

# Environmental accounts for nature conservation

A methodology

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**Environmental Accounts for Nature Conservation:  
A Methodology**

Roy Haines-Young  
University of Nottingham

In association with  
Colin Barr, Gavin Stark and Bob Bunce  
Institute of Terrestrial Ecology

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# **Environmental Accounts for Nature Conservation**

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# Executive Summary

## ***Introduction***

i. This study considers English Nature's requirements for environmental accounts that describe the conservation status of habitats, landscapes and species. Such accounts are useful because they describe the stock and change of different types of environmental resources and the processes that affect them. They can help to:

- *Define and present indicators for wildlife, habitats and the wider countryside.*
- *Develop and review policy goals.*
- *Set and monitor management targets.*

ii. The aims set for the Study were as follows:

- *To establish in English Nature's requirements for nature conservation accounts.*
- *To make recommendations on appropriate methodologies for the construction of environmental accounts.*
- *To establish the relationship between the current initiative and work elsewhere.*
- *To establish how habitat accounts can be used to understand the impact of economic activity on the countryside.*

## ***General Requirements***

iii. Our review of potential uses of environmental accounts suggested that their main value to English Nature lay in supporting the tasks of describing the condition of the wider countryside and of communicating this information to the wider policy community. We recommended that:

- *Providing suitable data are available, the development of a hierarchical system of landscape and habitat accounts provides a way of characterising the conservation status of the wider countryside.*
- *The aim of developing such an accounting system should be to assist communication of information between EN and its partners, by providing a framework for reporting indicators describing the state of habitats and the wider countryside.*

- *The accounts should be developed within the context of the Biodiversity Action Plan. This would require the identification of criteria for assessing the conservation status of BAP Broad Habitats and the landscape mosaics in which they occur.*
- *That the extension of environmental accounts to the level of individual species is probably unnecessary, except where species information can be used to indicate the condition of a particular habitat or landscape.*

### **Data Resources**

- iv. Our review of potential data resources suggested that the information that will become available from Countryside Survey 2000 (CS2000) provides a good foundation for the development of nature conservation accounts. Using CS2000 data it will be possible to estimate:
  - *The stock (area) of all BAP Broad Habitats that characterise the wider countryside.*
  - *The change in stock of each Broad Habitat since 1990 and 1984.*
  - *The condition of each Broad Habitat in 1998, from the analysis of its associated vegetation characteristics.*
  - *Change in condition of each Broad Habitat since 1990 and 1978.*
- v. In the long term, however, we suggest that if accounts are developed using CS2000 information, they will have to include other species and habitat inventory data in order to:
  - *Increase the level of thematic detail in the accounts.*
  - *Extend the range criteria used to assess the conservation status of habitats and landscapes.*

The possible future role of other habitat inventories and animal census data, such as that available from BTO, was considered.

### **Building Nature Conservation Accounts**

- vi. We reviewed the concept of generic targets as it is used in the context of site monitoring, and although the criteria used for special sites cannot be applied to the evaluation of BAP Broad Habitats and landscapes, the general approach was found to be useful.
- vii. It was suggested that the descriptions of desired 'directions' or 'trends' in BAP Habitat Statements could be used to define evaluation criteria or ***condition indicators*** that could be used to examine the status of each Broad Habitat.

Landscapes in defined geographical areas could also be assessed using such criteria.

- viii. A number of potential condition indicators were considered. Given the types of data available, the indicators proposed for assessing the status of Broad Habitats were:
- *Changes in stock (area) of each Broad Habitat.*
  - *Types of transfer of land area in and out of a Broad Habitat category.*
  - *The types of landscape pattern exhibited the Broad Habitat.*
  - *The mix of plant species groups occurring in the Broad Habitat.*
  - *The mix of functional strategies found in the plant groups making up the Broad Habitat.*
  - *Mean species richness of each Broad Habitat.*
  - *The relationship between the plant groups associated with each Broad Habitat and gradients of nutrient availability, wetness and shade.*

If change data are available the trajectory of these condition indicators could be compared to the status of the best sites for nature conservation, so that measure of 'distance to target' could be developed. Additional condition indicators based on typical or characteristic species were considered and recommended.

- ix. Our review suggested that the condition indicators proposed could be assessed using information from the following types of environmental account:
- *Stock accounts*
  - *Flow accounts*
  - *Pattern accounts*
  - *Biodiversity accounts*

These four types of account formed the basis of the methodology proposed. Although the methods suggested were intended for the assessment of Broad Habitats and landscapes, the framework was shown to be sufficiently flexible to accommodate more detailed habitat information should this be available.

- x. Using Countryside Survey data it is possible to produce regional disaggregations of each type of environmental account, so that a landscape view can be developed. It was proposed that the conservation status of a landscape could be considered mainly in relation to the condition of the mosaic of Broad Habitats occurring in that area, although additional landscape level criteria could be developed.
- xi. Different regionalisations were considered. It was suggested that one based on a typology of Natural Areas was probably the most appropriate given the nature of the data available from CS2000. It was noted, however, that it will be possible to build stock and pattern accounts for individual Natural Area using

the CS2000 land cover census data derived from the analysis of remotely sensed imagery (Land Cover Map 2000).

- xii. In order to use CS2000 data to build a set of nature conservation accounts that would meet English Nature's requirements, it was concluded that a limited amount of development work is required.

#### ***Relationship to Other Initiatives***

- xiii. We considered the relationship between on-going work within English Nature and other initiatives, particularly CS2000. It was concluded that there was scope for the accounting work within English Nature to contribute to the CS2000 reporting process and to lead on to the construction of a full set of environmental accounts once CS2000 data are published in summary form.
- xiv. For the maximum value to be obtained from any development work undertaken by English Nature, we concluded that it must be carefully co-ordinated with the timetable for reporting the results of CS2000. As a result, the development work would require close liaison with DETR and its partners.
- xv. The relationship between the current interest in environmental accounts by English Nature and the initiative by the Office of National Statistics to build an integrated set of environmental and economic accounts was considered.
- xvi. We recommended that the development of integrated environmental and economic accounts was of a lower priority than the development of accounts for nature conservation. However, it was clear that habitat and landscape accounts provided a framework in which the impact of economic activity on the nature conservation resource could be considered. We argued that such accounts could be used to estimate some of the defensive and remedial expenditures that might be incurred in pursuing biodiversity goals.

#### ***Next Steps - Implementing Nature Conservation Accounts***

- xvii. The study concluded by describing the development work that was needed to build a set of nature conservation accounts using CS2000 data. This work consisted of two elements:
  - *A pilot study was proposed to develop and test the proposed methodology for evaluating the conservation status of Broad Habitats. The outputs from the study would be used to help report the results of CS2000 in November 2000, and as the basis for publishing a more complete set of environmental accounts in 2001.*
  - *A consultation exercise was proposed because we recognised that the process of defining condition or quality indicators for the Broad Habitats may need a formal mandate from the Biodiversity Co-*

*ordinating Group. Thus EN needs to create a process that can engage relevant interest groups in order to develop the concepts. We considered that an important output from the exercise would be the creation of lists of typical or characteristic species for each Broad Habitat. These could be used as additional criteria for assessing their conservation status.*

- xviii. The development work proposed is of strategic importance, because it will allow English Nature to evaluate the accounting concept and to participate actively in the CS20000 reporting process. In the long term we consider that such work will also help English Nature to develop ways of describing and reporting the conservation status of habitats, landscapes and the wider countryside.
- xix. **We recommend that the environmental accounting concept be further explored as part of English Nature's on-going work programme.**



## **Part 1: Introduction**

- 1.1 Environmental accounts can be used to describe the stock and change of different types of environmental resources and the processes that affect them. Their value lies in the fact that by documenting the condition of resources systematically, we may be better able to manage them. Such accounts can be used, for example, to help us define and monitor management targets, and to develop and review policy goals.
- 1.2 In this Scoping Study we have looked at a particular type of environmental account, namely those used to look at nature conservation issues relating to landscapes, habitats and species<sup>1</sup>. The purpose of the work is to consider the methodological issues underlying the development and use of such accounts by English Nature (EN).
- 1.3 The study is timely because a range of new information about the wider countryside is about to become available from Countryside Survey 2000 (CS2000). These data include the results of a detailed sample survey of land cover and vegetation undertaken in the field, and a census of land cover using remotely sensed satellite data. By integrating such data with other information available in EN and other environmental organisations, it may be possible to develop a comprehensive set of habitat and landscape accounts.
- 1.4 The aims set for the Scoping Study were as follows:
  - i. To establish in detail, English Nature's requirements for habitat, species and landscape accounts, and to determine how they can support activities related to the planning, management and policy functions of the organisation.
  - ii. To make recommendations on appropriate methodologies for the construction of habitat, species and landscape accounts, given range of data sources available within EN and the other organisations concerned with land cover and biodiversity issues.
  - iii. To establish the relationship between development of habitat, species and landscape accounts within EN and other initiatives, including those of DETR and ITE involving the construction of land cover accounts from CS2000.
  - iv. To establish how habitat accounts can be used to understand the relationships between habitat and landscape change and different economic activity sectors.
- 1.5 This study began in October 1998 and involved consultation with staff in EN, DETR, other Government Departments, RSPB, BTO and ITE. Our

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<sup>1</sup> The term nature conservation account will be used to refer collectively to accounts drawn up at the landscape, habitat and species levels that help us understand conservation issues at each scale.

recommendations are based on the output from two workshops and written responses to an interim report circulated in January 1999. This document draws together our findings and makes recommendations in relation to the aims set for the study.

- 1.6 The aims set out for the study (para 1.4) provide the framework for this Report. In Part 2 we review EN's requirements for environmental accounts. On the basis of these findings we move on, in Parts 3 and 4, to consider the availability of data and how nature conservation accounts can be constructed. Parts 5 and 6 we examine the relationship of work within EN and other initiatives, such as CS2000 and that of the Office of National Statistics (ONS) on integrated economic and environmental accounts. The report concludes by describing what further work is required before a complete set of nature conservation accounts can be constructed.

## **Part 2: Review of English Nature's Requirements for Nature Conservation Accounts**

### *Scope and purpose of environmental accounts*

- 2.1 As a result of work undertaken by EN prior to the start of this Study, a number of requirements for nature conservation accounts were identified. Although these requirements were set out in general terms in the specification for this Scoping Study, it was apparent that these views need to be considered in the light of recent developments and examined critically.
- 2.2 Environmental accounts can be viewed as an information management tool. While the concept can help us organise data there are, however, no standard approaches. Rather, accounts have to be tailored to deliver data in efficient and appropriate ways. A key issue explored in this study was the purposes for which nature conservation accounts might be required by EN.
- 2.3 The review of the requirements involved discussions with staff in EN and two workshops that took in a wider group of people. The first workshop was held in October 1998 and the second in January 1999. These meetings included staff of EN, DETR and other Government Departments, and RSPB.
- 2.4 Two potential uses could be envisaged:
  - i. *As a management tool within EN*, to document information about landscapes and habitats as an aid the allocating management resources at, for example, the regional or Natural Area level. In this context, accounts would be used to help set priorities between areas, identify suitable management targets and monitor the effectiveness of management initiatives.
  - ii. *As a tool for communication*, to enable EN to disseminate information about the condition of habitats and landscapes to other country agencies, Government Departments, NGOs and the wider public. Such accounts would be more general in character than those required for management purposes; their main aim would be to influence and shape policy debates.
- 2.5 Although the two types of use are not mutually exclusive, consultations suggested that the focus of any initial work by EN should be on the use of environmental accounts as a way of presenting countryside information at general levels. While EN might have some specific management objectives that could be supported by habitat and landscape accounts, the development of a management information system based on the concept would be complex. Moreover, it seemed unlikely that such a system would be possible given the data resources available. These findings form the background to our first recommendation, namely: *that the development and use of environmental*

*accounts for nature conservation should be considered in relation to the tasks of describing the condition of the wider countryside, and of communicating that information to the wider community.*

- 2.6 In order to clarify the scope of this recommendation, a discussion of the particular terms used is helpful.
- 2.7 The term 'wider countryside' is often used to denote those parts of the countryside that are outside the formal network of designated sites and areas. In study we will use also use it this way, but note that in some cases particular data sources make no distinction between the special sites or areas and the matrix in which they are set.
- 2.8 The term 'condition' is used in the same way that it is applied in the UK Biodiversity Action Plan (HMSO, 1994, 1995, 1996) to refer to the status of special sites or species. Consultations suggested that environmental accounts should enable EN and others to make a judgement about the state of the wider countryside in relation to a specific set of conservation criteria. In developing these criteria the goal should be to determine whether or not the state of the wider countryside supports the broad conservation objectives set for the special sites and species<sup>2</sup>. The term 'favourable condition' is used when these 'condition criteria' are met. A major part of this study has focused on exploring what these criteria might be.
- 2.9 In reviewing the accounting approach, consultees suggested that for it to be worthwhile then it must 'make a difference' to the way in which people manage and think about countryside resources. It was suggested that if they could be used as a framework in which an assessment of the 'favourable condition' of the countryside could be made, then the accounting paradigm would potentially have much to offer. **It was also argued that they would be of value if they could be used to underpin the development of a range environmental indicators at national and regional scales.**
- 2.10 Consultations also considered the benefits of the linking the development of environmental accounts by EN to the on-going initiatives by the Office of National Statistics (ONS) to produce integrated environmental economic accounts at national levels (ONS 1998). The aim of making such a linkage would be to better understand the impact of different economic sectors on biodiversity. It was concluded that given the nature of the problem and the level of generality that would be possible, a focus on the wider countryside at national or regional scales was perhaps the best way forward. However, such development could not occur until we had a better understanding of how to use environmental accounts to describe the state of the wider countryside given the data resources currently available.

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<sup>2</sup> The 'Favourable Conservation Status' is used in conjunction with the Habitats and Species Directive to refer to a species or habitat that meets a series of criteria designated to ensure optimal conservation of the species or habitat into the foreseeable future (English Nature 1998).

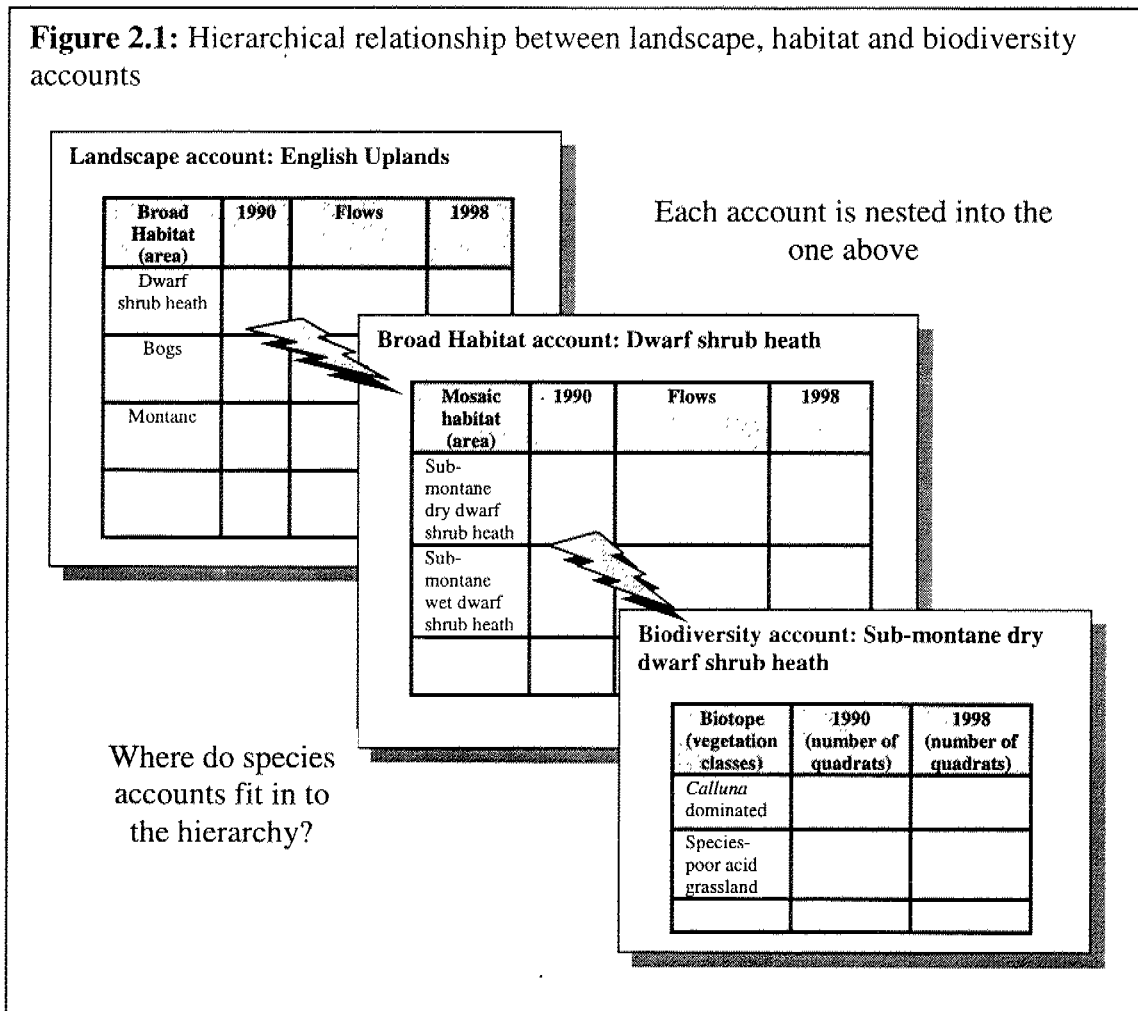
***The general requirements for nature conservation accounts.***

- 2.11 Given the proposition that nature conservation accounts might be used as a way of providing information about the condition of the wider countryside, this study has considered what criteria might be used to make such an assessment.
- 2.12 The importance of the wider countryside for biodiversity was stressed by the *UK Biodiversity Action Plan* (HMSO 1994) which made it clear that:
- It is important to monitor biodiversity in the wider countryside as well as special sites since these areas comprise most of the country and support a great variety of wildlife. (para 9.17)*
- 2.13 The condition of the wider countryside is also important because it may affect the long-term integrity or viability of designated areas, due to trans-boundary impacts. Moreover, it may also facilitate species movement between protected areas, and thus help overcome the effects of isolation and local extinction.
- 2.14 Given the importance on the *Biodiversity Action Plan* in shaping current conservation policy, those consulted emphasised that whatever approach was adopted in the environmental accounts for characterising the wider countryside, it must be consistent with the 'BAP Process'. It was also considered vital that approaches should support and build on the reporting frameworks employed by Countryside Survey 2000 (CS2000) and other national monitoring initiatives.
- 2.15 While the *Biodiversity Action Plan* stresses the importance of monitoring biodiversity in the wider countryside, the document explores the biodiversity issues mainly in relation to individual species and habitats. The document pays very little attention to the way in which the condition of the wider countryside can be monitored, assessed or reported. Although CS2000 has been proposed as one way in which this deficiency might be addressed (Haines-Young and Swanwick, 1999) an accepted approach to the problem of characterising the wider countryside has not yet been developed. Our discussions suggested that the development of habitat and landscape accounts by English Nature might be one way in which such a consensus might be achieved.

***A hierarchical model for nature conservation accounts***

- 2.16 The hierarchical model shown in **Figure 2.1** was used to provide a focus for our consultations. If rural landscapes are thought of as mosaics of different habitats, then it was suggested that we might characterise the wider countryside using some system of habitat classification. Landscape accounts might be used to describe the *combinations* of habitats in different areas or regions, and to highlight ways in which they are changing over time. For each landscape, a set of nested habitat accounts could be used, to describe the stock and change of the individual mosaic elements. The hierarchical model was also used to explore the question of what role species accounts might play in such a system.

**Figure 2.1:** Hierarchical relationship between landscape, habitat and biodiversity accounts



- 2.17 While the ideas of habitat and species accounts are straightforward, the concept of landscape account needs some clarification because of the many different ways in which the term 'landscape' is used.
- 2.18 In this study 'landscape' is used to denote a mosaic of different habitat types within a region of interest. Consultations suggested that the goal of this work should be to explore ways of characterising such landscape mosaics by reference to condition of the individual habitat elements, rather than to identify distinctive landscapes *per se*. The landscape unit should be considered as a 'given', defined by criteria other than those relating to habitats. Thus they might areas that have relevance in a cultural or conservation context (Character Areas, Natural Areas) or regions that have some value in a policy or management context (e.g. target areas for agri-environmental schemes or administrative sub-regions).
- 2.19 Despite its simplicity, the hierarchical model helped to clarify ideas about ENs general requirements for nature conservation accounts. Debate focussed on two general issues, namely:
- The thematic resolution of the habitat classification used to characterise each landscape unit. and,
  - The geographical scale at which landscape accounts should be constructed.

We consider each of these issues below in general terms, unconstrained by issues relating to data availability. The goal at this stage is to set out the broad requirements and format for nature conservation accounts and then move on to a consideration of more practical issues in Parts 3 and 4.

### ***Thematic resolution of accounts***

- 2.20 In relation to questions about thematic resolution for habitat accounts it was concluded that:
- i. Habitat accounts at the level of BAP Broad Habitats might initially be developed as a way of characterising the landscape mosaics that constitute the 'wider countryside'.
  - ii. While BAP Broad Habitats are very general in character they are appropriate given the need to use accounts for as an aid to communication. The classification of Broad Habitats was devised to (a) give a workable number of habitat types that could be used to characterise the whole land surface of the UK; and, (b) be sufficiently simple to be understood and recognisable by a wide range of people (HMSO, 1995).
  - iii. The hierarchical classification of biotopes by the Biodiversity Action Plan into Broad and Key (Priority) Habitats would, however, facilitate the development of nested habitat accounts that provided extra levels of detail, providing data were available.
  - iv. Further work was necessary to devise ways of assessing the condition of BAP Broad Habitats and hence the landscape types in which they occur.

### ***Geographical Scale of Accounts***

- 2.21 In relation to questions about the geographical scale at which accounts might be constructed, it was concluded that:
- i. Although EN's Natural Areas are perhaps obvious targets for the construction of landscape-level accounts, this scale of geographical resolution was probably too detailed for the purposes of developing a general picture of the condition of the wider countryside. Instead a typology of Natural Areas might be used as a framework for the initial phase of development. Investigation of the way in which accounts could be grouped should therefore be considered in detail by this study.
  - ii. Methods should be developed to describe broad trends in the condition of the wider countryside by reference to the stock and change of habitats in the different types of landscapes or regions.

- iii. Landscape accounts could be also developed at the scale of EN's Regions. Although such areas do not constitute landscapes in the conventional sense, information about the stock and change of habitats within the regions might be useful.

### ***Species accounts***

- 2.22 In addition to consideration of landscape and habitat accounts, the specification for this Scoping Study asked us to look at any general requirements for species accounts within EN. Our initial round of consultations examined what role species accounts might have in relation to the hierarchical concept of landscape and habitat accounts described above.
- 2.23 Species data are clearly essential for the definition of the habitat units themselves and for the monitoring of changes within them. However, our consultations suggested that the extension of landscape and habitats accounts down to the level of individual species was probably unnecessary, if the focus of the accounts was on the state of the wider countryside. It was suggested that selected species data were probably best included in any system of accounts by using them as potential indicators of the condition of the habitat units in which they occur or on which they partly or wholly depend.
- 2.24 Previous work on the development of pilot environmental accounts for land cover and biodiversity using CS1990 data (Haines-Young et. al, 1996), has stressed the importance of separating estimates of *quantitative* and *qualitative* measures of landscape change. While quantitative estimates were obtained from the area-based estimates of land cover stock and change, an assessment of qualitative changes could be made by reference to the vegetation data collected from within the surveyed land cover parcels. It is envisaged that such species data will continue to be used in this way.
- 2.25 While it was accepted that species accounts are likely most likely to be used to help assess the condition of the habitats in which they occur, it was recognised that such accounts might well have value in the context of the priority species identified by the *Biodiversity Action Plan*. In the long-term species accounts will need to be developed as part of a full set of accounts.

### ***General requirements for nature conservation accounts***

- 2.26 On the basis of our investigations of EN's general requirements for habitat and landscape accounts we make the following general recommendations:
  - i. ***That, providing suitable data are available, the development of a hierarchical system of landscape and habitat accounts should be considered as a way of characterising the condition of the wider countryside.***



- ii. *That the purpose of the system should be facilitate communication of information between EN and its partners, rather than as a management tool within EN. The accounts should provide a framework in which indicators describing the state of the wider countryside can be developed, maintained and reported.*
- iii. *That the accounts should be developed within the conceptual framework provided by the Biodiversity Action Plan.*
- iv. *Criteria must be developed to assess the condition of Broad Habitats, landscapes.*
- v. *That initially, the extension of environmental accounts to the level of individual species is probably not advisable, except where species information can be used to indicate the condition of a particular habitat or landscape mosaic. In the long term, however, species accounts may be necessary in the context of the Biodiversity Action Plan.*

2.27 These recommendations formed the basis for our investigation of the data issues underlying the construction nature conservation accounts (Part 3) and the review of methodological issues (Part 4).