemmas for the Planning System. *Transactions of the Institute of British Geographers NS*, **19**, 4, 439-456.

Owens, S. (1996) I wouldn't start from here: land use, transport and sustainability in Cartledge, B. (ed) *Transport and the Environment: The Linacre Lectures 1994-95.* Oxford University Press, 45-61.

Owens, S. & Cowell, R. (1996) *Rocks and Hard Places - Mineral Resource Planning and Sustainability.* CPRE.

Peterborough Environment City Trust (1995) *The Peterborough Natural Environment Audit - Consultation Document.* Peterborough Environment City Trust, English Nature, The Wildlife Trust Peterborough

Peterborough Environment City Trust (1995) *The Peterborough Natural Environment Audit - Technical Supplement.* Peterborough Environment City Trust, English Nature, The Wildlife Trust Peterborough

Peterborough Environment City Trust (No date) *Peterborough Built Environment Survey Pack.*

Pritchard, D. (1994) *Is Carrying Capacity Real, and an we use it in Planning?* RSPB Conservation Review 8.

Pritchard, D. (1996) *Site Safeguard Concepts and Systems: A Design Guide for the next Millennium.* RSPB

Ratcliffe, D. (ed) (1977) *A Nature Conservation Review - The Selection of Biological Sites of National Importance to Nature Conservation in Britain. Volume 1.* Cambridge University Press: Cambridge.

WWF (1996) *Sustainable Use of Natural Resources: Concepts, Issues and Criteria*