

Developing definitions of natural capital for use within the uplands of England

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**ENGLISH NATURE RESEARCH REPORT
NO. 197**

**DEVELOPING DEFINITIONS OF NATURAL CAPITAL
FOR USE WITHIN THE UPLANDS OF ENGLAND**

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**A discussion paper commissioned by the Uplands & Freshwater Team and
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1. INTRODUCTION

1.1 Background

In November 1993 English Nature published a position statement on sustainable development which adopted the concept of environmental sustainability as a way of focusing action to put sustainable development into practice (Appendix 1).

The position statement promotes the concept of environmental sustainability, being the maintenance of the environment's natural qualities and characteristics and its capacity to fulfil its full range of functions, including the maintenance of biodiversity. The broader social and economic goals of sustainable development must therefore be achieved in a manner that ensures the *quality* and *value* of the natural environment is sustained.

English Nature has been one of the lead organisations in the development of the application of this concept and have commissioned a number of research projects since 1992 (English Nature, 1992; 1994, Masters and Gee, 1995, Gillespie and Shepherd, 1995). This work has clearly identified the overall maintenance of England's Natural Capital (Constant Natural Assets) and the protection of core areas (Critical Natural Capital) within as key principles of environmental sustainability.

In 1995 English Nature commissioned a discussion document titled '*Establishing Criteria for identifying Critical Natural Capital in the Terrestrial Environment*' (Gillespie and Shepherd, 1995). The study considered various ways of identifying Critical Natural Capital. It did not, however, specifically consider how the concepts of Constant Natural Assets (CNA) and Critical Natural Capital (CNC) can be applied. In previous research projects and publications the use of the concepts of CNC and CNA have very much been tied in with the formal planning system which does not currently regulate many of the activities that affect large parts of the English uplands. Consequently, the Upland and Freshwater team of English Nature commissioned this current study from East Midlands Environmental Consultants to further develop methods of defining Natural Capital and applying the concept as a contribution towards achieving environmental sustainability in the English uplands.

1.2 Study brief

The aims of the study brief were:

1. To produce a discussion paper for English Nature to use as the basis for developing the concepts of environmental sustainability with those that live and work in the uplands
2. To recommend appropriate criteria for defining and identifying Critical Natural Capital and Constant Natural Assets in the uplands (based on those already outlined for terrestrial habitats)
3. To raise awareness and encourage discussion (within English Nature) of the practical application of Critical Natural Capital and Constant Natural Assets within the uplands of England.

The study has been implemented through reviews of recent work on the concept of Environmental Capital and through a series of workshops with relevant staff from the English Nature offices that have responsibility for the eighteen upland Natural Areas in England. A meeting to discuss the concepts and their application was also held with the Royal Society for the Protection of Birds (RSPB).

1.3 Definitions of “upland”

There have been several attempts to define what is meant by upland but there is no universally accepted definition. Definitions of upland based on altitude are difficult to apply and the altitudinal level for upland varies from one part of the country to another. Others define the uplands as the open unenclosed land, but this does not reflect the practical connections with the enclosed marginal land in terms of management or that a proportion of upland species utilise both enclosed and unenclosed habitats.

English Nature defines upland as being;

“land associated with the upland meat regime and farming systems, both beef and sheep, i.e. moorland, allotment and in-bye land”

and go on to state;

“Overall the best definition of upland for targeting policy is described by the administrative boundary of Less Favoured Areas (LFAs)”

This report has been prepared within a spatial framework based on Natural Areas. English Nature’s upland Natural Area boundaries are not an exact reflection of “Less Favoured Area” boundaries, however upland Natural Areas are those whose boundaries lie predominantly within or are equivalent to the Less Favoured Area boundary.

1.4 The character of the English uplands

The character of the uplands of England is very different than that of the lowlands. In general terms, with the possible exception of coastal areas, the lowlands are intensively managed for agricultural and development purposes which has resulted in the extensive reduction and fragmentation of semi-natural and natural habitats. In contrast the uplands support large continuous tracts of semi-natural habitat which are shaped primarily by agricultural and game management, forestry and access and recreation.

In the lowlands economic activity by and large takes place outside the natural capital resource (semi-natural habitat) whereas in the uplands economic activity is inter-related with the maintenance of those habitats and systems that give the uplands their unique character and value. Consequently, in the uplands there is a very close tie between the agriculture-based economy and semi-natural habitats which are an integral part of the farming and other land management systems.

1.4.1 Habitat continuity and spatial scale

The continuity of semi-natural habitat places a greater importance on the maintenance of the overall working mosaic of upland habitats rather than on the defence of isolated patches or sites which is often the case in the lowlands of England.

This difference in the scale of semi-natural habitat between lowlands and uplands can also lead to difficulties in the formulation of arguments for the long-term maintenance of overall value and extent of the natural capital resource. In the lowlands, where natural capital is concentrated into small fragments and generally dealt with on a site by site basis, the arguments against loss of natural capital are perhaps more simply formulated, because of the tendency to think in terms of “loss of [or damage to] a whole site”. In the uplands damage to the natural capital resource often appears to be less significant because of the scale and continuity of the overall resource. The cumulative effects, however, of apparently small scale losses can be likened to “death by a thousand cuts”. Adverse changes to the overall value of the natural capital of the uplands can also result through a process of steady degradation in quality due to over intensive management, and to a lesser degree, an absence of appropriate land use.

1.4.2 Land management, development and recreation

Over the centuries human use and the management of the uplands of England has created large expanses of moorland (blanket bog and upland heath) and grassland with a consequent loss of native woodland. Today, much of the uplands are in some form of agricultural management and in recent years concern has been expressed over the impact farming has had on the ecological interest of the uplands. Over-grazing of open moorland is reported as a problem resulting in the reduction of heather dominated moorland and an increase in upland grassland. Moorland is also affected by drainage and intensification of in-bye land to achieve greater productivity. Enclosure and improvement of open moorland are also seen as threats to the maintenance of the interest of the upland environment. Overgrazing is one factor preventing natural regeneration of native woodland and moorland, and other unenclosed upland habitat (including native woodland) has been converted to commercial coniferous forestry.

The winning of minerals including rock and metals through quarrying can be very destructive locally. The demand for minerals and metals is likely to continue for industrial and urban development and further extraction in the uplands is therefore likely. The expansion of significant urban development is unlikely in the uplands; although other construction activities for wind and hydro-electric schemes, military installations and infrastructure, water supply and tourism may well expand in the future. Mineral winning and development proposals in the uplands on the whole are subject to planning control. A wide range of other activities in the uplands, however, are not governed by planning control to any significant extent. One of the other major management issues in the uplands is the control of access and recreational activities. Over the last 30 years there has been a large increase in the number of visitors to the uplands and an increase in the range of recreational activities undertaken by them.

2. ENVIRONMENTAL CAPITAL

2.1 Environmental Capital and sustainability

The concept of Environmental Capital arises from the early work of environmental economists who view the natural resources of the planet, such as biodiversity, nutrient cycling, waste assimilation, water and air supply as a 'capital resource' comparable with financial capital and human made capital. Like other forms of capital, environmental capital can be depleted, enhanced and in some instances replenished. Environmental capital and the functions it performs provide a basic support mechanism for all of human activity, now and in the future, providing food products, minerals, biodiversity and air and water. Consequently, the appropriate management and wise use of environmental capital has a key role to play in ensuring environmental sustainability, an approach which is embodied in "*Sustainable Development The UK Strategy*" (HM Government, 1994b).

This does not mean that the present constitution of environmental capital should be preserved in its current state. Environmental resources will continue to be exploited and the natural world (or the natural capital component of environmental capital) will continue to fluctuate. The message is clear, however, that a healthy and functioning environment is essential to achieving the broader social, political and economic goals of sustainable development.

One part of our environmental capital is that which makes up the natural world: the natural capital, with all the commercial and social benefits and products it can supply. The natural world is in a constant state of flux although over the last couple of centuries the trend has been strongly towards depletion of our overall natural capital resource and subsequent extinction of species. As such there has been a net loss in the overall quantity and quality of our natural capital both globally and in the UK (Wilson, 1992). In order to redress this degradation and work towards a sustained natural capital resource it is clear that many aspects of our natural capital need to be enhanced beyond their current state (Biodiversity The UK Action Plan, 1994). In the future society must aim to ensure that the overall worth (quality and quantity) of our natural capital is sustained for future generations.

Sustainable development is very much a societal concept that aims to ensure continued social development whilst retaining the benefits we currently gain from the natural world. Many of the scientific arguments about which aspects of the natural environment should be sustained in order to maintain this life support function are not well understood and therefore the adoption of a precautionary approach to questions of land use and management change should be adopted.

The concept of sustainable development also proposes that society passes on to future generations a stock of capital (in the widest sense) of equal or greater worth than that which it inherited. This capital, as described above, includes natural capital. It follows, then, that as well as ensuring that our scientific understanding of the natural environment is good enough to make sure that human activities do not damage the ability of the environment to continue to support human life, it is also important that society decides which aspects of the natural environment it values and wishes to be passed on for the

benefit of future generations. To illustrate this point, it could be argued that science suggests the conservation of our peatland resources is an objective society should strive to achieve because they are a major store of carbon which it is predicted would affect the global climate if released into the atmosphere. Equally, however, society may judge our upland blanket bogs to be of value simply because of their “appeal” and the fact that the UK supports a large percentage of this type of habitat within Europe, facts which are reflected in national and international legislation.

The importance of such societal judgements is one aspect that should be recognised and accepted when formulating arguments for sustaining our natural capital.

2.2 Terminology

The term Environmental Capital has been regularly used in connection with a wide range of features of the environment including air and water supply and quality, landscape character, access to the countryside and historic features of the landscape as well as the habitats and species that comprise the natural world. English Nature’s position statement on Sustainable Development identifies two specific aspects of Environmental Capital: Critical Natural Capital (CNC - natural assets that are irreplaceable) and Constant Natural Assets (CNA - natural assets that are replaceable). These terms have been widely used throughout most of the research commissioned by English Nature with the exception of a discussion document on identifying critical capital in the marine environment (Masters and Gee, 1994) where irreplaceable natural capital is referred to as Critical Environmental Capital.

For the purposes of this study and to remain in keeping with English Nature’s position statement on Sustainable Development the terms Critical Natural Capital and Constant Natural Assets are generally used although, as suggested at the end of Section 2.3, there may be merit in reconsidering these terms and their use. The terms are specific to the aspects of environmental capital with which English Nature are primarily concerned, namely natural capital. Natural capital has been defined for this study as:

All semi-natural habitats and naturally occurring plant and animal species and geological exposure and geomorphological features

Although geological and geomorphological assets are included in the working definition of Natural Capital, they have not be discussed in this report and will be the considered separately by English Nature. Other elements of environmental capital including aesthetic, cultural, historical and amenity are being considered in England by organisations such as the Countryside Commission and English Heritage. For example, landscape character is being referred to as Countryside Capital by the Countryside Commission (Environmental Resources Management, 1995).

2.3 Existing definitions of Natural Capital

To accommodate land use and management change, both positive and negative, it is generally recognised that the composition of our natural capital will fluctuate over time, but that the overall quality of the resource should be maintained or enhanced by replacement of lost capital. It is also recognised that certain aspects of the natural environment cannot be readily replaced once lost. This is reflected in “*Biodiversity, The UK Action Plan*” (HM Government 1994) which states:

“While some habitats, particularly those populated by mobile species which are good colonisers, have some potential for re-creation, the majority of terrestrial habitats are the result of complex events spanning many centuries which defy re-creation over decades. Therefore, the priority must be to sustain the best examples of native habitats where they have survived rather than attempting to move or re-create them elsewhere when their present location is inconvenient because of immediate development proposals”

A distinction has been made between capital that can be traded so long as it is replaced with an asset of equivalent or greater worth and those which are irreplaceable and should be considered as inviolable and must be maintained and passed on to future generations. English Nature have identified 3 types of Natural Capital in ‘*Sustainability in Practice*’ (English Nature, 1994). These are Critical Natural Capital, Constant Natural Assets and Desirable Natural Assets. These are as follows:

“Critical Natural Capital is defined as those assets, stock levels or quality levels that are highly valued; and also either essential to human health, essential to the efficient functioning of life support systems, or irreplaceable or unsubstitutable for all practicable purposes”

“Constant Natural Assets are those aspects of the natural capital resource which are not critical in themselves, but contribute to the overall quality of our Natural Capital which should not decline below defined levels. It is the safeguarded total levels that should be maintained and not necessarily all of the individual component features”

“Desirable Natural Assets are those aspects of the natural environment which are not critical in themselves and which do not make up an asset level which should be maintained constant”

This distinction between Constant Natural Assets and Critical Natural Capital should not be used as a grading system in terms of importance or value. The danger in this assumption is that CNA will be viewed as less important than CNC. This is not the case: CNA as a whole makes an equally important contribution to the overall quality and quantity (worth) of the natural capital resource and it is the overall quality or worth of the natural capital resource that must be maintained if environmental sustainability is to be achieved. The difference between CNA and CNC is related principally to replaceability in terms of physical re-creation, maintenance of critical stock levels or critical quality levels. Different assets may be identified as being constant or critical at different times depending on changes in the state of our knowledge or as a result of severe declines in the extent of

a habitat or the size of a species population and a flexible approach to identifying CNA and CNC over time will need to be adopted.

The essential concern is that those parts of the constant natural asset that are lost must be replaced with natural capital of an equal or greater worth or their loss will result in the diminution of the overall value of the natural capital resource. By applying this approach rigorously it should theoretically be possible to sustain the worth of the natural environment in the long term. The process of replacement must be achievable technically, financially, ecologically and politically. It has been argued by Buckley (1995) that if all the difficulties of replacement can be overcome, then a successful replacement should be established prior to the loss of the existing asset. This will demonstrate practically that an adequate replacement can be achieved. Whether this will be practically possible in many circumstances is difficult to determine, but the principle of this cautious approach should be adopted.

Footnote to the Terminology Section

There is need for a review of the terminology associated with the concepts of natural capital. Words such as “Critical”, “Constant” and “Desirable” are confusing and have not been clearly defined. They also take on different meanings when discussing definition and classification of environmental assets, than when discussing the application of the concepts. It is suggested here that “inviolable” and “tradable” (conditionally for valued assets; unconditionally for “not valued” assets) will be easier to define, understand, promote and use.

3. DEFINING THE NATURAL CAPITAL RESOURCE

The purpose of defining natural capital as critical, constant or desirable is to identify those aspects and qualities of the natural world that society wishes to sustain and pass on to future generations; and to ensure the continued functioning of the environment including the maintenance of biodiversity. The process also indicates to society which elements of the natural capital resource cannot be replaced once lost.

By defining the natural capital of a given area and determining what society should pass on to future generations it is possible to take the first steps towards achieving a more sustainable use of our natural resources and in particular our natural capital. To define natural capital as irreplaceable (critical) and tradable (constant and desirable) is effectively to audit the natural capital resource at a given moment in time. This provides a base line against which future audits can be compared to determine how successful society has been in sustaining local and national natural capital resources. If the results of the audit are combined with objectives for biodiversity locally and nationally it will be possible to set targets for the future extent and quality of different components of the natural capital resource.

3.1 The Spatial framework - Natural Areas

In any process of determining the extent and quality of a resource there must be a clear indication of the spatial scale of operation. The choice of scale is influenced by theoretical and practical considerations.

There are many different spatial scales within which the natural capital resource can be considered including geographical regions or national and local government administrative boundaries. To be effective and to ensure the full geographical range of characteristic biological diversity and features of natural capital are considered throughout England, English Nature have stated in their position statement on Sustainable Development (Appendix 1) that natural capital should be defined within Natural Areas.

Natural Areas are defined in “*Biodiversity - The UK Action Plan*” (HM, Government, 1994) as:

‘biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation’

Natural Areas provide a manageable basis for defining natural capital because, while they are an artificial classification, they are based on natural features of the land which reflect the local diversity of natural capital more effectively than existing administrative boundaries. Using Natural Areas should ensure that the full geographical spread of species is covered and that the mosaic of habitats, species and landforms that contribute to the local distinctiveness of the natural capital resource throughout England are fully considered.

It should be possible from existing knowledge to start the process of defining natural capital on a Natural Area basis to guide and influence priorities for planning, land management and rural development.

Natural Areas do not have official status in planning or local government organisation. Consequently it will be necessary to deliver objectives developed from the application of natural capital concepts through the existing administrative system.

3.2 Natural Capital support mechanisms

In the process of defining the natural capital of a given area there is likely to be a degree of uncertainty about what should be included as part of the natural capital resource. There is a gradient from entirely artificial structures such as buildings which clearly could not be described as forming part of the natural resource, to land uses that are also man made, inherently of low ecological value, but comprise living organisms albeit non-native species or productive agricultural cultivars (e.g. arable fields, monocultures of coniferous plantation and agricultural grass leys). These 'habitats' bear little resemblance to semi-natural habitats. There are also 'environmental services' such as a clean water supply that are essential for the maintenance of the interest of semi-natural habitats.

It is important therefore to be clear about what aspects of the natural environment should be included in a definition of the natural capital resource and what aspects of the environment should be recognised as supporting mechanisms for certain constituent parts of the natural capital resource. Whilst these mechanisms can be vital to the successful functioning of an economic land management system, provide an essential requirement for the maintenance of a natural capital asset, or support a particular species of interest, it is arguable that they are not in themselves natural capital, rather they provide essential support for certain constituent parts of the natural capital resource.

It is therefore questionable whether what is defined as natural capital should include artificial habitats such as buildings or environmental services such as groundwater supply to a fen. It is less certain, however, whether inherently ecologically poor, semi-artificial habitats such as an arable field, conifer plantation and improved grass ley; should be included as part of the definition of the natural capital resource.

Wherever the distinction between supporting mechanisms and the natural capital resource is made, it should be recognised that it does not preclude supporting mechanisms from being identified as in need of protection or maintenance when trying to practically apply the concepts of natural capital. For example, should an area of heavily overgrazed blanket bog be defined as a constant natural asset or critical natural capital? An initial reaction may be to define it as CNA because the degraded vegetation community could be restored given the right management. An alternative approach may be to define blanket bog as an irreplaceable asset because the vegetation community, whether degraded or not, is dependent on the layer of peat that has accumulated over thousands of years and this resource clearly cannot be replaced. In this circumstance it could be argued that the peat deposit, whilst vital to the vegetation, and effectively irreplaceable itself, is nevertheless the support mechanism and the plant and animal communities that develop on the peat surface are the natural capital.

Simpler cases can be made in the uplands for the role of agriculturally improved in-bye land in the life-cycle of a number of bird species; or for the role played by some coniferous plantations in providing nesting opportunities for goshawk. This may seem a very strict distinction to make, but it does ensure that a clear indication is given as to what constitutes the natural capital resource of a Natural Area.

The importance of these supporting mechanisms will vary and should be considered in determining the replaceability of an asset. A proposed relationship between natural capital, total biodiversity, supporting mechanisms and economic and social biodiversity (e.g. crops, livestock, domestic pets) is shown in Figure 1.

3.3 Identifying Inviolable Assets - Critical Natural Capital

Critical Natural Capital is defined as *“those assets, stock levels or quality levels that are highly valued; and also either essential to human health, essential to the efficient functioning of life support systems, or irreplaceable or unsubstitutable for all practicable purposes”*

From this definition of CNC it is apparent that CNC could include irreplaceable assets, critical stock levels of species populations or habitats and critical quality levels. The English Nature research report 141 (Gillespie and Shepherd, 1995) has identified a number of key considerations for determining whether an asset is replaceable or not, but before determining this, it is important to decide whether or not the asset is sufficiently *valued* to warrant consideration as CNA. If it is, then the decision about whether it is a critical component of the natural capital resource is still very much related to irreplaceability or the maintenance of species populations or habitat stocks.

Although not included in the definition of CNC used by English Nature, natural capital could be determined not only on the basis of irreplaceability, but on a broader concept of inviolability, which would include irreplaceable assets and other aspects of the natural capital resource so highly valued that society would not accept their violation or exploitation. This circumstance is recognised in *Sustainable Development the UK Strategy* (HM Government, 1994) which states in paragraph 3.15

“Sometimes environmental costs have to be accepted as the price of economic development, but on other occasions a site, or an ecosystem, or some other aspect of the environment, has to be regarded as so valuable that it should be protected from exploitation. Such judgements should make proper allowances for the interests of future generations and for the pressures that one society places upon the global environment”.

The basis for determination of Critical Natural Capital will differ for habitats and species. Habitats can be critical because they are irreplaceable and/or because the stock levels of a highly valued habitat have declined below an acceptable threshold. Certain stock levels of habitats could also be identified because the size of the habitat makes an important contribution to the overall quality of the natural capital. Individual species, however, can only be judged as critical on the basis of the size of their population. This judgement could consider whether a species population is regarded as being at a dangerously low level; or the size of the population within a given area may be important on a wider geographical

basis and contribute significantly to the quality of the overall natural capital resource. Both habitats and species, therefore, could be identified as being critical because they are essential to the maintenance of quality levels.

3.3.1 Critical Natural Capital - species

Determining the replaceability of a species can be approached in a number of ways depending on particular circumstances. If the objective is to replace a species lost from a given site or area then various technical and ecological aspects will need to be considered including habitat requirements, life cycle and interactions with existing species. In other circumstances the objective may be to replace a reduction in the size of a population which may be achievable through increasing carrying capacity on other areas used by the species concerned. Consequently whilst species can breed and reproduce then losses are theoretically replaceable given the right ecological and technological circumstances.

A species, therefore is not inherently irreplaceable until it becomes extinct or its population levels becomes so small and isolated that genetic drift and inbreeding effectively consign that species to extinction, regardless of human efforts to restore a viable population. In order, therefore, to ensure the continued survival of species it is a viable stock level or population size that should be maintained. Viable population sizes, however, are very difficult to determine accurately for all but a few species. Owing to the uncertainties surrounding the determination of minimum viable population sizes there is a need to develop a practical operational approach to identifying which species and what population sizes should qualify as Critical Natural Capital.

It is suggested here that the current conservation status of a species, either internationally, nationally or within the Natural Area, could be used to identify species for consideration as elements of the Critical Natural Capital. Those valued species considered to be in an unfavourable condition would qualify as Critical Natural Capital. The populations and range of these species should not be allowed to deteriorate further, although this is not to say that individual locations of that species cannot be relocated if necessary and feasible. It is likely that targets will need to be set in terms of population sizes in order to measure whether a species has reached a favourable condition.

There are therefore the questions of what constitutes a valued species and how favourable condition should be determined. Part of the process should involve discussions and consultations between English Nature and non-government organisations, but could consider internationally and nationally rare, threatened or declining species; species that are rare, threatened or declining within a Natural Area; and species for which England has special responsibility (i.e. significant proportions of European or global populations). Clear measures of when the conservation condition of a species becomes favourable could also be determined.

It is arguable that even some very large populations of species within or across Natural Areas could be viewed as critical, not because they are in an unfavourable condition, but because the size of the population is highly valued and contributes to the overall quality or worth of the natural capital resource. For example, society may value the significant breeding population of Golden Plover present in the English uplands. It may be suggested,

however, that the size of the population could theoretically be reduced without affecting the long term viability of the population in England, but such a reduction could be seen as a diminution of the quality of the upland natural capital. Consequently a critical population size for a species could be set not only for population viability reasons, but because society values the size of the population.

3.3.2 Critical Natural Capital - habitats

Many of the issues surrounding the determination of the irreplaceability of habitats are covered by Gillespie and Shepherd (1995). There are aspects of irreplaceability determination that are common to the lowlands and the uplands, such as the role of habitat quality which is recognised as influencing the ease with which an example of a habitat can be replaced. There are, however, a number of factors peculiar to the upland environment that are likely to affect the determination of irreplaceability of habitats. These include the scale and continuity of upland habitats and the topographic and climatic constraints on the location within which certain upland habitats can occur. Both these characteristics will affect the ease with which space can be found to replace lost assets. The notion forwarded in English Nature's Research Report 141 (1995), that technical feasibility is not the only consideration in determining replaceability, are therefore likely to be even more relevant in the uplands.

As well as considerations of replaceability of a habitat, Critical Natural Capital could also be determined based on overall stock levels and, in common with species, the conservation status of a habitat within a Natural Area could be used to identify Critical Natural Capital. It could be argued for example that, apart from reasons of the inherent irreplaceability of peatland deposits within a reasonable timescale, blanket bog should be considered a critical asset because it is recognised as important as reflected by its inclusion in Annex A of the EU Habitats Directive which identifies active and inactive blanket mires to be of community importance. Linked to that, the UK supports significant proportions of the total European Community blanket bog resource and the UK's proportion therefore plays an important role in maintaining the overall quality of the European natural capital resource.

To determine the conservation condition of a species or habitat at any given time information on changes in the natural capital resource is required. The conservation movement and its knowledge base within England may be advanced enough to enable trends in habitats and species to be broadly identified. There is also a need to decide at what spatial scale conservation condition should be determined.

3.4 Identifying tradable assets - Constant and Desirable natural assets

“Constant Natural Assets are those aspects of the natural capital resource which are not critical in themselves, but contribute to the overall quality of our Natural Capital which should not decline below defined levels. It is the safeguarded total levels that should be maintained and not necessarily all the individual component features” (English Nature, 1994).

This definition clearly indicates that all elements of the natural capital resource that are not considered critical should be identified as potentially tradable. These assets, however, make a vital contribution to the overall worth of the natural capital resource and it is the worth (quantity and quality) of the natural capital that must be sustained over time if environmental sustainability is to be achieved. This does not mean that the relative contribution that each component part (habitats and species) makes to the overall worth of the natural capital resource will, or indeed should, remain the same; rather the overall worth of the critical and constant assets must be sustained and in many cases enhanced.

The process of defining the constant natural assets of a Natural Area will involve an audit of the current state of the natural capital resource. Identifying which aspects of the tradable capital that are valued (and therefore must be replaced if lost) will involve a broad evaluation of the importance of each component part of the natural capital resource within a Natural Area. It is suggested in *Sustainability in Practice* that this process will exclude certain elements that society does not believe should have to be replaced. These are referred to as “Desirable Natural Assets”. Whilst the word ‘desirable’ may lead to confusion, the principle of having this third classification is a sound one so long as a consensus can be reached about what we do not value sufficiently to insist on compensation.

The setting of targets for different component assets is an integral part of the application of natural capital concepts in a forward planning manner. The relative importance of each of the component parts that together constitute the natural capital of a Natural Area will determine priorities for action and guide decisions about which assets need to be expanded and which assets can be allowed to decline so long as they are replaced by an asset of equal or greater worth.

These determinations should be linked to local and national biodiversity targets and should provide the justification for expansion of particular habitat or species resources. For example analysis of the rare, threatened and declining species of a given Natural Area may indicate a need to expand native upland woodland for a suite of plant and invertebrate species, to ensure these species attain a favourable condition. Equally the analysis may identify that there is more purple moor grass or mat grass dominated grassland than required to maintain the interest and value of this habitat and the species it supports. The expansion of the woodland may therefore be acceptable at the expense of upland grassland because the overall worth of the natural capital will have been maintained and even enhanced according to the objectives so set.

It should be recognised that the objectives and targets set for a Natural Area may not be achievable simply through a process of reshuffling habitats and species within the extent of the existing resource and that expansion of habitats onto land which supports no natural capital may be necessary.

4. APPLYING NATURAL CAPITAL CONCEPTS IN THE ENGLISH UPLANDS

It is suggested here that applying natural capital concepts within a Natural Area is essentially a process of natural capital resource accounting. Once the existing natural capital resource has been characterised at a particular moment in time it is then necessary to determine how it should change to ensure the overall worth of the natural capital resource is sustained. This will involve a process of setting objectives and targets for the resource within a Natural Area which in turn should reflect objectives for the uplands of England nationally.

The process of setting objectives must remain flexible at all times. The natural capital resource of the uplands of England is dynamic and is likely to change over time and it may become necessary to amend objectives in reaction to new information or research data which enhances our understanding of the status and function of different habitats and species. Consequently, there should be a regular review of natural capital objectives and characterisation of the natural capital resource to reflect the changes in natural capital. This is particularly true in the uplands where we are not dealing with discrete land parcels, but with complex mosaics of continuous expanses of semi-natural habitat. The setting of objectives in the uplands, then, needs to be undertaken very carefully to ensure that proposed land-use changes needed to meet such objectives do not take place in a manner that is detrimental to the functioning of other aspects of the environment. There is a need for focused data gathering and assessment of natural ecosystem changes over time as well as increased study of the relationships between the component parts of the upland ecosystems.

4.1 Setting objectives and targets for the natural capital resource

In making decisions about whether a proposed change in land use can be considered to bring about no net loss in the overall worth of the natural capital resource, consideration should be given to the overall objectives set for natural capital within a Natural Area. If an increase in native woodland is an agreed objective for a Natural Area and it is recognised that the expansion of this habitat is of greater importance than the maintenance of, say, mat grassland then by definition the replacement of one with the other would be judged to be of equivalent or greater worth to the overall resource. Any decision, however, will need to be viewed in relation to the changing status of mat grassland habitat within the Natural Area. The setting of objectives will also need to be undertaken in conjunction with local communities and other interest groups.

To determine the relative importance of each component part of the natural capital resource will require an assessment of the status of the habitat itself and the species reliant upon it. The assessment should be based initially on key species and communities: those that are rare, threatened or declining internationally, nationally or within the Natural Area. An analysis of the relative status and importance of these species and their ecological requirements will help guide the establishment of clear objectives for each Natural Area. Ideally these objectives should also be set within a national framework.

Once objectives have been established, clear and well reasoned targets should be set to achieve the objectives for each Natural Area with consideration of the potential problems

highlighted above. For example, one objective for a Natural Area may be to maintain all ancient woodland sites, to maintain the existing cover of mature secondary woodland and to encourage an overall increase in woodland cover during the next twenty five years. The targets for such an objective may include specific hectarage for woodland cover and increases or stabilisation of the populations of a suite of key woodland species. There is an obvious connection between this approach to natural capital resource accounting and the formulation and implementation of biodiversity action plans, although the application of natural capital concepts includes all aspects of the natural capital resources and not just those most at risk. The two processes, however, should be linked and complement each other.

There are a number of sources of information that are likely to be valuable to the process of setting objectives and targets for the natural capital resource. These might include: a) data on past and more recent changes in the nature of the overall natural capital resource (e.g. changes in habitat cover); and b) national and local biodiversity targets. For the former it will be important to consider how far back in time one must go to get a reasonable picture of what the nature of each of the upland areas might ideally be. The latter will be useful tools for identifying species and habitats that could be considered to not be in an favourable condition. Determining just how much of each component part of the natural capital is needed to maintain the overall worth of the natural capital resource (i.e. setting targets) is difficult and is very unlikely to be an absolute process and at this stage it may only be initially feasible to determine broad objectives for natural capital resource at the Natural Area level.

The core profiles for Natural Areas will also provide information on species and habitats of both national and local importance, but they need to be developed further before clear objectives and targets for the natural capital resource can be developed.

Owing to the very close relationship between upland agricultural systems and the ecological make up and value of the upland natural resource, careful consideration should be given to the effect on the viability of agricultural systems one might have in pursuing “ideal” natural capital objectives. In this respect it is arguable that changes in the ecological characteristics of the uplands are so far advanced due to certain farming practices that in order to sustain the natural capital of the uplands it may also be important to sustain certain agricultural practices. These practices should be viewed as “supporting mechanisms” for much of our upland natural capital (see Figure 1).

4.2 Natural Capital concepts and existing designation systems

The potential conflict between existing site designations systems and the identification of assets as critical, constant or desirable has been considered in earlier reports commissioned by English Nature (Gillespie and Shepherd, 1995) and in other publications (Buckley, 1995). Any further development and use of these concepts must make careful consideration of the relationship with designated sites. There should be a clear distinction made between the purpose of the statutory designation systems and the use of natural capital concepts. Designation systems are very much protective means aimed at ensuring a representative range of habitats and species is maintained across the UK.

It is suggested here that CNC and CNA should not be seen as new forms of designation and it is very unlikely that they will gain any formal or statutory status in the short term even if used in this manner. The application of natural capital concepts can be undertaken as a process of planning the use and enhancement of the overall natural capital resource which includes designated sites, but it is also more concerned with those aspects of the natural world outside of such sites.

This distinction between site-based designation systems and the broader “wider countryside” related concepts of environmental sustainability is particularly sharp in the uplands. In very general terms the uplands consist of little poor quality natural capital within a large block of higher value natural capital. In the lowlands it could be argued that we are dealing with fragmented “sites” of higher quality natural capital within an expanse of poor quality land. This is not to suggest that the same principles cannot be applied in either situation; rather that if effective consideration is to be given to environmental sustainability in the uplands, then the uplands should be viewed as complete, functioning ecosystems and acknowledgement given to the fact that many hectares of very high quality habitat exists outside of the designated series.

4.3 Integration with wider Environmental Capital objectives

Although objectives and targets will need to be generally agreed and accepted by society as a whole, the initial process of defining CNA and CNC should be open and undertaken by professional ecologists within English Nature and non-government organisations. These objectives and targets should subsequently be developed in consultation with local communities, local authorities and other groups and organisations interested in the environment. Consequently, the objectives and targets so established can then be integrated with objectives and targets derived for other elements of environmental capital.

The use of natural capital concepts to set clear objectives and targets for the natural capital resource will initiate clear statements of what aspects, quantities and qualities of our existing natural capital society wishes to sustain and pass on to future generations. As such these are societal objectives and it should be recognised that it may not be possible to justify targets for the maintenance of the overall worth of the natural capital resource entirely on scientific grounds.

Finally to ensure that the full range of our environmental capital is appropriately valued and maintained there is a need to integrate natural capital definitions with ‘countryside capital definitions’. The uplands of England are some of the most heavily visited parts of the countryside. If access to the countryside, the landscape character and the wildlife resource that visitors come to see are to be maintained then an agreed and joint setting of objectives will be essential.

4.4 Application in the upland environment

The process of defining tradable and inviolable assets in a given Natural Area should be applicable to all parts of England. How the definitions are applied, however, will differ between the uplands and lowlands of England and even from one Natural Area to another.

The character of the upland environment in terms of the extent of the natural capital resource and the factors that influence or control land use will affect how natural capital concepts are applied. The character of the uplands of England is very different to that of the lowlands (see Section 1.4). The uplands support large continuous tracts of semi-natural habitats which have largely been created and are currently maintained by agricultural management, game management, forestry and access and recreation.

To date natural capital concepts have very much been developed in conjunction with the planning system (English Nature, 1992 and 1994). In the uplands, however, the quality, interest and extent of a significant amount of the natural capital is determined by agricultural management, most of which is not controlled by the planning system. Consequently, whilst it will be important to feed the concepts and the definition of natural capital into the planning system, to be effective they should also be used to influence and direct the upland agricultural subsidy systems. This will require close consultation with, and the co-operation of, the farming community, English Nature and the Ministry of Agriculture, Food and Fisheries. Setting natural capital objectives and targets could provide guidance for the targeting of agricultural subsidy and provide yard sticks against which the success of subsidy programs could be monitored.

The maintenance of a sustainable farming system in the English uplands is clearly very important for certain habitats and species. This may involve changes in subsidy structure and, on a more local scale changes in land use, both of which may conflict with natural capital objectives and targets. It is for this reason that close consultation about the 'vision' for the future of natural capital of the English uplands is important and should be an integral part of a strategic approach to maintaining and enhancing the natural capital resource of the uplands.

English Nature should develop the concepts within Natural Areas through its upland strategy with the development of Natural Area and national objectives for habitats and species of importance in the uplands of England. These objectives will need to be used to influence the activities of the many individuals, organisations and government departments that collectively have the ability to sustain the upland environment or, conversely, to degrade it further. English Nature and conservation bodies should produce clear objectives and targets for Natural Areas based on natural capital concepts as part of the strategic approach to achieving more sustainable management of the uplands.

5. SUMMARY OF KEY POINTS

- a) The concepts of Critical Natural Capital and Constant Natural Assets should be used to help in sustaining the overall worth of the natural environment. The concepts can be applied pro-actively through natural capital resource accounting, or reactively in environmental protection and conservation.
- b) Key elements of the natural environment should be deemed inviolable assets and should, except in the most extreme circumstances be protected from exploitation or violation.
- c) The sum total of valued replaceable assets are of equal importance to Critical Natural Capital because they make a significant contribution to the overall quantity and quality of the natural capital resource which must be maintained and where necessary enhanced over time to achieve Environmental Sustainability. Consequently, identification as Constant Natural Assets or Critical Natural Capital should not be interpreted as grading the resource, but as guidance for decision making that ensures the overall worth of natural capital is sustained. Such identification helps to inform about the reason an asset is valued and whether the contribution it makes to the overall natural capital resource can be replaced if lost.
- d) It is recognised that there are parts of the natural capital resource which are replaceable, but not highly valued. These elements may not necessarily need to be replaced if lost. The identification of these “desirable natural assets” will be an extremely value-laden process and will require wide consultation and consensus among the conservation movement and others.
- e) Trading of valued replaceable elements of natural capital can take place between different habitats and species, so long as there is not net loss in the overall worth of the natural capital resource.
- f) Decisions about what can be traded can only be guided by clear setting of objectives and targets for the natural capital resource. These objectives can only be set through comprehensive resource accounting combined with an appreciation of the conservation status of the habitats and species that contribute to the natural capital resource.
- g) It is recognised that for much of the natural capital resource there are assets that are currently below critical thresholds and need to be enhanced. These assets must not be viewed as being of “no value” because they are below critical levels. Rather their poor condition should be seen as an indicator for urgent action.
- h) There should be no conflict between the use of natural capital concepts and existing site designation systems.
- i) There should be broad consultation when setting objectives and targets for natural capital. Societal, value judgements are likely to have as much of a role to play in objective setting as judgements based on our collective scientific understanding of the uplands.
- j) The objectives and targets for natural capital could be used to influence agricultural subsidy structure and planning control, as well as to bring about more sustainable management of the natural capital resource of the English uplands.

Natural Capital Definitions in the Uplands of England

- k) There are many different spatial scales within which the natural capital resource can be considered including geographical regions or national and local government administrative boundaries. To be effective and to ensure the full geographical range of characteristic biological diversity and features of natural capital are considered throughout England, English Nature have stated in their position statement on Sustainable Development (Appendix 1) that natural capital should be defined within Natural Areas.

Summary of considerations for the determination of Critical Natural Capital

The draft table below presents some of the criteria and subsequent considerations of data and other aspects that will be needed in the determination of critical natural capital.

It may be possible to devise a similar table to identify the distinction between valued and non-valued replaceable natural capital to assist in the identification of those assets that must be replaced if lost.

Habitat irreplaceability: technical and financial considerations (taken from Gillespie and Shepherd 1995)

Critical stock levels

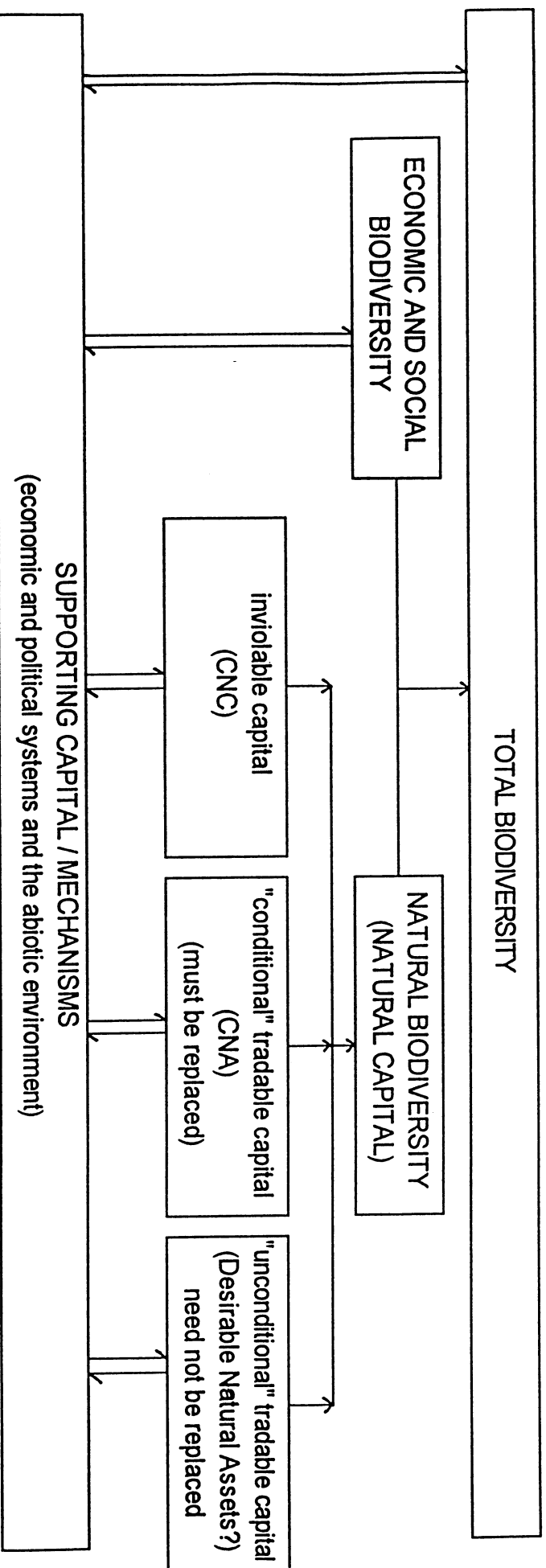
Critical quality levels

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Is there room to replace the lost habitat? • Will the replacement support all the rare, threatened or declining species? • Will the replacement serve the same function as the original in terms of the upland habitat mosaic? • Can the objectives of replacement be achieved within an accepted timescale? | <ul style="list-style-type: none"> • Do population sizes suggest an unfavourable condition? <i>i.e.</i> is the species recognised as being internationally, nationally or locally rare or threatened ? (perhaps use % decline in recent years). • Are habitat stocks in an unfavourable condition, <i>i.e.</i> not sufficient to support the range of species <p>dependant on the habitat; or not sufficient stock to maintain the full representation of the geographical distribution of the habitat?</p> | <ul style="list-style-type: none"> • Is the size of the species population or habitat stock of national or international importance? to an extent this is a societal judgement, based on the information that may be available at any particular time. • Does the habitat make a high contribution to the overall asset quality (<i>e.g.</i> by being of high complexity, long established, etc. <p>Does the habitat support any rare or threatened species?</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

6. APPENDICES AND FIGURES

(overleaf) **Figure 1.** Natural Capital Relationships

Figure 1
Natural Capital Relationships



Total biodiversity is taken to mean all living organisms. Economic and social biodiversity is that part which includes non-native species, cultivars, crops, pets and other species bred or introduced for economic or social reasons. Natural biodiversity (capital) is the sum of the remainder, *i.e.* all of our native natural biodiversity. This is made up of inviolable capital (CNC); CNA which must be replaced if lost; and what has been called "desirable natural asset", meaning those species, habitats, etc of which we would not demand their replacement or conservation if they were threatened. Our supporting capital is made up of those systems which contribute to the maintenance of our biodiversity. In many cases the biodiversity itself acts as a supporting mechanism for other aspects of our biodiversity.

Position statement on sustainable development

What is sustainable development?

As our natural environment has degraded, so the concept of sustainable development has evolved. The most used definition comes from the World Commission on Environment and Development. It is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. The UK government also see it as 'living within our environmental means'. Sustainable development seeks to improve the quality of human life without undermining the quality of our natural environment. It therefore embraces social, economic and environmental issues and recognises that none should be in conflict with the other.

Sustainable development and nature conservation

The natural environment can only support human life, health and well-being if its own resources are healthy and if it can continue to assimilate wastes and support a wealth of native biodiversity – our heritage of natural features, wild plants and animals and their natural communities. Nature conservation policy seeks to safeguard and enrich the UK's native biodiversity for the benefit of people and wildlife. Its success reflects an environment in good health, which in turn indicates progress towards sustainable development. English Nature's policy is to ensure choices are available that meet social and economic needs without undermining the quality of the natural environment.

Putting sustainable development into practice

English Nature is working with its partners to put theory into practice. To focus action, we have adopted the concept of **environmental sustainability**. This means maintaining the environment's natural qualities and characteristics and its capacity to fulfil its full range of functions, including the maintenance of biodiversity. Those aspects of native biodiversity which cannot readily be replaced, such as ancient woodlands, we call **critical natural capital**. Others, which should not be allowed, in total, to fall below minimum levels, but which could be created elsewhere within the same Natural Area, such as other types of woodland, we refer to as **constant natural assets**. A '**Natural Area**' is a geographical unit defined to take account of the distribution of plants and animals, natural coastal characteristics, land use and cultural heritage and used to specify nature conservation objectives and identify programmes to achieve these.

The way forward

To achieve environmental sustainability, environmental considerations must be integrated into all levels of policy formulation, development and land use planning. If we establish environmental limits we can avoid unacceptable environmental impacts. These limits will determine what needs can be met within them and encourage us to find other ways to meet or eliminate those demands which are unsustainable. This does not mean a lower quality of life. It does mean meeting only real needs and realistic wants and not passing unacceptable environmental costs on to future generations.



English Nature's policy is to –

- ☉ Seek to establish limits on human impacts, based on **environmental carrying capacity**.
- ☉ Promote **demand management** so as to keep development within carrying capacity.
- ☉ Seek to establish clear objectives for the next 5, 10 and 20 years which reduce and ultimately eliminate environmentally unsustainable activities. These should be substituted, where necessary, with alternative, **sustainable approaches**.
- ☉ Promote resource pricing which reflects environmental costs and incorporates the '**polluter pays**' principle.
- ☉ Promote **natural resource accounting** which monitors, informs and adjusts the impact of human activity on the environment and makes explicit the full environmental costs and benefits.
- ☉ Promote **strategic environmental assessment** as a means to deliver sustainable development and a framework for strengthened **environmental impact assessment** of projects.
- ☉ Seek **environmental appraisal** of all policies, plans and programmes at international, national, regional and local levels.
- ☉ Promote a **precautionary approach** which minimises risk in the event of uncertainty over potential environmental impacts.
- ☉ Promote **public information** on environmental issues (eg through state of the environment reports, environmental audit and eco-labelling) so as to help people to make choices which favour the environment.
- ☉ Oppose development and land use which adversely and irreversibly affects **critical natural capital** and encourage, in tandem with development, the maintenance and enhancement of natural features to ensure an increasing level of net **natural assets**.
- ☉ Target the maintenance and enhancement of natural assets within the **Natural Areas** framework.
- ☉ Promote the need of everyone to have an improved quality of life through access to the nature conservation resource.

In seeking sustainable development in the UK we must recognise global needs and not export our unsustainable demands. We can give a lead to other countries whose actions can in turn affect our own environment.

The next step

Significant progress towards sustainable development within the next 5 to 10 years is essential if we are to maintain our rich and varied natural heritage and if today's and future generations are to enjoy the quality of life to which we aspire. The White Paper *This Common Inheritance* has confirmed the government's commitment to sustainable development. We welcome the Prime Minister's endorsement of the Rio Declaration and the setting up of the UN Commission on Sustainable Development. We believe that Agenda 21 (the action programme from the Rio Earth Summit of June 1992), and the European Communities 5th Environmental Action Programme *Towards Sustainability* must be fully embraced and reinforced within the UK Strategy for Sustainable Development.

November 1993

ENGLISH
NATURE

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