

# A Nature Conservation Review

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## 1 Introduction

A national strategy for nature conservation was formally prescribed in 1947 with the publication of the Government White Papers Conservation of nature in England and Wales (Cmd 7122) and National Parks and the conservation of nature in Scotland (Cmd 7235). These documents presented the basic philosophy that the practice of nature conservation in Britain should centre around the safeguarding of a fairly large number of key areas adequately representing all major types of natural and semi-natural vegetation, with their characteristic assemblages of plants and animals, and habitat conditions, of climate, topography, rocks and soils, and biotic influences. Geological and physiographic features were to be represented for their own intrinsic interest. Since such areas were intended to be set aside for a range of human uses in posterity, their selection had to be related to the variety of interests involved. In implementing nature conservation strategy, this key area concept has been expressed most significantly in the statutory declaration of a series of National Nature Reserves, which provide the means of safeguarding many important sites, and in the notification of some 3500 Sites of Special Scientific Interest (SSSI). The growth of the voluntary conservation bodies movement has also led to the setting up of many nature reserves without statutory protection.

During the last two decades, human pressures on the land of Britain have caused a rate and scale of attrition of wildlife and habitat even greater than that foreseen in 1947. At the same time, growing interest in the biology and ecology of the natural environment has led to fuller survey and the identification of many more sites of high scientific value and importance to nature conservation. The Nature Conservancy therefore kept progress in the site conservation programme under periodic review, first in 1955, and then in 1965 when a still more comprehensive reappraisal of the situation was launched. This report presents the results of the last review, which has aimed at compiling a countrywide list of sites whose safeguarding is a matter of priority and urgency within the provisions for nature conservation in Britain.

This review has, however, been concerned essentially with biological features, and though these are considered in relation to the background of physical environment, the conservation of physical features other than soils (i.e. geological and physiographic features) has been left for separate, later assessment. Many important physical features are represented within biologically valuable key sites, but their inclusion is only incidental.

The key area concept itself is fairly straightforward, but the actual process of choosing sites and compiling a list to represent an adequate national sample of all major ecosystems' raises some extremely complex and difficult problems, both conceptual and practical. The earlier expositions of nature conservation requirements in Cmd 7122 did not dwell on these problems, but made recommendations intended to be taken as reasonable conclusions, having regard to the declared objectives, and the experience of those concerned with site selection.

It is now felt, however, that the case for safeguarding a national series of sites should explain why these key areas are important to nature conservation, and how the assessment of their quality is made. Considerable thought has therefore been given to the rationale behind the assessment and selection of key areas, and the next chapter spells out this thinking in some detail. This is a difficult field in which value judgements figure prominently and so a good deal of subjectivity of approach is inevitable. The valuation placed upon features of the ecosystem is to a large extent directly related to the fulfilment of some human purpose, be it scientific, educational, aesthetic or economic. There are profound philosophical problems in defining the ultimate purpose of nature conservation, and it is sufficient to say here that generally accepted criteria, relating to the range of human concern, have been defined and used in the evaluation of site features and therefore of overall site quality.

A four-point grading of quality has been devised for areas sufficiently important to be notified on SSSIs. Sites in the top two classes are regarded as of national importance to nature conservation; they exemplify the key area concept, and are termed 'key sites'. Each is described in vol. 2 of this report. Grade 1 sites are those of the highest importance; the safeguarding of these is regarded as essential to the success of nature conservation in Britain. Grade 2 sites are of almost equal importance, but either duplicate the features of related grade 1 sites or are of slightly lesser quality, or both. The conservation of grade 2 sites is a matter of less extreme urgency, but nevertheless requires considerable thought and effort.

The selection of key sites has required a systematic and comprehensive survey of areas of natural and semi-natural ecosystems over as much of Britain as could be covered in the time available. In general, the datum line is 1967, although revision to take account of subsequent developments has been made wherever possible.

## 2 RATIONALE OF THE REVIEW,

### METHODS AND RESULTS

#### A. RATIONALE OF THE REVIEW

##### BASIC CONCEPTS

The key area concept in nature conservation has been admirably spelt out in Cmd 7122 (Ministry of Town and Country Planning, 1947) in a discussion of the main purposes of a series of National Nature Reserves (NNRs). The need to represent in such a series the countrywide diversity in nature conservation interest according to the range of human concern attaching to this is expressed as follows (*ibid.*, para. 50):

*to preserve and maintain as part of the nation's natural heritage places which can be regarded as reservoirs for the main types of community and kinds of wild plants and animals represented in this country, both common and rare, typical and unusual, as well as places which contain physical features of special or outstanding interest. These places must be chosen so far as possible to enable comparisons to be made between primitive or relatively undisturbed communities and the modifications introduced by varying degrees of human interference; typical and atypical physical conditions; distinctive characteristics imposed upon communities and species by differences in geographical position, physiography, climate, geology and soil, both within the main physical regions and in the transitional zones between them; the behaviour of species or communities living within and at the margins of their geographical distribution*

*or their ecological tolerance. The series as a whole should take fair account of the varied requirements and interests of the several different lines of scientific approach: the systematic study of particular groups of species ; studies of communities or species in relation to their environment; of the rise and fall in population numbers; of breeding structures of populations and the way in which inherited variations are distributed; of geographical distribution ; of plant and animal behaviour; of the climatic and microclimatic conditions which so largely govern the distribution of organisms; of soils; of the rocks and the fossils they hold; and of the physical forces which shape the surface of the land; as well as general evolutionary studies. Considered as a single system, the reserves should comprise as large a sample as possible of all the many different groups of living organisms, indigenous or established in this country as part of its natural flora and fauna; and within them the serious student, whatever his bent and whether he be professional or amateur, should be able to find a wealth of material and unfailing interest.*

This lucid statement emphasised the range of scientific value inherent in the features which were to be thus conserved and the exposition went on to elaborate the functions of the sites in providing for research, educational and amenity' use. It was stressed that such sites would usually need careful management if their scientific and nature conservation value was to be maintained, and that this in itself would often require research in depth. An extension of the open-air laboratory' notion was that some sites might have to be acquired specially as research areas, so that experiments of a kind destructive to other interests might be performed. Experimentation was envisaged as including the deliberate re-creation of new or lost habitats. The research was understood to serve the advancement of science, and the giving of advice on land management elsewhere (especially in National Parks). It should also serve as a means to an end in learning how to manage the sites themselves. The living-museum' concept was related more to the educational function and to provide for that considerable section of the public who without any scientific interests can derive great pleasure from the peaceful contemplation of nature'.

The above quotation makes it clear that the key areas were intended to cater for the wants of those with relatively simple interests in wildlife, as well as for the more esoteric needs of the scientist, and the aesthetic element is clearly stated. Within the range of broadly cultural functions, scientific purpose and maintenance of the 'natural heritage' were stressed above all. The conservation of key areas was thus held to be concerned especially with the advancement of knowledge and understanding, both in the individual and in society, and with human fulfilment in a non-material sense.

The present review accepts and endorses this rationale, but is concerned to examine in greater depth how it is translated in practice into criteria to guide the selection of the key sites.

It was emphasised further in Cmd 7122 that It has proved necessary under the conditions now obtaining in this country to concentrate in the first instance on saving places which are still known to possess high scientific value . . . The experience of the last 25 years has reinforced this view. It is now accepted that human impact in Britain is so universal and pervasive that no area of land or water is safe from developments destructive or deleterious to their nature conservation interest, unless deliberate measures are taken to ensure that they remain unmodified. There is, in fact, an even stronger realisation now that, since many sites are both irreplaceable and severely at risk, serious and permanent loss is imminent if adequate safeguards are not taken or maintained.

Present concern in the Review has thus been to identify these irreplaceable sites before it is too late. The overall intention has been to delineate the most valuable and vulnerable part of the national capital of wildlife and habitat, plus an additional element which is adequately representative of other major semi-natural ecosystems. The process of selection presupposes that nature conservation interest is spread throughout Britain, but unevenly and discontinuously in a geographical sense, and variably also in terms of intrinsic quality. Graham (1944) first proposed a classification of land into categories of different quality according to its potential for agriculture, and the zoning of land according to its capability for one purpose or another is now widely accepted in planning. The Nature Conservation Review represents an attempt to identify the highest quality land of Britain in terms of nature conservation interest, but also indicates how the concept of differential quality could be made the basis for a more comprehensive zoning of this interest.

The term 'highest quality' obviously implies that the 'best' examples of the range of ecosystems should, by preference, be chosen for the national series of key sites. Yet the definition of 'best' in terms of specific, measurable qualities is an extremely difficult task, and often involves many-sided value judgements in which standards are essentially relative and not absolute. Moreover, the concepts of 'best' or 'most important' may involve a considerable degree of unusualness, since they connote the acme of quality. There is also some need to represent the typical or ordinary rather than the exceptional. The series of key sites will thus be a mixture of the scarce and unusual and the typical or common examples of ecosystems; moreover, there may be intermediate cases or both types may be represented within the same site.

While criteria for selection of sites must depend to a large extent on evaluation of their intrinsic qualities in relation to the range of human interest, there is an over-riding need to take account of the vulnerability of the features themselves. It is therefore necessary to consider where human impact bears most heavily on wildlife and its habitat; importance attaches especially to species, communities and habitats which have been most heavily reduced by past human influence, to those most likely to disappear if no remedial action is taken, and to those which are least readily replaced once they have been lost or badly damaged. The exceptional sites will thus tend to predominate in the selection, for these are the places whose destruction would cause the greatest loss to nature conservation. The typical sites are by definition usually more widespread than the exceptional, and there is more chance that examples will escape serious modification, or that they can be re-created elsewhere as opportunity allows. Even so, it is important that the national series of key sites contains major reference points within the field of ecological variation, as type examples of significant ecosystems, communities and species aggregations. Where sites chosen for their special attributes do not also contain more ordinary and typical features, it is necessary to choose additional sites, to ensure that the whole series is adequately representative. The notion of a 'representative series' should not, however, be taken too far, for it could lead to the selection of sites which are unimportant in a national context.

The criteria for assessment of quality of an ecosystem must express the range of human concern contained within the whole concept of nature conservation. In other words, values have to be attached to ecosystem features according to their significance to definable human interests. Each criterion is thus a real attribute transformed by a value judgement about function into an abstract quality of dual character. As an example, diversity can be measured as an attribute, and as such has neutral value; but because high diversity usually has

more interest to biologists than low diversity, the actual value measured can be used as an index of quality in this respect. But nature conservation is a complex subject, expressing a range of interests (see p. 3) each with its own scale of values, e.g. what is important to a geneticist may not be important to a field naturalist, and vice versa.

The requirements for the open-air laboratory' will often be different from those for the living museum'. Some criteria involve more subjective concepts of quality than others, and their attributes are less precisely quantifiable. An additional problem in the definition of criteria is that the human interests which they reflect not only cover a wide range of viewpoint, but also may undergo change in the future. Preferably they should therefore acknowledge potential as well as present values. These criteria, and the way in which they are applied, are discussed later.

The choice of key sites involves the comparative assessment of a large number of different examples of ecosystems, to identify those of high enough quality to be accepted for the national series. The process depends on an awareness of the range of variation in British ecosystems, within which certain types' can be identified. This in turn requires that the extensive knowledge of real plant and animal communities in the field be translated into some kind of abstract framework through a classification of data. Only through adequate field survey is it possible to be confident that this ecological framework of reference is reasonably complete, and that all the important sites are considered in making the selection of 'type' examples of natural and semi-natural ecosystems. Sites of similar character, corresponding to a certain type or combination of types, are compared with each other and judged in terms of accepted criteria, so that relative status can be assigned to each. There is a steady process of sifting, to identify the most promising or obviously outstanding sites so that, finally, it is possible to decide that one site in particular is preferred above all others. Often, however, the type which is being considered for representation is so broad and variable that it can only be adequately represented by a series of specific sites. For instance, oakwood is an important semi-natural vegetation type in Britain, but woods with the common feature of oak dominance differ enormously in other ecological features according to differences in climate (on both a local and regional scale), topography, soil and management. It is therefore necessary to choose a series of different oakwood sites which adequately represent this range of variation.

A still more difficult aspect of the selection process concerns the extent and number of the preferred sites. In Cmd 7122 the highest importance was attached to safeguarding examples of major ecosystems as scientific study areas; it was felt that this selection, forming a NNR series, should include important 'museum-piece' examples of types not easily re-created or restored, but that the areas concerned should not be too large, nor the number of sites greater than a judiciously chosen minimum. It was, however, envisaged that important larger areas, e.g. of upland ecosystems, would be adequately safeguarded by other proposed measures which were not, in fact, later adopted. The failure to include in subsequent legislation the National Park Reserves, Scientific Areas and Conservation Areas proposed in Cmd 7122 at once made the original list of proposed NNRs inadequate.

Subsequent developments have involved a growing realisation that, on the one hand, the national strategy for nature conservation must consist of much more than the safeguarding of a hard core of key sites and, on the other, that wildlife and its habitats in Britain are under ever-growing pressure of an order greater than that envisaged a quarter of a century ago. It is therefore natural

and desirable that the purpose of safeguarding key sites should have advanced beyond the idea of a minimum sample of relatively small areas to the notion that the series should be as large as can be allowed by available resources. Cmd 7122, para. 50, itself contains the statement that ' Considered as a single system, the reserves should comprise as large a sample as possible of all the many different groups of living organisms, indigenous or established in this country as part of its natural flora and fauna.' It is probable that ' reserves ' here was intended to mean all categories of area safeguarded for their nature conservation interest, but the general view is clear and supports that just expressed.

The problems and decisions relating to 'as large a sample as possible' of key sites will be discussed in the following amplification of the selection process.

#### THE PROCESSES OF KEY SITE ASSESSMENT AND SELECTION

The objective of the Review has been to select according to established criteria of nature conservation value a series of sites which gives acceptable representation of all the more important features within the range of variation in natural and semi-natural ecosystems in Britain. The process of working towards this goal involves three distinct stages, though the second two are so interwoven that they tend to be thought of as one. These stages are as follows:

##### (1) Recording the intrinsic site features

This is the straightforward though usually laborious identification and recording of the primary scientific data for the site, to describe its range of ecosystem variation in terms of environmental and biological characteristics, which can be used to judge (ii).

##### (ii) Assessing comparative site quality

On the basis of the scientific record obtained in (i), the quality of each site is compared with that of other sites of similar type, so that there is a continual process of selection to identify the 'best' site within a related group.

##### (iii) Choosing the national series of key sites

This involves decision on which, how many and what extent of important sites should constitute the national series, and is the most difficult part of the whole process to rationalise satisfactorily, since it is essentially subjective, even when based on a consensus view.