

Review of UK Biosphere Reserves

Environmental Change Institute
University of Oxford



Report to the Department of the Environment, Transport and the Regions.

The opinions expressed in this report are those of the contractor and do not necessarily coincide with those of those of the Department.

This document was researched during 1997 and published by the UK MAB Committee in 1998 as its Periodic Review of Biosphere reserves in the UK. The information was accurate at the time the document was originally published.

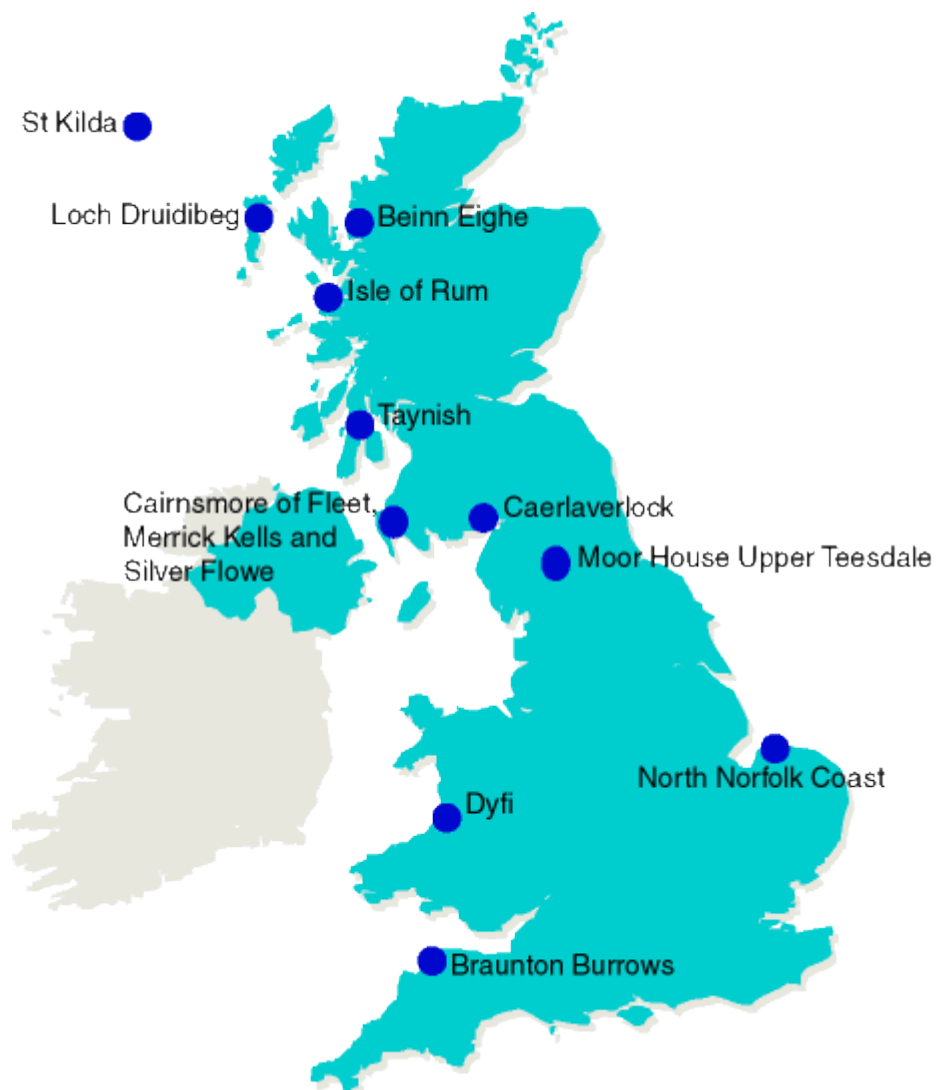
Table of Contents

1. Executive Summary
2. Background and context
 - 2.1. Objectives of the study
 - 2.2. Evolution of the biosphere reserve concept
 - 2.2.1. The 1970s: An emphasis on conservation, science, and education
 - 2.2.2. The 1980s: Strengthening linkages between conservation and development
 - 2.2.3. The 1990s: Finding a balance between conservation and sustainable development
3. History of UK biosphere reserves
4. Comparison of functions and criteria of biosphere reserves with those of UK, European, and global conservation designations and UK schemes
 - 4.1. Core area
 - 4.2. Buffer zone
 - 4.3. Transition area
5. Application of the Seville criteria in the UK; sustainable use and the involvement of local communities
6. Applicability of the biosphere reserve concept to existing UK biosphere reserves
 - 6.1. Braunton Burrows
 - 6.2. North Norfolk Coast
 - 6.3. Moor House / Upper Teesdale
 - 6.4. Dyfi / Cors Fochno
 - 6.5. Caerlaverock
 - 6.6. Cairnsmore of Fleet / Merrick Kells / Silver Flowe
 - 6.7. Taynish
 - 6.8. Rum
 - 6.9. Beinn Eighe
 - 6.10. Loch Druidibeg
7. Biosphere reserves in the UK: sites of excellence for conservation and sustainable development
8. Guidelines for the selection of new UK biosphere reserves
 - Appendix 1: References consulted for individual biosphere reserves
 - Appendix 2: Interviewees at individual biosphere reserves

Map

U.K. Biosphere Reserves:

Braunton Burrows Biosphere Reserve
North Norfolk Coast Biosphere Reserve
Moor House – Upper Teesdale Biosphere Reserve
Dyfi – Cors Fochno SSSI
Caerlaverock Biosphere Reserve
Cairnmore of Fleet, Merrick Kells & Silver Flowe Biosphere Reserve
Taynish Biosphere Reserve
Rum Biosphere Reserve
Beinn Eighe Biosphere Reserve
Loch Druidibeg Biosphere Reserve



Acknowledgements

The preparation of this report has depended on inputs from a very large number of people. The authors would like to thank the members of the steering group for the project, and many others in the departments and agencies they represent, for providing information, documents, advice, and comments on the draft report. As is evident from Appendix 2, evaluations of the existing biosphere reserves were strongly dependent on information from many local people. Their contributions are gratefully acknowledged.

1. Executive Summary

Background and context

Biosphere reserves are areas nominated by national governments and designated under the Man and the Biosphere (MAB) programme of the United Nations Educational, Scientific, and Cultural Organisation (UNESCO). Since 1976, UNESCO has designated 356 members of the World Network of Biosphere Reserves in 90 countries. These include 13 National Nature Reserves (NNRs) in the UK, designated in 1976/77.

As the intended functions of biosphere reserves have evolved considerably since the late 1970s, many biosphere reserves designated then do not match the current criteria well. These criteria are incorporated in "The Statutory Framework of the World Network of Biosphere Reserves" (the Statutory Framework), adopted by the General Assembly of UNESCO in 1995.

Article 9 of the Statutory Framework requires concerned authorities to submit a report on the status of biosphere reserves under their jurisdiction to the MAB Secretariat every ten years. In 1997, UNESCO requested the UK government to submit such a report with respect to all UK biosphere reserves. To date, the UK government has not submitted this report to UNESCO. This delay is regarded as constructive by the International Advisory Committee for Biosphere Reserves, which recognises the need for governments to undertake thorough reviews of biosphere reserves under their jurisdiction.

Objectives of the study

This study considers the application of the criteria defined in the Statutory Framework with respect to the UK. Two main objectives were defined in the terms of reference:

1. to consider the concepts supporting biosphere reserves and provide advice on their relevance and value in the light of other designations across the UK;
2. to determine if there is any real wildlife gain (i.e., benefits to wildlife) to be achieved by adopting the designation in the UK and, if so, under what circumstances.

Following discussion with DETR, the report takes a wider view of the benefits of biosphere reserves as "sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale", as defined in the Statutory Framework.

Evolution of the biosphere reserve concept

Biosphere reserves have three characteristics that, at least in principle, differentiate them from other 'protected areas': they are part of an international network of sites designated by UNESCO, rather than by national governments; their outer boundary is flexible, rather than being legally defined; and the land and water they contain is administered and managed by more than one agency or owner. In fact, only the first of these characteristics defines all biosphere reserves. According to the criteria in the Statutory Framework, they should have three zones: a legally constituted **core area(s)** devoted to long-term protection, according to the conservation objectives of the

biosphere reserve, and of sufficient size to meet these objectives; a **buffer zone(s)** clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place; and an outer **transition area** where sustainable resource management practices are promoted and developed.

This scheme has evolved over three decades, reflecting both experiences of practical application and wider trends in the fields of conservation and resource management, particularly the evolution of the concept of sustainable development and the growing recognition of the need to involve local people in the management of protected areas. The emphasis of the biosphere reserve concept has shifted from the promotion of conservation, science, and education to the notion of "sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale" within a global network providing unique opportunities for exchanges of experience and collaborative research.

History of UK biosphere reserves

Candidate UK biosphere reserves were selected at the same time that the Nature Conservancy Council (NCC) was undertaking its Nature Conservation Review. This identified representative habitats, of which NNRs were the 'best' representatives. Thus, although the UK includes only three of the biotic provinces then in UNESCO's typology for site selection, 15 NNRs were nominated. Other criteria used to select candidate NNRs were direct or cooperative management by NCC; and potential for long-term monitoring.

In the late 1970s and 1980s, UK biosphere reserve managers were aware of the biosphere reserve concept, but had many priorities that often conflicted with its implementation. In 1985, NCC concluded that these sites could only produce expected benefits if they were extended, and that close cooperation with stakeholders would be needed. In 1990, a working group reported to the UK MAB Committee that: none of the existing reserves met UNESCO's current criteria, though all but one could do so; the sites did not adequately represent UK ecosystems; the challenge of developing strategies for integrating the core area with surrounding land would lie with organisations other than NCC; implementation of such strategies could not rely on NCC funds.

In the 1990s, little has changed, although extension of the concept to urban and peri-urban areas has been explored by the Urban Forum of the UK MAB Committee.

Comparison of functions and criteria of biosphere reserves with those of UK, European, and global designations

Biosphere reserves are areas with multiple functions, designated by UNESCO. Comparably, statutorily-designated areas with multiple functions exist in the UK. These include National Parks and Areas of Outstanding Natural Beauty (AONB), which typically include diverse land management practices and many sites of importance for conservation, protected under international agreements and/or nationally. Differences between a biosphere reserve and such large-scale UK designations include the flexible outer boundary; the need for zoning and the definition of types of activities in each zone; and provisions for research, monitoring, education, and training. For UNESCO to recognise an area as a biosphere reserve, a number of

criteria should be fulfilled, both for the area as a whole and with regard to the three zones.

UK and European Union designations which fulfil the criteria for **core areas** include Sites/Areas of Special Scientific Interest (SSSI/ASSI), NNRs, Area of Special Protection (ASP), Marine Nature Reserve (MNR), Special Area of Conservation (SAC), and Special Protection Area (SPA). All of these designations also fulfil the criteria for **buffer zones**, together with a wide range of non-statutory designations and schemes which apply to clearly-identified areas, with statements of permitted or appropriate activities. The only criterion for a **transition area** is that sustainable resource management practices should be promoted and developed. This objective is consonant with policies for many non-statutory designations and schemes, including National Parks, AONBs, and Estuary and Firths Fora.

Application of the Seville criteria in the UK: sustainable development and the involvement of local communities

The linkages between sustainable development and biodiversity conservation espoused by the biosphere reserve concept are consonant with many UK government policies. The need for partnerships, involving local communities and authorities and many other stakeholders, to deliver such joint benefits is widely recognised in the UK, and there are an increasing number of examples. The successful implementation of a biosphere reserve with a full complement of zones requires 1) a high level of coordination between stakeholders in the planning and implementation of economic and conservation-related activities and 2) the commitment of substantial resources from multiple sources. The necessary levels of commitment have been achieved for biosphere reserves in other countries, and existing partnership approaches in the UK may provide useful models.

Applicability of the biosphere reserve concept to existing UK biosphere reserves

All of the UK biosphere reserves meet the Statutory Framework criteria to some extent. However, none meets them fully, so that if any are to continue as members of the World Network of Biosphere Reserves, consideration will need to be given to their boundaries and management. For two sites – Claish Moss and St. Kilda – due to the absence of a local community, there appears to be no possibility of restructuring to meet the Statutory Framework criteria. These sites could be recommended for de-designation as biosphere reserves without further consideration.

Based on site visits, a summary of the current situation at the other biosphere reserves is presented, under the following categories: designations and schemes; land uses, research and education; conservation value and management; local involvement; issues to be resolved if the biosphere reserve were to be restructured. It is concluded that conservation objectives are largely met. However, while there are many examples of the promotion and development of sustainable resource management practices, often linked to conservation needs, around and near existing UK biosphere reserves, these practices have not been implemented in the context of a biosphere reserve policy relating to a broader region with one or more buffer zones and a transition area.

Biosphere reserves in the UK: sites of excellence for conservation and sustainable development

Since the core area – and often part or all of the buffer zone(s) – of any UK biosphere reserve must be statutorily protected, additional designation by UNESCO appears unlikely to result in additional direct ‘wildlife gain’. However, indirect benefit may derive from this international accolade, as it may encourage stakeholders to give greater consideration to their actions and their consequences. The regional approach of biosphere reserves also reflects landscape-scale approaches to conservation found in conservation policies at global to local levels, and should contribute to the delivery of Biodiversity Action Plan objectives.

Membership in the World Network of Biosphere Reserves also brings benefits for scientific research and management through exchange with others working in the Network. Exchanges and joint actions, as well as the international accolade, may also be valuable for local communities in the context of sustainable development.

Guidelines for the selection of new UK biosphere reserves

The UK government has a number of options with regard to the future of UK biosphere reserves, and may wish to implement a consultation process in this regard. A set of guidelines is provided for the government, should there be a wish to maintain biosphere reserves based on existing sites, or to identify potential new biosphere reserves in consultation with local and other stakeholders. These guidelines address: biogeographic representativeness; spatial extent; significance for biological diversity conservation; broad support from local stakeholders and statutory agencies; and financial resources.

2. Background and Context

Biosphere reserves are areas nominated by national governments and designated under the Man and the Biosphere (MAB) programme of the United Nations Educational, Scientific, and Cultural Organisation (UNESCO). Since the development of World Network of Biosphere Reserves began in 1976, UNESCO has designated 356 sites in 90 countries. A total of 13 of these are in the UK. These sites were designated in 1976 and 1977, almost entirely on existing National Nature Reserves; all have other national, European, or international conservation designations.

Since the late 1970s, the intended functions of biosphere reserves have evolved considerably, with an increasing focus on sustainable development, as well as conservation, research, training, and education; and it is recognised that many biosphere reserves designated at this time do not match the current criteria particularly well. These criteria were defined at the International Conference on Biosphere Reserves, held in Seville, Spain, in March 1995, and incorporated in "The Statutory Framework of the World Network of Biosphere Reserves" (the Statutory Framework). This document was adopted by the General Assembly of UNESCO in November 1995.

Article 9 of the Statutory Framework requires concerned authorities (i.e., governments) to submit a report on the status of biosphere reserves under their jurisdiction to the MAB Secretariat every ten years. In 1997, UNESCO requested the UK government to submit such a report with respect to all UK biosphere reserves. To date, the UK government has not submitted this report to UNESCO. However, the Department of Environment, Transport, and the Regions (DETR) has asked the conservation agencies for their advice on the appropriateness of existing UK biosphere reserves. The UK is one of many countries which has not yet submitted a report to UNESCO; this delay is regarded as constructive by the International Advisory Committee for Biosphere Reserves, which recognises the need for governments to undertake thorough reviews of biosphere reserves under their jurisdiction.

2.1. Objectives of the study

The principal aim of this study is to consider the application of the criteria defined in the Statutory Framework with respect to the UK, with two main objectives defined in the terms of reference:

1. to consider the concepts supporting biosphere reserves and provide advice on their relevance and value in the light of other designations across the UK;
2. to determine if there is any real wildlife gain (i.e., benefits to wildlife) to be achieved by adopting the designation in the UK and, if so, under what circumstances.

At a meeting to review progress on the project, the inter-agency Steering Group for the project concluded that the second objective was too narrow, and that the report should therefore take a wider view of the benefits of biosphere reserves as "sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale", as defined in the Statutory Framework. DETR agreed to this proposal.

2.2. Evolution of the Biosphere Reserve Concept

The 356 sites in the World Network of Biosphere Reserves form a unique international network which is now the primary focus of UNESCO's MAB programme, which began in 1971. Biosphere reserves have three characteristics that, at least in principle, differentiate them from other 'protected areas':

- they are part of an international network of sites designated by UNESCO, rather than by national governments;
- their outer boundary is flexible, rather than being legally defined;
- the land and water they contain is administered and managed by more than one agency or owner.

In fact, only the first of these characteristics defines all biosphere reserves. It is now well-recognised that biosphere reserves are not 'protected areas' which fit into the six-fold system of categories developed by IUCN-The World Conservation Union; while the core and buffer zones often fit within these categories, the reserve as a whole – and usually the outer transition area, if it exists – cannot be so neatly categorised. Similarly, the Statutory Framework specifically avoids this terminology, recognising that the outer zone is not necessarily legally protected, and that the flexible outer boundary means (at least in theory) that a biosphere reserve's specific geographic extent should not be precisely defined.

As the biosphere reserve concept has evolved, there has been an increasing emphasis on the expectation that local people should be involved in planning and managing activities in and around biosphere reserves. The latest formal statement of the concept is to be found in the Seville Strategy, formulated by the participants at the International Conference on Biosphere Reserves, held in Seville, Spain, in March 1995, and adopted by the General Assembly of UNESCO in November 1995. Thus, as discussed below, the emphasis of the concept has shifted over nearly three decades from the promotion of conservation, science, and education to the recognition that biosphere reserves should be used to explore and demonstrate approaches to regional conservation and sustainable development; and that the global network provides unique opportunities for exchanges of experience and collaborative research.

2.2.1. The 1970s: An emphasis on conservation, science, and education

The biosphere reserve concept was first proposed as part of the plan for the MAB programme, submitted to the General Conference in UNESCO in 1970. Quite soon after the MAB programme began in 1971, this concept was formalised at two meetings. The first was the 1973 meeting of the Expert Panel on Project Area (theme) 8 of the programme, on 'Conservation of natural areas and of the genetic material they contain'. The inclusion of biosphere reserves within this theme led to a concentration on scientific topics that would now be referred to as 'biodiversity'. However, the International Coordinating Council (ICC) of the MAB programme recognised that, in keeping with the objectives of the programme, greater emphasis should be given to the human uses of the reserves. To this end, UNESCO, in collaboration with IUCN, the United Nations Environment Programme (UNEP), and the Food and Agriculture Organization of the United Nations (FAO), organised a Task Force on 'Criteria and guidelines for the choice and establishment of biosphere reserves.'

The Task Force recognised three primary objectives of biosphere reserves:

- to conserve the diversity and integrity of biotic communities of plants and animals within natural and semi-natural ecosystems, including those maintained under long-established land use; and to safeguard the genetic diversity of species.
- to provide areas for ecological and environmental research.
- to provide facilities for education and training.

The Task Force also suggested various zonations for biosphere reserves, from which two general models subsequently developed. The first included a strictly protected core zone and two 'buffer' zones: "administrative units subject to change as needs arise." The inner buffer was for research and education, with limited public access; while the outer one, with a flexible outer boundary, could be "used for various purposes, including public recreation... controlled according to the carrying capacity of the area". The second model recognised that, in some cases, the optimal approach might be to establish multiple core areas surrounded by buffer zones.

Between 1976 and 1981, 208 biosphere reserves were designated in 58 countries; including 13 in the UK. Yet, "the conservation role had been kept prominent, and the logistic and development roles largely forgotten." Most reserves had been superimposed on existing protected or research areas, and the idea of formal buffer zones involving other administrative entities had rarely been implemented.

2.2.2. The 1980s: Strengthening linkages between conservation and development

In the early 1980s, global conservation was greatly influenced by the 'World Conservation Strategy', which stressed the need to strengthen links between conservation and development. This trend, as well as the evident problems in applying the evolving – and sometimes apparently contradictory – biosphere reserve concept, was recognised at the First International Biosphere Reserve Congress held in Minsk, then in the Belarussian Republic of the USSR, in 1981. In his keynote address, Michel Batisse recognised that "One innovation of the biosphere reserve is ... the attempt to link conservation with human development." Other papers at this conference, as well as the earlier tenth anniversary symposium of the MAB programme, stressed the importance of involving local people in the development of regional perspectives centred on the protected cores of biosphere reserves; and two sessions in Minsk were devoted to these topics. McNeely proposed an even wider vision, calling for biosphere reserves "to be expanded in size and for greater efforts to be made to support alternative lifestyles in biosphere reserve areas established for the primary objective of developing sustainable human ecosystems for (the) post-petroleum age." Many of these new ideas were included in an action plan for biosphere reserves whose development began at Minsk.

In 1984, the MAB ICC approved the 'Action Plan for Biosphere Reserves', which set nine objectives and included the statement "People should be considered part of a biosphere reserve". The ICC also established a Scientific Advisory Panel on Biosphere Reserves. The Panel's report, published and approved by the ICC in 1986, recognised the importance of considering local people and their socio-economic development in defining and managing biosphere reserves: "a primary concern of the biosphere reserve is conservation... however,... the conservation function ... should be viewed in a more

anthropic manner, where biosphere reserves should be demonstration sites of harmonious, long-lasting relationships between man and the natural environment". Thus, the objectives of biosphere reserves were redefined into three 'concerns' to be combined and harmonised:

- conservation: "Biosphere reserves should help to strengthen the conservation of biological diversity, genetic resources and ecosystems";
- logistic (international research and monitoring): "Together, biosphere reserves should constitute a well identified international network of areas for research and monitoring directly related to MAB field activities, making the accompanying training and information exchange";
- development: "Biosphere reserves should associate environment and land and water resources development in their research, education and demonstration activities."

The other major conceptual advance made by the Panel was to redefine the outer buffer zone as a 'transition area' or 'zone of cooperation' "which is perhaps best defined by the extent of cooperation between the landowners and users of the area and the manager of the protected area.... (It) is not strictly delineated and corresponds more to biogeographic than to administrative limits" The Panel foresaw that information deriving from experiments, research, and land management practices within the (formerly inner, now only) buffer zone should be applied in the transition area, thus expanding the sphere of influence of the biosphere reserve; and, equally, that a wide range of cooperative activities should be developed between "researchers, managers, and the local population, with a view to ensuring appropriate planning and sustainable resource development in the region while maintaining the greatest possible harmony with the purposes of the biosphere reserve".

2.2.3. The 1990s: Finding a balance between conservation and sustainable development

In 1992, two major global meetings of particular concern for biosphere reserves took place. The first of these was the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil. This included the final negotiation of 'Agenda 21', a plan for action into the 21st century, and its endorsement by the heads of state or government of most of the world's nations. The second was the 4th World Congress of National Parks and Protected Areas, held in Caracas, Venezuela. At both of these meetings, numerous presentations and statements underlined the interdependence between environmental and development issues, and the need for clear linkages between policy frameworks for socio-economic and environmental domains, often noting that protected areas had vital roles to play in developing these linkages.

Also in 1992, the ICC established a new Advisory Committee on Biosphere Reserves. A particular stimulus was the growing recognition that many biosphere reserves did not, and appeared unlikely to, fulfil the 'concerns' defined in 1986. As long as a significant proportion of biosphere reserves were merely 'protected areas' with an extra label, with neither transition area nor involvement of local people, the strength of both the World Network and the concept on which it was based were severely weakened. This led to some delicate political issues: notably, how to ensure that biosphere reserves included all three zones and that the activities taking place within these zones corresponded to those defined in 1986. This was a particularly difficult problem with respect to reserves which had been designated before 1984, when conservation and

ecological and environmental research in biogeographically-representative areas were the dominant themes.

At the 1993 meeting of the ICC, the Advisory Committee recommended that each reserve should be reviewed regularly in order to decide whether it should be 're-certified,' based on assessment of the effectiveness of the concept's implementation. While the ICC did not adopt this proposal, the General Conference of UNESCO, meeting later that year, recognised its value and therefore requested the 1995 International Conference on Biosphere Reserves to examine the 1984 Action Plan and to analyse and comment on draft statutes for the World Network.

As a result of the first request, the IUCN evaluated the implementation of the 1984 Action Plan. It found that "approximately fifty percent of biosphere reserves consist of a national park with an additional buffer or transition zone the majority of biosphere reserves are managed by people trained in the biological sciences who may be more adept at working on ecological, rather than socio-economic, issues. This, too, has led to the under-representation of the social sciences and development function within biosphere reserves". Furthermore, while actions on the objectives relating to the early concept of biosphere reserves – *in situ* conservation, research, and monitoring – were generally assessed as quite successful, actions within the objectives most relevant for the current vision of biosphere reserves – (multi-purpose) management, regional planning, local participation, environmental education and training, and information dissemination – had only been partially achieved, if at all.

The evaluation also noted that "There is a critical gap ... as to what are the unique management challenges of biosphere reserves"; "Local participation is a crucial component of biosphere reserves that has never received the attention it merited It is not enough to allow local communities to participate in biosphere reserve management; they must also benefit from it"; "Training in biosphere reserves develops a new skill base for those working in and around the biosphere reserve. It also has unique opportunities as the World Network allows for cross-training and communication for people working in similar conditions or facing similar problems (Yet) training to date has focused primarily on enhancing the expertise of biosphere reserve managers or staff". In summary, the evolution of the concept had rarely been followed by the development of new approaches to planning, management, or other activities 'on the ground' in biosphere reserves; nor had the potential of a global network been realised to any great extent.

These findings provided the background to the preparation of draft statutes for the World Network of Biosphere Reserves and to the International Conference on Biosphere Reserves in Seville, in March 1995. One of the products of the conference was an almost final draft of a statutory framework, which was further discussed and finalised at the meeting of the ICC in June 1995 and then forwarded to the General Conference of UNESCO in November 1995, where it was adopted. Various parts of this documents are referred to in considerable detail in following chapters of this report. The General Conference also adopted a longer document entitled "The Seville Strategy". The initial version of this strategy was prepared before the conference, in order to provide the framework for recommendations deriving from panels on the following sets of themes: conservation, sustainable use, and management; research, monitoring, and networking; and implementation of the biosphere reserve concept.

By the end of the conference in Seville, the 'traditional' roles of research and monitoring were mentioned in only one of the ten 'key directions' in the preamble to the final version of the Strategy, entitled 'The Vision from Seville for the 21st Century'. In common with the reports of the panels, this places a strong emphasis on the importance of biosphere reserves for sustainable development, as well as conservation. It notes that "the global community needs working examples that encapsulate the ideas of UNCED for promoting both conservation and sustainable development ... express[ing] all the social, cultural, spiritual and economic needs of society and ... based on sound science", and proposes that "Biosphere reserves offer such examples. Rather than forming islands in a world increasingly affected by severe human impacts, they can become theatres for reconciling people and nature, they can bring knowledge of the past to the needs of the future, they can demonstrate how to overcome the sectoral nature of our institutions".

3. History of UK Biosphere Reserves

Full archival material relating to the history of UK biosphere reserves is unavailable. Two unpublished studies have presented this history, and other papers have also specifically addressed various aspects of UK biosphere reserves. This chapter summarises these studies and relevant parts of these papers, supplemented by information from those directly involved in the designation process.

In 1974, UNESCO asked the UK government to nominate potential biosphere reserves. Thus, in December 1974, the International Branch of the Headquarters of the Nature Conservancy Council (NCC) sent a circular memorandum to all Regional Officers requesting nominations. Potential sites had to have adequate degree of both scientific interest and protection. In terms of scientific interest, the advice was that such sites needed to warrant a higher status than SSSI, i.e., NNR – the current top tier of designation. However, UNESCO's current criteria for selecting biosphere reserves were not made available to the staff involved in the selection process. This appears to be one reason for the large number of sites in the UK, which includes only three of the biotic provinces according to the classification which UNESCO used in the 1970s as a framework for site selection. In the mid-1970s, the NCC was undertaking its Nature Conservation Review, based on representative habitats and unrelated to any global system of biogeographical provinces. National Nature Reserves are the 'best' representatives of particular habitats. Thus, potential biosphere reserves were chosen at least as much according to local criteria as those proposed by UNESCO.

After the Regional Officers had proposed sites, the NCC compiled a preliminary list, based on the Grade 1 and 2 sites of the Nature Conservation Review. Sites where protection could not be assured were deleted; these included many based on a limited-period Nature Reserve Agreement with a private landowner. Most of the sites on the final list were owned and managed by the NCC or owned by another government department or agency and managed by the NCC. Other sites in mixed or private ownership with a history of successful co-operative management were also proposed, including three (Braunton Burrows, Caerlaverock, Upper Teesdale) whose NNR status was based on NRAs of limited duration. A primary consideration was the potential for long-term monitoring, so that sites with established field research facilities were particularly favoured (e.g., Beinn Eighe, Moor House, Rum). In 1976, the Chief Scientist of the NCC nominated 13 sites to UNESCO, which designated 11 sites (not including the two from Northern Ireland). Claish Moss and Tainish were nominated and designated in 1977.

In May 1977, following designation by UNESCO, a meeting of all Regional Officers concerned with biosphere reserves took place. The meeting discussed a paper which noted the needs for management planning, protecting the reserves from external influences, creating adequate management systems, establishing monitoring, undertaking research, and participating in international cooperation. The possibility of extending the reserves to include a buffer zone was also noted.

In the early 1980s, the managers of the UK biosphere reserves were recognisably part of a global network through which considerable amounts of information were disseminated by UNESCO. Consequently, these individuals came to have a good understanding of the concept of biosphere reserves. However, this was also a period of significant workload for NCC staff, particularly as a consequence of the EC Wild Birds

Directive and the 1981 Wildlife and Countryside Act. The latter required re-notification of all existing SSSIs and NNRs, a rather time-consuming exercise. At the same time, reserve managers were producing management plans for their sites, a complex task involving a large number of people. In 1985, NCC staff prepared a paper which concluded that UK biosphere reserves could produce benefits that would not come from existing designations, but that their extent would have to be increased, and close cooperation between a wide variety of stakeholders would be needed.

In the same year, the UK withdrew from UNESCO. This did not affect the existence of UK biosphere reserves, but undoubtedly gave them a lower significance in terms of UK conservation policy. The withdrawal also led to the temporary suspension of meetings of the UK MAB Committee (1984-87) and weakened links with the MAB Secretariat at UNESCO. For instance, a request for information on management practices in biosphere reserves, sent out from UNESCO in early 1986 with a return date of 31 July, was not received at NCC Headquarters until January 1987. This request stimulated the International Branch of the NCC to begin an initial appraisal of the UK reserves and how they might progress towards the terms of the 1984 Action Plan.

In 1989, at the request of the UK MAB Committee, a working group on biosphere reserves was established, including representatives from the Department of the Environment (DoE), the UK MAB Committee, and the Institute of Terrestrial Ecology (ITE). By this time, only seven UK biosphere reserves had formally approved management plans; and only three of these plans mentioned that these sites were biosphere reserves. The working group's comprehensive report was completed in 1990. The first volume reviews the original and revised criteria for biosphere reserves. Its conclusions include the following:

- none of the existing reserves met the current criteria, though all but one (Claish Moss) had potential for doing so;
- the sites did not provide an adequate representation of UK ecosystems;
- the challenge of developing strategies for integrating the core with surrounding land would lie with organisations other than the NCC;
- implementation of such strategies could not rely on NCC funds.

The report also makes 53 detailed recommendations with regard to research, monitoring, education, and local participation. The second volume provides detailed data sheets and bibliographies for all of the reserves except for Claish Moss, with recommendations about implementing the zoning concept using existing designations and planning mechanisms.

In December 1990, a seminar for biosphere reserve managers was held in Lockerbie. Speakers came from UNESCO and NCC. The discussion mainly focused on the recent report and its implementation. The draft report advocated a new approach to biosphere reserve management, and clearly stated the need for additional resources from statutory and other organisations in addition to normal NNR funding. In October 1991, representatives from a number of government departments met in Bristol, at the invitation of the UK MAB Committee and the DoE to hear a presentation on biosphere reserves. Participants in the meeting expressed support for the biosphere reserve concept, but recognised that additional resources would be needed. To date, these have not been provided. During the 1990s, site managers of NNRs which are also biosphere reserves have generally only recognised this status when they have received correspondence and questionnaires from UNESCO and university researchers.

Although three meetings of coordinators and managers of EuroMAB biosphere reserves have been held, only two UK site managers have attended one of these.

In recent years, a major emphasis of MAB activities in the UK has been the exploration of the possibility of extending the concept of biosphere reserves to urban and peri-urban areas. This has been done through the Urban Forum of the UK MAB Committee, which has a diverse membership from all parts of the UK, and is partially funded by English Nature. As mentioned above, the Seville Strategy for biosphere reserves recognises that urban areas can be part of the transition area – which is the case for a number of biosphere reserves, though not for any of the existing UK sites. The Urban Forum has proposed that biosphere reserves could focus on cities, with the core area(s) in cities, surrounded by the other zones. Similar concepts have been proposed by scientists working with MAB programmes in other countries, and the International Advisory Committee on Biosphere Reserves has proposed that a committee should be set up to consider such proposals.

4. Comparison of functions and criteria of Biosphere Reserves with those of UK, European, and global Conservation designations and UK schemes

Biosphere reserves are areas with multiple functions, designated by UNESCO. Comparably, statutorily-designated areas with multiple functions exist in the UK. These include National Parks and Areas of Outstanding Natural Beauty (AONB) which, although designated and managed for different sets of objectives from biosphere reserves, encompass a large region which typically includes a range of land management practices and a number of sites of importance for conservation. These may be of various sizes, protected under international agreements as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites; or nationally as Sites of Special Scientific Interest (SSSIs) or National Nature Reserves (NNRs); or both internationally and nationally. Such designations commonly overlap; for instance every SAC and candidate SAC (cSAC) is an SSSI, and many are also NNRs. However, there are certain differences between a biosphere reserve and existing large-scale UK conservation designations, particularly the flexible outer boundary; the need for zoning and the definition of the types of activities taking place in each zone; and provisions for research, monitoring, education, and training. In addition, various UK schemes and land and/or water designations encourage sustainable development practices, as expected in the transition area of a biosphere reserve. However, there is considerable variation in the extent to which the objectives of such schemes and designations are linked to the conservation objectives for the areas to which they apply.

For an area to be suitable for designation by UNESCO as a biosphere reserve, a number of criteria should be fulfilled, both for the area as a whole (whose outer boundaries need not be defined) and with regard to the three zones. This chapter and chapter 5 address the issue of how these criteria compare to the characteristics and objectives of existing conservation designations and relevant schemes for conservation and sustainable development in the UK. Table 1 provides a summary of this comparison, and should be consulted with reference to the text in this chapter.

4.1. Core area

According to Article 4, section 5(a) of the Statutory Framework, the core area(s) of a biosphere reserve should have the following characteristics:

- legally-constituted;
- devoted to long-term protection, according to conservation objectives;
- of sufficient size to meet these objectives.

The requirement of being "legally constituted" generally means that the core area of any UK biosphere reserve should be statutorily designated at least as an SSSI or, in Northern Ireland, the comparable Area of Special Scientific Interest (ASSI). Given the fact that most

SSSIs/ASSIs of "significant importance for biological diversity conservation" are further protected through another statutory designation under UK legislation (NNR;

Area of Special Protection, ASP; Marine Nature Reserve, MNR) which places further constraints on activities which may be practised, it would seem appropriate that the core area of any UK biosphere reserve should be designated under one of these categories. Similarly, given this criterion, it would appear likely that core areas would often also be designated as Natura 2000 sites (SAC or SPA).

Taking an alternative argument, Local Nature Reserves (Local Authority Nature Reserves in Northern Ireland) may also be considered as legally constituted, though by local planning authorities rather than country agencies. While it would seem unlikely that such a site suitable for designation as the core area of a biosphere reserve would not be an SSSI/ASSI, the possibility could be considered. However, it does not appear desirable. Nevertheless, comparable situations occur in other countries.

While all sites designated as SSSI/ASSI, ASP, MNR, and/or NNR are devoted to long-term protection, the objectives of designation defined in legislation and management plans differ between categories and sites. Nevertheless, the legal obligations of owners and occupiers of SSSIs/ASSIs with regard to notified operations are well-defined and further supported by the options of Nature Conservation Orders and Compulsory Purchase Orders. All ASPs, MNRs, NNRs, SACs, and SPAs have more stringent management objectives. The objectives of all of these designations should be appropriate to meet the criterion in the Statutory Framework.

The criterion of "sufficient size" will vary from site to site, depending on the habitats to be protected, the range of critical species, land management activities in the surrounding area, etc. However, these issues are considered in the process of designating any SSSI/ASSI – and even more so, any ASP, MNR, NNR, SAC, or SPA – so that any site designated as such should be suitable as the core area of a biosphere reserve.

4.2. Buffer zone

According to Article 4, section 5(b) of the Statutory Framework, the buffer zone(s) of a biosphere reserve should have the following characteristics:

- clearly identified;
- surrounding or contiguous to the core area or areas;
- only activities compatible with the conservation objectives can take place.

In addition, according to section 7(a), provision should be made for:

- mechanisms to manage human use and activities.

Land and water designated under all of the categories suitable for a core area should be suitable as buffer zones, on the same grounds as presented in the previous paragraphs. In addition, a number of non-statutory designations would appear to be suitable. These designations include:

- Forest Nature Reserves (Forestry Commission);
- Forest Parks (Forest Enterprise);

- Heritage Coasts in England and Wales, which are defined by the Countryside Commission (or Countryside Council for Wales) in consultation with local authorities;
- Local Nature Reserves;
- non-statutory nature reserves established by public and private bodies including the county wildlife trusts, the National Trust, the National Trust for Scotland, and the Royal Society for the Protection of Birds (RSPB).

In addition, in marine areas, marine SACs would appear to be appropriate as buffer zones.

The criterion of 'clear identification' should not pose a problem for any of these types of designation, whether statutory or non-statutory, as their boundaries are delineated on maps in documents relating to designation and management. Similarly, the criterion that buffer zones should surround or be contiguous to core areas would appear self-evident. In many cases, a buffer zone will comprise land and/or water under a number of designations. Consequently, a map which clearly shows the extent of the buffer zone(s) and the various ownerships and designations will generally be necessary.

The criterion that "only activities compatible with the conservation objectives can take place" is clearly consonant with the legislation and regulations pertaining to any SSSI, ASSI, ASP, MNR, and/or NNR. More specifically for individual sites, all SSSIs are intended to have management documents; and every MNR and NNR has a management plan. Such documents should fulfil the criterion of making provision for a "mechanism to manage human use and activities", but would have to be integrated with a 'management policy or plan' for an area as a biosphere reserve. However, adherence to these two criteria is more complex for land and water which is not statutorily designated.

For sites on land, in addition to the prescriptions in existing management plans for sites designated for conservation objectives, 'compatible activities' may also be promoted through a number of schemes, all of which also require statements of permitted or appropriate activities (with a certain level of monitoring). These schemes include:

- European Union: LIFE Fund (DETR and territorial offices); Objective 1 (DTI, Scottish Office, DoENI); Objective 5b, LEADER funds (DETR/MAFF and territorial offices); all of which are currently being revised according to the Agenda 2000 Rural Development Regulation;
- England: SSSI Management Agreements, SSSI Reserve and Wildlife Enhancement Schemes (English Nature); Countryside Stewardship, Environmentally Sensitive Area, Farm Woodland Premium Scheme, Habitat Scheme, Moorland Scheme, Organic Aid Scheme (MAFF); Environmental Action Fund (DETR); Woodland Grant Scheme (Forest Authority); Rural Action for the Environment;
- Northern Ireland: SSSI Management Agreements (DoENI); Environmentally Sensitive Area, Farm Woodland Premium Scheme, Habitat Scheme, Moorland Scheme, Organic Aid Scheme (DANI); Woodland Grant Scheme (Forest Authority);
- Scotland: SSSI Management Agreements (SNH); Countryside Premium Scheme, Environmentally Sensitive Area, Farm Woodland Premium Scheme, Habitat Scheme, Moorland Scheme, Organic Aid Scheme (Scottish Office); Woodland Grant Scheme (Forest Authority);

- Wales: SSSI Management Agreements, Berwyn Scheme, Tir Gofal (Countryside Council for Wales); Countryside Access Scheme, Environmentally Sensitive Area, Farm Woodland Premium Scheme, Habitat Scheme, Moorland Scheme, Organic Aid Scheme (Welsh Office); Woodland Grant Scheme (Forest Authority); Coed Cymru (CAIS/Coed Cymru).

It should be noted, however, that all of the agri-environment schemes are time-limited, so that they can not necessarily ensure that ‘compatible activities’ take place over the long-term. In addition, Local Environment Agency Plans, Local Biodiversity Action Plans, and Habitat Action Plans should be appropriate mechanisms for contributing to the fulfilment of these criteria within the broader context of management policy or plan for a biosphere reserve.

At present, the picture is complicated by three processes: the consultation process regarding SSSIs in England and Wales; the development of new proposals for legislation for SSSIs in Scotland (following a recent consultation process); and the development of the Natura 2000 programme. The results of the former processes cannot be predicted. With regard to the Natura 2000 programme, designation of a site as an SAC, or SPA – with the attendant regulations and requirements for management strategies – would improve adherence to the two criteria relating to human activities in the buffer zone of biosphere reserves. The same should hold true for marine SACs, especially as management plans also consider land-based activities that affect habitats and key species within the SAC. Similarly, designation of a site as a Ramsar site, by the Council of Europe as a Diploma Site (Category A or B), or by UNESCO as a Natural World Heritage Site, provides additional levels of oversight.

4.3. Transition area

For the transition area of a biosphere reserve, the only specific criterion stated in the Statutory Framework is that sustainable resource management practices are promoted and developed (Article 4, section 5[c]). As addressed in the following chapter and chapter 7, this criterion is consonant with the policies of the UK government and its various agencies with regard to sustainable development, in which the conservation of the natural heritage is generally recognised as integral. The majority of non-statutory designations discussed above, particularly in conjunction with the schemes mentioned and Local Agenda 21 schemes, should mesh well with this criterion. The same holds true for a number of designations made by various levels of planning authorities (e.g., Country Park, regional landscape designations, Regional Park, sites of importance for conservation). In England and Wales, policies and management plans for National Parks and AONBs, as well as the best-developed Estuary Fora, fit well with this criterion, though a distinction should be made between the two former statutory designations and the latter non-statutory partnership management approach. In Scotland, the same is apparent for National Scenic Areas (statutory) and the areas covered by Firth Fora and Area Sustainability Strategies (non-statutory). Similarly, for Scotland, the consultation paper and recent statements on national parks and recent documents on community planning, rural development, and land reform (see following chapter) stress the promotion and development of sustainable resource management practices.

Overall, the critical issue is to ensure complementarity and harmonisation of all of these designations, schemes, policies, and initiatives. This links to a further series of criteria stated in sections 6 and 7 of Article 4 of the Statutory Framework:

- involvement and participation of a suitable range of *inter alia* public authorities, local communities and private interests in the design and carrying out of functions;
- management policy or plan for the area as a biosphere reserve;
- designated authority or mechanism to implement this policy or plan;
- programmes for research, monitoring, education and training.

These criteria apply to the entire reserve, and are discussed in chapter 5.

5. Application of the Seville Criteria in the UK: Sustainable Development and the Involvement of Local Communities

As discussed in chapter 2, two of the major emphases of the biosphere reserve concept are the sustainable use of natural resources and the involvement of local communities in the management of biosphere reserves. Article 3 of the Statutory Framework states: "biosphere reserves should strive to be sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale". Two of the three functions of biosphere reserves identified in this Article are:

(ii) development – foster economic and human development which is socio-culturally and ecologically sustainable;

(iii) logistic support – support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development.

According to Article 4, on "General criteria for an area to be qualified for designation as a biosphere reserve", the major focus of activities relating to the exploration and demonstration of "approaches to sustainable development on a regional scale" (sec. 3) should be the transition area "where sustainable resource management practices are promoted and developed" (sec. 5[c]). In addition, "conservation activities compatible with the conservation objectives can take place" in the buffer zone(s) (Art. 4, sec. 5[b]).

The involvement of local communities is a key element of sustainable development. This is reflected in Article 4, section 6:

Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and carrying out of the functions of a biosphere reserve.

These principles are consonant with many of the policies of the UK government and its agencies in regard to both sustainable development and conservation, particularly those stemming from the UK's signing of both Agenda 21 and the Convention on Biological Diversity at the UN Conference on Environment and Development, held in Rio de Janeiro in 1992. As recognised in both the Convention and the UK government's responses to it, "biodiversity is regarded as a crucial part of sustainability"; and "biodiversity is ultimately lost or conserved at the local level". Such statements are the foundation of Local Biodiversity Action Plans (LBAPs), which should "act as a catalyst to develop effective partnerships capable of ensuring that programmes for conservation of biodiversity are maintained in the long term... the biodiversity component of Local Agenda 21". Such plans often conform to the boundaries of local authorities, and have to be harmonised with the other development and functional plans of these authorities. Given the similarities of the conservation objectives of biosphere reserves and LBAPs, the structures set up to implement and monitor these plans – and Local Agenda 21 initiatives in general – could contribute to some extent to addressing the criterion for a mechanism to ensure broad local involvement in the planning and management of

biosphere reserves. Nevertheless, it should be recognised that actions outlined within LBAPs typically consider individual species and habitats, rather than the mosaic of habitats and landscapes which a biosphere reserve should comprise.

The concept of partnerships which recognise the linkages between sustainable development and conservation is reiterated in recent speeches by government ministers and a number of recent documents from UK government agencies. Considering that the core areas of UK biosphere reserves must be designated, at least, as SSSIs/ASSIs, the recent consultation papers on SSSIs in Scotland, and in England and Wales, are particularly relevant. The latter makes clear linkages between sustainable development and conservation, particularly with regard to planning by a wide range of agencies (e.g., local authorities, Regional Development Agencies, Environment Agency), and proposes that "agencies should play as full a part as possible in the local community, and should involve the public wherever possible in the management of sites under their control". There are various other examples of such partnerships in England and Wales. Some of these concern areas with existing statutory designations without an explicit conservation purpose, such as AONBs, where those responsible for agenda-setting have recognised that the objective of conserving and enhancing 'natural beauty' requires consideration of both sustainable development and conservation goals – and that this requires joint action, with secure funding, by statutory agencies, local authorities, and other stakeholders. A pilot initiative in these directions has been the experimental Conservation Board for the Sussex Downs AONB. Other relevant examples in England and Wales include the Island 2000 Trust for the Isle of Wight and the more successful Estuary Fora.

The Scottish consultation paper on SSSIs, "People and Nature", includes a number of statements that propose increased involvement of local people in the management of SSSIs – *inter alia*, making the connection between LBAPs and SSSIs (pp. 13-14) – and explicitly links the conservation of the natural heritage and sustainable use. In particular, the paper proposes that "SNH and the local authority could encourage local partnerships for the management of SSSIs" (p. 31). Following the conclusion of the consultation processes on SSSIs and national parks, the Secretary of State called for "a stronger voice for local authorities and local communities in the management of SSSIs", and stated that they should be "promoted as a positive asset to local communities". He further noted the need for collaboration and consensus in the preparation of national park plans, and the need for "strong local involvement" in their management.

Recent documents produced by Scottish Natural Heritage also stress the close connections between rural development and various aspects of nature conservation: employment in the management of designated sites; environmental education and interpretation; maintenance of landscape features, including forests, pastures, walls, and footpaths; scientific research; game management; and the provision of facilities to tourists. A number of examples of successful partnerships promoting both sustainable development and conservation exist in Scotland. Many of these are supported through the types of schemes listed in section 4.2; the various Firths Fora are also particularly notable examples; and the Area Sustainability Strategies, funded through the EC LIFE Environment programme for three pilot areas in the Highlands and Western Isles, also take a similar approach. The Community Planning Working Group, commissioned by the Scottish Office, also notes the existence of various types of partnerships involving diverse stakeholders in a recent report; though it also notes that "The kaleidoscope of local and subject-specific plans and partnerships was not related to a common purpose

to develop a shared strategic vision for an area and a statement of common purpose in pursuit of that vision."

This realistic assessment is important when considering the implementation of the biosphere reserve concept in the UK. Already, a wide range of conservation designations exists (and must be identified in Local Environment Agency Plans and local authority plans). Typically, these overlap with other conservation designations, and often also with schemes to promote sustainable development. The successful implementation of a biosphere reserve with a full complement of zones will require, first, a high level of coordination in the planning and implementation of economic and conservation-related activities and, second, the commitment of substantial resources to fulfil not only the criteria mentioned at the beginning of this chapter, but also those mentioned in Article 7 of the Statutory Framework:

- (b) a management policy or plan for the area as a biosphere reserve;
- (c) a designated authority or mechanism to implement this policy or plan;
- (d) programmes for research, monitoring, education and training.

The need for coordination is already recognised in principle in Local Environment Agency Plans, Local Biodiversity Action Plans, and the development and functional plans of local planning authorities. It is also clearly evident not only in the consultation papers on SSSIs, but also the one on national parks in Scotland, which proposes a zoning scheme which is rather similar to that of biosphere reserves; a principle supported by the Secretary of State in his speech at the conclusion of the consultation process. Nevertheless, SSSIs have a more limited extent and set of objectives than would be expected for a biosphere reserve and, while national parks are designated through national legislation, and would generally be expected to have a management authority with a reasonable level of resourcing, biosphere reserves are designated by UNESCO.

Reaching agreement on 1) a management policy or plan covering a non-statutory area under a wide range of ownerships and (often overlapping) jurisdictions and 2) the resources and appropriate "authority or mechanism" to implement it would be a challenging and complex process. This has recently been shown with regard to Natura 2000 sites and is also recognised for AONBs – and these are statutory designations. Considerable effort would be required to ensure the long-term goodwill and resources required from a large number of stakeholders within the region – recognising that the outer boundaries of the transition area do not have to be specifically delineated. Nevertheless, there are a number of positive experiences in the UK, particularly in coastal areas, and, as experiences with biosphere reserves in other countries – including Canada, France, Germany, and the USA – have shown, such agreements are possible and can be successfully implemented in the long term, as long as there is broad stakeholder support and funding from a broad base of sources.

6. Applicability of the Biosphere Reserve Concept to Existing Biosphere Reserves

In order to assess the applicability of the biosphere reserve concept to the existing UK biosphere reserves, a preliminary desk comparison was made to the criteria specified in Article 4 of the Statutory Framework. The following conclusions can be made about all existing sites:

- they are "of significance for biological diversity conservation" (sec. 2);
- they have "a legally constituted core area devoted to long-term protection" (sec. 5[a]).

Many sites "encompass a mosaic of ecological systems representative of major biogeographic regions", though there is rarely much of "a gradation of human interventions" (sec. 1). Many have "programmes for research, monitoring, education and training" (sec. 7[d]). In some cases, these programmes are implemented de facto; in others, according to strategic research plans. Very few of the existing biosphere reserves have organisational arrangements for involvement and participation of stakeholders (sec. 6). However, none has:

- a clearly identified buffer zone(s), with mechanisms for managing human use and activities (sec. 5[b], sec. 7[a]);
- a outer transition area (sec. 5[c]) and is therefore of "an appropriate size to serve the three functions of biosphere reserves" (sec. 4), particularly providing "an opportunity to explore and demonstrate approaches to sustainable development on a regional scale" (sec. 3);
- a management policy or plan for the area as a biosphere reserve, or designated authority or mechanism to implement this policy or plan (sec. 7 [b], [c], emphasis added).

The corollary of the above is that if any of the existing UK biosphere reserves are to continue as a member of the World Network of Biosphere Reserves, consideration will need to be given to their boundaries and management. Equally, if any new biosphere reserves were to be established in the UK, this would have to be done using very different criteria from those used in the 1970s. There are, however, two sites where there appears to be no possibility of restructuring to meet the criteria in Article 4 of the Statutory Framework: Claish Moss and St. Kilda. The absence of any local community at these two sites makes it impossible for them to fulfil the development functions of a biosphere reserve. Moreover, their isolation makes many of the logistic functions, such as education and training, equally difficult. Consequently, it was decided that these sites did not merit a site visit and could be recommended for de-designation as biosphere reserves without further consideration.

Situated on the remote Ardnamurchan peninsula in Lochaber, Claish Moss is an excellent example of an oceanic raised mire system and, being a scarce habitat, was designated an SSSI and an NNR. It is now also a candidate SAC (cSAC). The conservation role of the reserve is adequately fulfilled but, given a history of burning and grazing, the site can no longer be considered entirely 'natural'. Although owned by SNH, the surrounding land is subject to commercial forestry and peat extraction, which could potentially threaten the hydrological security of the site. The logistic role of the reserve has also been unattended; the remoteness and hazardous nature of the mire

make it unsuitable for education, training, or interpretation, and little research or monitoring has taken place.

The St Kilda archipelago of islands lies 100 miles west of the Scottish mainland and is of outstanding value to international conservation. The biosphere reserve is representative of North Atlantic oceanic islands, with attributes which are unique in a British context: maritime and pre-maritime grasslands; internationally important bird populations, including 10% of the world's puffins, razorbills, guillemots and great skuas; the largest gannetry in the world; and surrounding waters which are internationally known for cetaceans. The ecological integrity of the island is assured by its management for conservation purposes by SNH and the National Trust for Scotland. Although it has no possibility of a development role, the island having been evacuated in the 1930s and having no permanent population, the logistic role is well represented by a small number of resident researchers carrying out monitoring of seabirds, seals, cetaceans and Soay sheep. The geographical remoteness of the island prevents the reserve being extended to include a neighbouring community, thus precluding any possibility of a development role. It is therefore impossible to adequately meet the expectations of a biosphere reserve. St. Kilda's reputation is already secured by numerous other designations including its status as an NNR, cSAC, SPA, and Ramsar and World Heritage Site.

In order to assess the current situation at the 10 remaining sites, as well as opportunities for, and limitations to, possible restructuring, visits were made in November and December 1998. The first point of contact in each case was the site manager, who was contacted as far in advance of the visit as possible in order to optimise arrangements. During the site visit (average length three days), the site manager was the first to be interviewed. Other interviewees were selected in consultation with the site manager and, for the Scottish sites, representatives from the headquarters of Scottish Natural Heritage and The Scottish Office. Most interviewees were representatives of statutory agencies concerned with the existing biosphere reserve and the surrounding area, particularly with regard to conservation and land use planning. In addition, representatives of relevant non-governmental organisations and landowners were interviewed when appropriate. Elected officials were generally not interviewed unless they had additional responsibilities (e.g., on local or regional statutory or non-statutory bodies). The principal aims of the visits were:

- to assess the extent to which the site, and activities on it, matched the Seville criteria;
- to identify existing activities, designations, initiatives, schemes etc. on, adjacent to, or near the site which could contribute to meeting the Seville criteria;
- to evaluate existing local management structures which could contribute to meeting the Seville criteria for a restructured biosphere reserve.

Information was elicited through semi-structured interviews and the review of relevant documents and maps. Each interviewee was asked whether his/her name could be recorded (see list of interviewees) and was assured of confidentiality, i.e., that no comments would be directly attributed. The resulting summaries for each site are presented below according to a standard format:

- designations and schemes;
- land uses, research and education;

- conservation value and management;
- local involvement;
- issues to be resolved if the biosphere reserve were to be restructured.

As agreed between the consultant and DETR, alternative approaches to the continuation of biosphere reserves at the other sites – with particular attention to building on existing designations, structures, initiatives, etc. to lead to greater coherence with the Seville criteria – are presented below. However, any restructuring would require substantial local and wider consultation, new structures would have to be established, and new resources found. An alternative might be to look for new sites which might be more easily adapted to the current criteria for biosphere reserves. This would require a national consultation process. The final chapter of this report sets out guidelines which might assist in this process, if it were to be pursued.

6.1. Braunton Burrows

Designations and schemes

The current biosphere reserve consists of Braunton Burrows SSSI, including the part de-declared as an NNR in 1996 because of a disagreement over grazing management practices between the landowner (Christie Devon Estates Trust) and English Nature. The site is also a candidate SAC (cSAC).

To the south of the site are the Taw-Torridge Estuary SSSI and Northam Burrows SSSI (on the other side of the Taw-Torridge Estuary). To the east of the site, on Braunton Marsh, formed in the lee of the sand dune system, are two small SSSIs: Braunton Swanpool (11.9 ha, of which 3 ha are owned by Devon Wildlife Trust), and Greenaway and Freshmarsh (owned by English Nature). Much of Braunton Marsh is also the subject of a Water Level Management Plan, released for consultation to landowners by the Environment Agency in November 1998. The entire marsh is also a target area for the MAFF Countryside Stewardship Scheme, as is the historically-important Braunton Great Field (mediaeval open field system) to its east, which will be the focus of a special project under the scheme.

The current biosphere reserve, and all the SSSIs and areas covered by schemes mentioned above, also fall within the boundaries of the North Devon Coast AONB and North Devon Heritage Coast, as well as the area of the Taw Torridge Estuaries Action Plan, which was developed and is being implemented through a partnership involving a wide range of statutory agencies and NGOs.

Land uses, research, and education

The principal use of the ex-NNR (604 ha), which is leased by the Ministry of Defence, is military training. It is also used, particularly by local people, for a range of leisure activities, particularly dog-walking, from three large car parks adjacent to the site. There is a long tradition of research, particularly botanical but also including monitoring of groundwater levels since 1972. Botanical research has shown, *inter alia*, significant changes in the composition of plant communities in areas grazed by Soay sheep, first introduced in 1987 in an enclosure. There is ongoing monitoring of the effects of this grazing, as well as cattle grazing in an adjacent enclosure. Environmental education (up to 2,000 school students/year, as well as guided walks) has also been ongoing for many years, although there are no facilities at the site. To the north of the ex-NNR is Saunton Golf Club (113 ha) and other small areas to the east are leased to local people for grazing. The foreshore (Saunton Sands) is part of the Crown Estate and leased to Braunton Parish Council, and is heavily used for beach recreation activities in summer.

Braunton Marsh is used for arable, horticulture, and grazing; its complex system of drainage ditches is overseen by an Internal Drainage Board (Marsh Commissioners). Both sheep and cattle are grazed; in this sense, the marsh is an important complement to other land owned by the same farmers on the slopes and upper parts of adjacent hills. The Great Field is used for arable. In the town of Braunton is a conservation-focused Countryside Centre established by the North Devon Environmental Trust and staffed by volunteers.

Tourism is an important use of the area in summer. In the wider area, fishing is important in the Taw-Torridge Estuary and offshore. There is another golf course on Northam Burrows, where there is also an environmental information centre.

Conservation value and management

Braunton Burrows is a prime British sand dune site, the largest sand dune system in England. It is particularly important because it includes the complete successional range of dune plant communities, with over 400 vascular plant species. The short turf communities are very rich in lichens and herbs, and the dune slacks are also rich. The many rare plants and animals include 14 with UK Biodiversity Action Plans. The site is not particularly important as bird habitat, possibly at least partly because of disturbance of ground-nesting birds by dogs. English Nature's 1997 management guidelines identify three management needs: 1) grazing (by sheep and cattle), to maintain and, if possible, expand the area of short turf and keep invasive scrub under control; 2) raising of the water table, to maintain dune slack communities; 3) keeping the dune system dynamic, with areas of bare, mobile sand, so that geomorphological and successional processes can continue. At the time of the site visit (late November 1998), the MoD was finalising a management plan. This will propose increased grazing, in line with English Nature's guidelines. English Nature makes an annual payment to MoD in this regard. English Nature has made site management statements with other occupiers, including Saunton Golf Club.

Braunton Marsh includes small areas of conservation importance in the remnant reedbeds and grasslands of the SSSIs. Raising the water table is a major aim of the Water Level Management Plan, not only to preserve these communities, but also to restore species-rich communities along the ditches. The Countryside Stewardship scheme focuses on raising water levels to enhance habitat for breeding and wintering birds, in combination with extensification of grazing and/or mowing, and other actions.

The Taw-Torridge Estuary is of major importance for its overwintering and migratory populations of wading birds, as well as rare plants growing along its shores. It includes the RSPB's Isley Marsh reserve. Northam Burrows, like Braunton Burrows, is a sand dune system with a falling water table. However, it is smaller, only hosts a few rare plant species, and is heavily grazed.

Local involvement

While the ex-NNR was sub-leased by English Nature from MoD, up to 18 local people worked as volunteers at the site, assisting with visitor counts, environmental education, and management. The de-declaration of the site was not popular with local people. Now that the site is managed by MoD (the former site warden for English Nature is now the supervisor of the site for MoD), there are six volunteers, though it is anticipated that more will be found.

Although Braunton Marsh has been targeted for Countryside Stewardship since the scheme began, hardly any of the landowners have taken up the incentives. A major reason is the fact that the pastures are part of a rotational grazing system; also, the payments under the scheme are not perceived as adequate. On Braunton Swanpool SSSI, mechanical clearance of scrub, followed by grazing, has been successful in restoring the area owned by Devon Wildlife Trust. There are also management agreements between English Nature and the other landowners for the remainder of the

SSSI for maintenance of the unusual wetland habitats. With regard to the Water Level Management Plan, the various interested parties do not entirely agree why water levels in Braunton Burrows have fallen; how this relates to past deepening or clearing of the West Boundary Drain which runs between the Burrows and the Marsh; and whether water levels can be raised significantly by the measures proposed in the Plan. In summary, although well-conceived schemes exist, their application has not progressed particularly far.

An Estuary Forum exists for the Taw Torridge Estuaries, including representatives of the various statutory agencies and interest groups concerned with the area. In 1997-98, the Forum developed the Taw Torridge Estuaries Action Plan through topic groups and open public meetings. It is being implemented through the Joint Advisory Committee (JAC) for the Coast and Countryside Service in northern Devon, which includes representatives of the Estuary Forum and the various statutory agencies concerned with the area.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists only of a core area, which is a prime example of a habitat that is unusual in England. However, it is only one element of an ecological complex that also includes the marsh to the lee of the dunes, and is part of a larger estuary ecosystem fed by streams from the surrounding hills and subject to a variety of land (and water) uses. Accordingly, if continuation of a biosphere reserve based on this site is deemed desirable, it should be considerably expanded.

The current biosphere reserve includes the grazing enclosures which are experimental approaches for a type of management that, over the long term, would appear to be desirable over much of the dune system. All parties involved with the site appear to wish that it should be redeclared as an NNR in the not-too-distant future. Even without NNR status, it is legally-constituted as an SSSI, with a management regime agreed between the landowner and MoD with the support of English Nature, and it is also a cSAC. Accordingly, it would seem appropriate for the core area of the biosphere reserve to include this area. In addition, Braunton Swanpool SSSI, the RSPB's Isley Marsh Reserve, and possibly part of Northam Burrows SSSI might also be considered as additional core areas.

Adjacent to the core area(s), possible areas which could be included within clearly-identified buffer zones could include:

- Taw-Torridge SSSI/SPA and Northam Burrows SSSI, recognising their legal status and management agreements, and the potential for fostering conservation compatible activities in areas adjacent to SACs and SPAs (under the EC Habitats Directive and Regulations);
- Braunton Marsh and Braunton Great Field, recognising their inclusion in the Countryside Stewardship scheme and the Water Level Management Plan, both of which promote conservation-compatible activities.

It should be recognised that, at present, many of the activities taking place in these areas are not wholly compatible with the conservation objectives of the proposed core area(s). However, given appropriate local consultation, and particularly in relation to

the Taw Torridge Estuaries Action Plan, it would appear likely that a greater emphasis on conservation-orientated management could be achieved.

A proposed outer 'boundary' for the transition area could be that of the Taw Torridge Estuaries Action Plan, which would be particularly appropriate for this purpose as the Plan states that this boundary "will be defined by the particular issue rather than any fixed geographic extent" (p. 9); phrasing that is very much in keeping with the Statutory Framework. The mission statement of the Plan also accords well with the concept of biosphere reserves: it "aims to secure the sustainable use of the estuaries through the co-ordination of, and consensus between all of the agencies and interested parties that have an impact on the estuarine environment" (p. 9). The Plan has been closely coordinated with other plans for the area, and includes a series of aims, each with a number of recommended actions. To be appropriate as a 'management policy or plan' for the biosphere reserve, the Plan would have to be amended, to detail the relationship of the Plan area and the biosphere reserve, with a map of the biosphere reserve core area and buffer zones. Overall coordination is through the Estuary Manager, in consultation with the JAC. Members of the JAC include the full range of organisations and interests that would be appropriate for a biosphere reserve. Thus, this would fulfil the criteria under Article 4, sections 6 and 7(c) of the Statutory Framework for biosphere reserves. If the biosphere reserve were expanded, it would probably require a new name. This issue would need to be approached carefully, given local sensibilities when the NNR was de-declared.

6.2. North Norfolk Coast

Designations and schemes

The current biosphere reserve comprises four sites – Holkham NNR, Scolt Head NNR, and the former Blakeney Point SSSI and Cley and Salthouse Marshes SSSI – which were all included within the North Norfolk Coast SSSI when it was notified in 1986. This SSSI, extending down to the low water mark, is also a Ramsar site and an SPA. Most (with the exception of some freshwater grazing marshes) is also a candidate SAC (North Norfolk Coast and Gibraltar Dunes) and a Heritage Coast (North Norfolk), whose landward boundary largely coincides with the A149 road which runs parallel to the coast. Along the same part of coast as the SSSI/cSAC, the Wash and North Norfolk marine SAC starts at the high water mark and extends about three miles out to sea, thus overlapping the SSSI/cSAC and SPA between low and high water. The lead agency for the marine SAC is the Eastern Sea Fisheries Joint Committee, which is funded by the three county councils adjacent to the Wash/North Norfolk Coast.

All of the North Norfolk SSSI/cSAC area also falls within the North Norfolk AONB, which includes a number of other SSSIs. Along the main part of the coast, the AONB boundaries have been drawn to exclude a number of communities, of which the largest are Hunstanton, Sheringham, Cromer, Overstrand, and Mundesley. The AONB extends 5-10 km inland (southwards) from the low water mark, and also considerably to the east of the SSSI/cSAC. It includes two outliers separated from the main part by heavily developed areas and/or large coastal defences: one to the west at the south-east corner of the Wash; the other to the southeast, north of Winterton-on-Sea. Many farms within the AONB are eligible for the MAFF Countryside Stewardship Scheme for the North Norfolk Coast (freshwater habitat creation from arable land) or North West Norfolk (heathland enhancement and re-creation on the greensand; Stiffkey, Burn, and Glaven River valleys; field boundary restoration). Finally, the AONB (with the exception of its southwestern outlier) lies within the area covered by the Environment Agency's LEAP for North Norfolk, which includes the drainage basins of the northward-draining rivers (Hun, Burn, Stiffkey, Glaven, Mun).

Land uses, research, and education

The North Norfolk Coast SSSI/cSAC – notably the six nature reserves, owned and/or managed by English Nature, Norfolk Wildlife Trust, and the RSPB – attracts hundreds of thousands of visitors a year. The primary reason for visits is recreation (notably beach activities and birdwatching), though educational visits – at all levels from primary schoolchildren to postgraduate students – are also important (tens of thousands a year). There are a number of interpretive and field centres in the area. Summer is the main season for both recreational and educational visits, though the peak has become less marked in recent years. Pressure on some sites is very heavy; visitor data are available for individual sites, but not for the area as a whole. Such visitation is addressed in the 1995 Visitor Management Strategy for the AONB, which provides a zoning for the area. It states that the entire SSSI/cSAC should not be promoted for visits, and that direction of visitors to less sensitive areas is essential.

Research in the SSSI/cSAC, covering the full range of biological sciences (and especially ornithology), and also relating to the geomorphology of coastal processes, has taken place for decades, notably by Cambridge University, University of East

Anglia, and the Institute for Terrestrial Ecology. However, the resulting data are generally available at the level of individual sites (nature reserves); the only joint work is monthly counts of waders and wildfowl. These are the focus of one minor use of local resources: wildfowling, which is decreasing. Other uses of the SSSI/cSAC are grazing, and harvesting mussels, cockles, shrimps, crabs, and bait; there is also some commercial shore-netting. Both samphire and sea lavender are collected, which is only legally permitted for the personal use of common rights holders.

In the remainder of the AONB, the main land use is the cultivation of cereals and sugar beet. There are some very large estates; in general, the size of farms decreases from west to east. Other crops – particularly oilseed rape and linseed – are also cultivated on arable land, and there is some set-aside. Livestock grazing is limited, with a shift taking place from cattle to sheep. This land use is decreasing, as graziers lose interest due to low prices. Along the A149, and especially in the various small resorts, tourism is the mainstay of the economy.

Conservation value and management

The large number of conservation designations clearly shows the area's importance. The SSSI/cSAC includes a wide range of habitats, from intertidal sands and muds, through shingle ridges, to saltwater and freshwater marshes. It is a dynamic area in terms of both coastal and ecological processes; sea-level rise, extreme events, and the need for 'managed retreat' are major management issues. The SSSI designation form describes the saltmarshes as the finest in Britain and among the best in Europe, and they provide habitat for a number of rare species. Their greatest value is probably with regard to birds, with nationally and internationally important breeding colonies (e.g., Sandwich, Little, Common Terns; and various marsh-dwelling birds) and more than 20,000 wintering wildfowl (e.g., Dark-bellied Brent and Pink-footed Geese, Widgeon, Knot). A number of these use not only the SSSI/cSAC, but also neighbouring farmland, leading to some management conflicts. A total of 81% of this area (four NNRs and two other nature reserves) is subject to reserve management plans formulated by the various landowners and English Nature; the remainder of the SSSI/cSAC in private ownership is covered by Site Management Agreements. The SSSI/cSAC is also covered by a Shoreline Management Plan (Snettisham to Sheringham) and a series of eight Water Level Management Plans (Environment Agency). Both Holkham and Scolt Head NNRs are used for the demonstration of conservation management techniques.

The principal reason for the designation of the marine SAC is that the area (which also includes the Wash) is a good example of inshore and intertidal habitats. While it includes the largest breeding colony of common seals (in the Wash), its primary conservation importance is in relation to the birds for which the SPA was designated. Draft conservation objectives (initially prepared by English Nature) are currently out for consultation; the management plan should be completed by June 2000. This will be part of a single Scheme of Management for the entire Natura 2000 site, which includes all of the SACs and SPAs in the Wash/North Norfolk Area. It will complement a Coastal Habitat Management Plan being drafted jointly by the Environment Agency and English Nature, considering potential changes over the next 50 years in the context of coastal erosion, flood defence, and possible gains and losses for species and habitats of European importance.

As described in "A Vision for Nature Conservation in the Norfolk Coast Area of Outstanding Natural Beauty (AONB)" (Vision for Nature Conservation), published by

English Nature in 1998, the remainder of the AONB also includes many other habitats, including mires, river valleys, heathlands, chalk and cliff-top grasslands, woodlands, and farmland. Many birds with Biodiversity Action Plans live in these habitats, particularly farmland; many of these (e.g., Grey Partridge, Skylark) have declining populations because of land use practices (notably, use of agrochemicals) – although more research is needed on this issue and the use of farmland and other inland habitats by wintering species. Unfortunately, Countryside Stewardship Schemes have been oversubscribed, and the aims of these schemes are far from achievement. The 1998 management strategy for the AONB specifically recognises this problem: policy 23 states that the project partners (a range of very diverse agencies and groups, see below) will "develop and lobby for the introduction of a specific agri-environment scheme for the AONB to encourage better management of wildlife, habitats and landscape features"

Local involvement

Local people are very protective of their rights and concerned about actual and potential effects of tourism, conservation, and other land uses and economic activities in the area; as well as the actual and perceived effects of European policies. There are many active local organisations, including parish councils, common right holders, fishermen's associations, and wildfowling clubs. At consultations, members of these these groups tend to be much more vocal than the many conservation-minded people who live in the area (these are often more recent immigrants). The consultation process required to set up and implement the management plan for the marine SAC involves many of these groups, many of which are represented on the advisory groups for the marine SAC. Within the various reserves in the SSSI/cSAC, many volunteers (mainly members of the Norfolk Wildlife Trust and/or RSPB) assist with management and interpretation.

At a broader scale, the degree of local involvement in joint action with regard to the management of the area is reflected in the management strategy for the AONB, published by the Norfolk Coast Project (NCP) in October 1998, following a wide-ranging public consultation – "Land and Life" – in 1997. Over 1600 questionnaires were received and analysed, and a series of local meetings involved about 120 people. The resulting strategy is endorsed by a large number of partners, ranging from local government to statutory and non-governmental conservation and heritage organisations, statutory tourism and development agencies, and the Norfolk branches of the Country Landowners Association and the National Farmers Union. This degree of local involvement has a long history, initially starting with the Norfolk Coast Conservation Committee in 1968, and gradually expanding through the creation of the North Norfolk Heritage Coast (1974) and, particularly, the NCP, established to coordinate activities within the AONB in 1991. The first activity of the NCP was to produce a Visitor Management Strategy, involving wide public consultation; this approach has continued since. Funding for the NCP is approximately half from the Countryside Commission and half from local authorities, on three-yearly cycles.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists of a number of core areas and perhaps some buffer zones managed for grazing or used for recreation. Only two of the original sites in the biosphere reserve nomination (Holkham and Scolt Head NNRs)

remain; the other two sites, as well as the two NNRs, are now part of the larger SSSI/cSAC. While this constitutes a well-defined area, it does not include a transition zone. Accordingly, if continuation of a biosphere reserve based on these sites is deemed desirable, it should be expanded, possibly to include the main coherent part of the AONB (i.e., without the two outliers), which is increasingly being considered as a coherent area for planning and management.

The delineation of the various zones of a revised biosphere reserve would require careful consideration of habitats, land uses, and designations. It should also be recognised that, because of the dynamic nature of coastal processes (both geomorphological and ecological) and the need for ‘managed retreat’ in view of these processes and sea level rise, fixed boundaries between core and buffer zones might not be appropriate along the entire length of the coast. The 1998 Vision for Nature Conservation provides detailed maps of the existing habitats, and also opportunities for evolution, reversion, creation, and re-creation of certain habitats. This document would be a key starting point for definition of potential future biosphere reserve zones.

In general, it might be proposed that core areas would comprise the various natural habitats in the SSSI/cSAC. Buffer zones could consist of the remainder of the SSSI/cSAC together with the grazing marshes in the SPA, offshore areas used for sustainable harvesting of shellfish and cockles within the marine SAC and, possibly, other SSSIs within the AONB. The transition zone could consist of the further offshore area and the remainder of the main part of the AONB – recognising that sustainable development is a guiding principle of the 1998 Management Strategy – together with the coastal enclaves. As the outer boundary of a biosphere reserve does not have to be defined, it might be easier to consider the entire AONB and adjacent areas as part of the transition zone. For some purposes, areas outside the AONB, notably the river valleys and possibly more of the area covered by the North Norfolk LEAP) might also be included in the transition zone.

The AONB Management Strategy, amended to detail, *inter alia*, the relationship of the AONB and the biosphere reserve, with a map of the biosphere reserve core area and buffer zones, could be appropriate as a ‘management policy or plan’ for the biosphere reserve. The NCP, working with its Officer Working Group, which includes a very wide range of local stakeholders, would be an appropriate starting point for an implementing ‘authority or mechanism’, though it would require guaranteed long-term resources. For the seaward part of the biosphere reserve, it would have to work in concert with the Management Group for the marine SAC.

6.3. Moor House / Upper Teesdale

Designations and Schemes

The two NNRS of Moor House and Upper Teesdale NNRS were designated by UNESCO as a single biosphere reserve in 1976. The NNRS are adjacent to each other and share many attributes, and, as of 1999, their management (until now split between the Cumbria and Northumbria English Nature teams) has been integrated. While ownership of Moor House is in the hands of English Nature, Upper Teesdale is owned principally by the Strathmore and Raby Estates. The two NNRS are surrounded by the Upper Teesdale, Moor House and Cross Fell, Appleby Fells, and Lune Forest (proposed) SSSIs. The existing SSSIs comprise both a cSAC and a pSPA. Part of Upper Teesdale NNR is also within the Pennine Dales ESA. The MAFF Countryside Stewardship Scheme is available to all farms in the NNRS. On land designated as SSSI, English Nature enters into agreements with owners and occupiers for positive conservation management through their Wildlife Enhancement Scheme.

Both NNRS lie within the wider North Pennines AONB, whose administration is split between Cumbria, Durham, and Northumberland County Councils, and a number of other bodies have ownership or control of land. Northumbrian and North East Water have 12 reservoirs, including Cow Green in Upper Teesdale; the MoD has extensive training areas at Warcop and Stainmore; 63 SSSIs exist, forming 27% of the area of the AONB, with various associated management agreements; Geltsdale reserve is managed by the RSPB; Cumbria, Durham, and Northumberland Wildlife Trusts, the Woodland Trust, and the National Trust own and manage other areas of land; and, in addition to Moor House and Upper Teesdale, English Nature manages Derwent Gorge & Muggleswick Woods NNR.

Land uses, research, and education

The two principal land uses are agriculture and estate management for game. Agriculture is mainly in the form of sheep and cattle grazing, with some production of hay meadow. Moor House is subject to common grazing rights, over which English Nature has no direct control. The estates manage large areas of heather moor for grouse shooting. In addition, a variety of management agreements encourage tenants to maintain traditional hay making practices. Other areas are used for small-scale forestry (coniferous and broadleaved).

Other uses include water storage, quarrying of limestone and whinstone, and barytes extraction. Recreational activities include walking (the Pennine Way traverses the site), riding, cycling, natural history interest (including use of nature trails), fishing, and visits to attractions such as mining museums and High force and Cauldron Spout waterfalls.

Both Moor House and Upper Teesdale have long histories of research and monitoring, including botanical, ornithological, and meteorological activities, with many published papers and recorded data. Both NNRS are used by the Institute of Terrestrial Ecology (ITE) at Merlewood; Moor House is a key site for the Environmental Change Network (ECN) and the Terrestrial Initiative in Global Environmental Research (TIGER). Durham University has used Upper Teesdale as a field site for over 20 years, carrying out research and monitoring relating to topics including vegetation cover, pollen,

invertebrates, and nesting waders. The Game Conservancy Trust is currently carrying out research into black grouse conservation, in conjunction with English Nature, the RSPB, and landowners.

The NNRs are used by a range of schools and colleges as an outdoor classroom, and Newcastle University uses Upper Teesdale for professional training in uplands management.

Conservation value and management

Moor House includes Calluneto-Eriophoetum-Sphagnum blanket bog, which is an uncommon European habitat, and environmental variations produce a mosaic of distinctive ecosystems, with species rich calcium-enriched flushes. Upper Teesdale is typical of heather moor, blanket mire, and acidic grassland, and the area is internationally important because of its combination of Arctic, Alpine and Continental plant communities (including the Spring Gentian). Traditional management has produced 'northern' or mountains hay meadows. Species recovery programmes are in place to bolster certain important populations including, for example, yellow marsh saxifrage, and management agreements exist with graziers for a number of short- and long-term exclosures. A five-year management plan for Upper Teesdale NNR was written in 1994, and for Moor House NNR in 1996; a summary document for both sites, with five-year objectives, will be produced in 2000. Site management statements exist for the SSSIs adjacent to the NNRs, and management policies have been agreed between English Nature and most landowners and tenants.

One of the most significant impacts on the landscape and conservation of the area is grazing. The common grazing rights, coupled with the effects of Hill Livestock Compensatory Allowances (HLCAs) on stock numbers in the wider area, have led to overgrazing problems. Both Countryside Stewardship and ESA schemes are available in the area, but these agri-environment measures do not appear to have met all their objectives for the protection of important moorland habitats. As stated above, tenanted farmers are encouraged to use traditional practices, and at Geltsdale the RSPB currently demonstrate effective management practices on its own farm holding.

Local involvement

Local communities and organisations are involved in many activities related to conservation and sustainable development. However, these are not spread uniformly across the whole of the AONB, partly for geographical reasons and partly because of the emphasis placed by different authorities/agencies on such activities.

In the Moor House and Upper Teesdale NNRs, local involvement is limited, largely due to the small local population. As indicated above, farmers are involved in varying degrees through site management agreements and agri-environment schemes or similar, including MAFF's Pennine Dales ESA and Countryside Stewardship and Moorland Schemes, and English Nature's Wildlife Enhancement Scheme. A number of volunteer wardens operate on behalf of English Nature and the Wildlife Trusts (for example, 15-20 volunteers have a long standing relationship with Moor House NNR, and several of these are also volunteers with Cumbria Wildlife Trust). At Warcop MoD site a conservation group operates, including agency, NGO and volunteer membership.

Management guidance for the AONB is through a steering group which includes Cumbria, Durham and Northumberland county councils, nine district councils, the Countryside Commission, and the Rural Development Commission; RSPB has also been invited. There are also many '2nd tier' members, including wildlife trusts, MAFF, NFU, and CLA. The Steering Group produced a management plan in 1995, following extensive consultations in the region. Its objectives stress "the social and economic vitality of communities", as well as maintenance and enhancement of wildlife and natural habitats.

Over an even wider area, the East Cumbria Countryside Project covers, broadly, an area bounded to the north by the Scottish border, to the south by the Yorkshire Dales, to the east by the Durham and Northumberland borders, and to the west by the M6. It is run in partnership by Carlisle City Council (which acts as the lead partner and provides all project employees), Eden District Council, and Cumbria County Council, with funding from the Countryside Commission and ERDF. The Project promotes local awareness and involvement, and carries out practical conservation, access work and interpretation. Individual contributions include work by the Fauside Foundation, Allendale, to set up a community access environmental database, and work at Ladycross Quarry, Slaley Forest, to produce a private reserve.

The RSPB is currently piloting its Community Project at Coanwood. This includes the recruitment of a Community Biodiversity Officer, and involvement of local schools in activities such as the design and commissioning of wood sculptures on nature trails. The project aims to act as a springboard for community consultation, and three similar projects are planned over the next three years. The RSPB will recruit a Wader Project Officer to work on its North Pennines project 'Working with Waders', consulting with communities and landowners. In addition, the RSPB involves schools in activities such as the Hen Harrier School Project, across the North East.

The progress of LA21 and BAPs varies in the area around the current biosphere reserve. In the Eden Valley, LA21 is being delivered through eight community action groups, each with a membership of c. 50. These include a Natural Environment Issues Group involved in practical work, lobbying and consultation. The responsibility for coordination of Biodiversity Action Planning rests with Cumbria English Nature through the Cumbria Biodiversity Partnership. Publication of an Action Plan document is due mid 1999. County Durham has an established and progressive LA21 process, with dedicated staff; aspects of its approach have received international recognition. Its planning process is focused on action, and eight round tables have been set up, including the Community Action Forum and the Natural Resources Round Table. The latter is coordinated by Durham Wildlife Trust. The County's LBAPs are due for publication in January (the partnership working on LBAPs includes Northumbrian Water, whose forthcoming Company BAP has been described as the first in the country).

Issues to be resolved if the biosphere reserve were to be restructured

Currently the geographical extent of the biosphere reserve is coterminous with that of Moor House and Upper Teesdale NNRs. There is no practical distinction of buffer or transition zoning, or between the activities/functions of the biosphere reserve and the NNRs.

The 1990 Report of the Biosphere Reserves Working Group recommended that the two NNRs should form the core area, with the Moor House and Cross Fell, Upper Teesdale, and Appleby Fells SSSIs forming the buffer zone, and the North Pennines AONB forming the transition area. If it is deemed desirable that a biosphere reserve based on this site should continue, in principle, this could represent an appropriate arrangement, for the following reasons:

- integration of the management of Moor House and Upper Teesdale NNRs would be likely to assist in the coordination of management of a wider biosphere reserve;
- the SSSIs adjacent to the NNRs (with the inclusion of the Lune Forest SSSI), and possibly other SSSIs within the AONB could provide an appropriate buffer zone, in which only activities compatible with conservation objectives would take place;
- expansion to the North Pennines AONB would encompass an appropriate proportion of the local population to enable the biosphere reserve to fulfil its community involvement objectives;
- the AONB has a strong regional identity which would be likely to provide impetus for further partnerships, and engender a sense of ownership in the community, if attached to the biosphere reserve designation;
- a range of community-based conservation and sustainable development activities already exists within the area – e.g., through the work of Durham County Council, Durham Wildlife Trust and the RSPB – which is in keeping with the biosphere reserve concept;
- the AONB, through its steering group, could provide the potential basis for future development of ‘a designated authority or mechanism’; and the management plan, which places a strong emphasis on sustainable development and conservation, already recognises the biosphere reserve.

To be appropriate as a ‘management policy or plan for the area as a biosphere reserve’, the AONB management plan would, at least, have to be modified to show the relationship between the AONB and the biosphere reserve, with a map of the biosphere reserve core area and buffer zones. Considering that the Action Programme in the plan has a five-year lifespan, such modifications could be made in the next version.

These suggestions assume that current designations and schemes are capable of providing the levels of protection and appropriate activities for a biosphere reserve. There are a number of widely recognised local management and economic issues, regarding overgrazing; the ability of the farming community to sustain traditional practices, such as those required to maintain hay meadows; and the effectiveness of agri-environment schemes to correct these challenges, particularly in conjunction with established common grazing rights. Any future move to expand the biosphere reserve would require such issues to be addressed.

6.4. Dyfi / Cors Fochno

Designations and schemes

The current biosphere reserve consists of Dyfi SSSI (including Dyfi estuary, Ynyslas dunes and Cors Fochno estuarine mire), together with Ynys-hir RSPB reserve and parts of the reclaimed or modified estuarine marshes (some of which are within Dyfi SSSI). Considerable areas of the current SSSI lie outside the biosphere reserve. The Dyfi estuary and Cors Fochno comprise a Ramsar site (with boundary revision in progress to include the entire SSSI). Cors Fochno is a cSAC and the estuary is part of the Penllyn a'r Sarnau marine cSAC.

Close to the site (and within, or partly within the Dyfi catchment) is a range of SSSIs, including Cae Ty-Hen, Cwm Llyfnant, Coed Maes-Mawr, Coed Esgairneiriau a Cheunant Caecenau, Coed Cwm Cletwr, Gwaun Troed-Rhiw Seiri a Llyn Mynydd-Gorddu, Pencarreg-Gopa a Moel Hyrddod, and Pumlumon. Parts of the estuarine system are subject to an Environment Agency Water Level Management Plan. Tir Cymen has been available on the north side of the Dyfi, and a number of farms participate. In addition there are several nature reserves owned by the wildlife trusts or local authorities in the wider area.

The estuarine area, consisting of the current biosphere reserve and adjacent low-lying land (up to 5 m contour), is the subject of the Dyfi Strategy Group. This partnership, including Countryside Council for Wales, the Environment Agency, Montgomery Wildlife Trust, and the RSPB, is developing a framework for wetland rehabilitation, and is awaiting the outcome of a lottery fund bid which will support work including land purchase and restoration around Dyfi/Cors Fochno.

Land uses, research and education

The estuarine marshes and surrounding land have traditionally been used by farmers to graze horses, cattle and sheep, and recent efforts have been directed at maintaining the traditional Welsh Black breed. Grazing of the saltmarshes is encouraged to maintain suitable conditions for wintering wildfowl. CCW has recently introduced a small herd of Welsh Mountain Ponies to the NNR to assist rehabilitation of mire-wet grassland habitats.

The dune area has open access and is the focus of considerable recreational use by both locals and tourists, with c. 200,000 people visiting the Ynyslas beach and dunes every year. There is a high degree of beach-related recreation in the summer months, including a range of watercraft-based activities. A number of large caravan parks exist, including developments close to the NNR. Aberdyfi, on the north side of the estuary, attracts many summer visitors, with associated water-based activities, and is the focus of a current proposal for the development of harbour facilities. There are golf courses adjacent to the Ynyslas dunes at Borth and on Aberdyfi dunes, and coastal management issues are common to both sides of the estuary.

The NNR is visited by 7-8,000 students every year, including considerable local use by the Aberystwyth University Department of Biology, and the Welsh Institute of Rural Studies. CCW operates a schools liaison and booking service, with the main school users being at secondary level. There is a long history of research and monitoring in the

area, including vegetation and hydrological analysis, ornithological and tourism impacts research, and invertebrate monitoring. CCW has a wide range of monitoring projects in place, including eight on invertebrates. A field studies centre is based at Borth Youth Hostel, close to the Dyfi NNR. A variety of talks and workshops are run by the CCW, for both associated professionals/specialists and interested local people and visitors.

Because of the habitat importance of the area, there is a high degree of interest from bird watchers and naturalists. There are well-developed facilities at the Ynys-hir RSPB reserve, and a permit system is operated by CCW for visits to the Cors Fochno raised bog. There is considerable use of the estuary by wildfowling, operating under a permit based, zoned wildfowling scheme. CCW cooperates with local farmers in fox control on and around Cors Fochno.

The estuary and river further inland have long-established public and private fishing rights. The estuary has historically been used by locals for cockle fishing, and in recent years has attracted fisherfolk from outside the area, due to heavy exploitation of larger stocks elsewhere. Commercial exploitation pressures are requiring frequent lengthy closure orders to allow recovery of Dyfi cockle stocks.

Further afield in the Dyfi catchment there is considerable commercial coniferous forestry, under control of the Forestry Commission.

Conservation value and management

The site is representative of western saltmarsh and estuarine systems, and the estuary forms one of the most important wildfowl and shorebird centres in Wales. *Spartina*, introduced in the 1917 for reclamation purposes, has colonised large areas, but now appears to be undergoing natural regression. Cors Fochno has the largest expanse of primary raised mire in the lowlands of Britain, and contains a high number of invertebrate species, including some of national and international importance. Cors Fochno is well protected in comparison to some other parts of the reserve; e.g., the unsustainable cockle exploitation in the estuary. The heavy recreational use of the Ynyslas dunes has led to an intensive and long-standing visitor management scheme incorporating interpretive displays and programmes, wardening, boardwalks and vehicle controls. A full management plan for the NNR was written in 1989, and summary update plans were completed for Cors Fochno and for Dyfi estuary and Ynyslas dunes in 1997. Sub-plans for the other parts of the SSSI are in preparation, together with an overview plan for the whole SSSI. A management scheme is also being produced for the Pen Llyn a'r Sarnau marine SAC, through consultation between the large number of involved organisations, including CCW, Environment Agency Wales, county councils, water authorities, Snowdonia National Park Authority, and the local Sea Fisheries Committee.

Drainage reclamation works at Dyfi/Cors Fochno began in 1820, and the last major phase was from 1945 to 1970. These have produced major change over the once extensive area of raised mire, with transitions to a range of tidal and freshwater marshes, reducing the wetland expanse by two-thirds, obliterating the natural habitat transitions, and leaving the remaining mire with damaged margins. CCW is currently producing a 'vision' statement which describes the potential for restoration of a range of key habitats within a functional wetland ecosystem. Its implementation, together

with that of the Environment Agency's Water Level Management Plan, will require widespread local support and favourable management of the regional drainage system.

Upstream along the Dyfi Valley are areas of native oak woodland. However, in spite of efforts to conserve these, many woods are still grazed, preventing the development of a natural understory. Some efforts are being made to return areas previously planted with conifers to native broadleaved woodland at both small and large scales (the latter through Forest Enterprise).

Local involvement

There is considerable interest amongst the local community in natural history and environmentally related issues – although the interest is, perhaps, strongest within elements of the 'incoming' population, who have moved to the area for its natural attributes. There is, apparently, well-established membership of organisations such as the RSPB, and local bat, raptor, barn owl and dormouse groups. Volunteer wardens deal with a variety of issues: e.g., four summer wardens assist with CCW schools liaison, and around 14 volunteers warden the wildfowling scheme. Consultation bodies include the Wildfowling Panel, and, in the wider area, the Forest Enterprise Environment Panel. The Cardigan Bay Forum and 'Friends of Cardigan Bay' interest groups are concerned with environmental issues in the area. Specific projects carried out by interested individuals also exist, for example private purchase of land for reforestation, and small-scale willow coppicing.

Tir Cymen support has been taken up by a number of farms on the north side of the estuary, for example to improve habitat on farmland for lapwing breeding. There has also been some local involvement in the Habitat, Hedgerow and Woodland Grant schemes. It is hoped that if the 'whole farm' approach of the proposed Tir Gofal agri-environment scheme comes into existence, this will enable farmers throughout the area to contribute more effectively to objectives in line with those of the biosphere reserve.

Ceredigion County Council has produced a consultation draft Coast and Countryside Strategy which refers to biodiversity action planning in general, and states the production of Local BAPs as an objective. However, none has yet been produced.

The most significant example of local involvement in sustainable development in the area was the establishment in January 1997 of the Eco-Valley Partnership (Ecodyfi), covering the Dyfi catchment area, with objectives that stress the sustainable use of natural resources and community-based economies. Ecodyfi brings together over 20 representatives from business and the public sector, including local county councils, Snowdonia National Park Authority, farmers' unions, CPRW, and the Development Board for Wales. Ecodyfi builds on the history of ecological initiatives in the Dyfi Valley, such as the Centre for Alternative Technology at Machynlleth, Parc Eco Dyfi, windfarm development, and organic farming projects aims to provide advice and grant aid to encourage and support sustainable initiatives. A current example of Ecodyfi's work is a three-year community renewable energy project, including the development of small-scale hydro, solar power, and biofuel initiatives.

Issues to be resolved if the biosphere reserve were to be restructured

Currently, the biosphere reserve includes most of Dyfi SSSI, including Dyfi/Cors Fochno NNR and Ynys-hir RSPB reserve. In practice, CCW informally defines the biosphere reserve by the five metre contour around the estuarine system (i.e., the area considered by the Dyfi Strategy Group). Within this area, appropriate zoning has not been formally revised from the original site map, but for practical purposes the primary raised mire expanse is viewed as core zone, and the rest of the NNR, the RSPB and Wildlife Trust reserves are largely managed in line with buffer zone requirements. Thus, Cors Fochno could be viewed as the current core zone, being subject to the most protection, under the permit-based access arrangement.

If a biosphere reserve is to be continued in this area, an appropriate zonation could be as follows. Cors Fochno would remain as a core area, with the remainder of the Dyfi SSSI forming the buffer zone. Further core areas could include part of the Dyfi estuary and one or more of the other SSSIs situated in the Dyfi Valley, depending on land use. Further buffer zones could also be formed by SSSI/managed areas, for example Llanbrynmair Moor, where a bid has been made for funding to manage a return to wetland from forestry. Consideration should be given to extending the transition zone to include the wider Dyfi catchment, for a number of reasons:

- the catchment forms a natural, distinct ecological unit;
- this area encompasses both the designations associated with the current biosphere reserve and a range of SSSIs, and 2nd tier reserves; as well as a considerable non-urban population within which there is much valuable support both specifically for the designation of a broader biosphere reserve and generally for activities which are consonant with the biosphere reserve concept (e.g., conservation and sustainable resource use);
- Ecodyfi is a significant partnership, with the potential to drive initiatives throughout the Valley in sympathy with (or, ultimately, explicitly to satisfy) MAB programme objectives. The partnership, with representation from a small number of additional organisations including CCW and Forest Enterprise, could form the basis of the overarching management body which would be required for development of the biosphere reserve.

Such a concept would fulfil the requirements of the Statutory Framework for a transition area and ‘designated authority or mechanism’. However, the zonation of the restructured reserve would have to be agreed on, and ‘management policy or plan’ prepared and implemented, with adequate funding and full involvement of other stakeholders such as farmers, wildfowlers, local interest groups, educational establishments, and recreational groups.

6.5. Caerlaverock

Designations and schemes

The current biosphere reserve consists of the Caerlaverock NNR, which covers almost 8000 hectares, leased from the Crown Estates and the Mansfield and Caerlaverock Estates. The Wildfowl and Wetlands Trust (WWT) has a reserve and centre at East Park Farm on the north edge of the NNR, and the work of WWT complements the management of the reserve by SNH. The NNR is situated within the Upper Solway Flats & Marshes SPA and SSSI (which also includes the WWT reserve and is a Ramsar site), the Inner Solway Firth cSAC, and the Nith Estuary National Scenic Area.

Caerlaverock NNR is also within the area covered by the Solway Firth Partnership, established in 1994 with the aim of "increasing integrated and sustainable management of the Solway Firth." The Partnership's seaward area extends westward to a line drawn between the Mull of Galloway and St. Bees Head, and its landward boundary is 1 km from Mean High Water Spring, with flexibility to include activities further inland, as appropriate. The Partnership aims to be linked with the Inner Solway European Marine Site management group, and the development of LBAPs and LA21 in Dumfries & Galloway (and Cumbria).

Land uses, research and education

The principal land uses in the area include grazing of saltmarsh (known locally as merse) and of surrounding improved land; silage production, which is a relatively recent move from past cereal and potato crop production; and beef and dairy production. There is a long tradition of wildfowling, and a history of uncontrolled shooting in the wider area, but at present only about 200 birds from a range of quarry species are shot per year on the NNR. Uses of the aquatic/marine resources include angling, traditional salmon 'haaf' netting and, traditionally, cockle fishing. However, the area has suffered from severe exploitation of cockles, particularly by outside fishing groups, and the cockle fishery is currently closed to harvesting by mechanical means due to depleted stocks. The area is also used for recreational purposes.

There has been research in recent years into cockle fishing, saltmarsh grazing, and marsh erosion and accretion (by Glasgow University). WWT carries out a long-term study of Barnacle Geese, and regular monitoring of other birds takes place, with data contributed to WEBS. Monitoring of rare plants and animals, and the cockle stocks takes place, and there has also been research into the influence of Sellafield power station on the area. SNH employs an Education Officer in the summer months to raise awareness, enjoyment, and understanding of the reserve and the wider countryside through talks, guided walks, events, liaison with schools, and displays in local museums and elsewhere in the region. WWT operates an educational programme for schools, groups and visitors, and Historic Scotland operates a programme at Caerlaverock Castle, close to the reserve. In the past, staff from other nature reserves have visited to learn about the wildfowling scheme operated in the reserve. The reserve takes on overseas students on placement on an *ad hoc* basis.

Conservation value and management

The NNR has one of the largest areas of saltmarsh in Britain, and the largest in Scotland. It is one of the few sites where undisturbed natural processes of growth and erosion of saltmarsh can be observed. The merse shows natural succession from plants colonising bare mud through to productive grasslands. Caerlaverock is well known for its wintering population of Barnacle Geese; the entire population from Svalbard arrive on the Solway to feed. SNH operates a Goose Management Scheme with local farmers to encourage controlled goose grazing on fields. SNH also operates a payment scheme to encourage the maintenance or re-introduction of traditional grazing practices on the merse. These schemes along with the wildfowling scheme are significant demonstrations of management practices. The site is the most northwesterly recorded breeding site for Natterjack Toads, and has c.10% of the UK population. Through a series of bylaws, SNH is able to control disturbance to the site at certain times of the year.

Local involvement

Local consultation takes place through discussions between SNH and the farming community, with formal meetings to discuss such activities as the Goose Management Scheme. A wildfowling panel exists to ensure control of shooting in the area.

In the wider area, the Solway Firth Partnership provides a vehicle for local involvement in sustainable use of the estuary. The steering group involves a very wide range of English and Scottish organisations, including municipal, county, and regional councils and a variety of statutory agencies concerned with conservation, fisheries, and water resources. The steering group has encouraged broad regional participation through a series of meetings held during the development of the Solway Firth Strategy, published in July 1998. In particular, over 150 people attended workshops to comment on the strategy and propose local actions. The 1,200 plus membership includes managers, users, interest groups, and local community members, who receive a regular newsletter. In addition to the quarterly meetings of the steering group, there is an annual standing conference open to all interested parties. Until July 1998, the main funding (40%) for partnership activities came from the 'European partnership' (a Dumfries and Galloway Objective 5b funded programme); most other funds have been contributed by English Nature and SNH, mainly to support a project officer. Additional funding comes from municipal and local authorities, and from other sources for specific projects.

A number of relevant structures and activities exist at the scale of Dumfries and Galloway Region. Solway Heritage, a limited company and charity, was constituted by the Regional Council in 1988. Its objectives are to ensure sustainable development, conserve and enhance landscape and buildings, and ensure public access and interpretation in the Region. Its members include the Council, Dumfries and Galloway Enterprise, SNH, FWAG, the Scottish Wildlife and Civic Trusts, and the Architectural Heritage Society of Scotland. Funding has come from Objective 5b funds, the Lottery, and Landfill Tax. The Dumfries and Galloway BAP is due to be published in 1999, and a consultative draft has been presented to the community. The Region's draft Structure Plan contains explicit policy statements relating to protection, and makes reference to the biosphere reserve.

In November 1998, the Southern Uplands Initiative was launched. It is intended to be a means for developing integrated land management through broad stakeholder

involvement. SNH and the Borders Forest Trust are joint coordinators, and Forest Enterprise, local authorities, communities, and landowners will be involved.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists of a core area, and in practice performs no function beyond that of the conservation function of the NNR, in spite of references to the biosphere reserve in the Region's Structure Plan and the Solway Firth Strategy. While the current designation appears largely to meet the expected conservation objectives of a biosphere reserve, it only covers a small area, and there is no defined buffer zone and only a limited population for the involvement of local communities and the promotion of sustainable development.

If a biosphere reserve is to be continued in this area, it would probably have to be extended considerably. The Caerlaverock NNR would be retained as a core area; the adjacent SSSI and SSSIs in the Dumfries and Galloway Region/Cumbria within the Inner Solway Firth cSAC could be core areas and/or buffer zones; and the transition zone could include part, or all, of Solway Firth Partnership's domain. This would seem appropriate considering that the vision statement for the Strategy is: "To secure an environmentally sustainable future for the Solway Firth Area which allows the economy to prosper while respecting the distinctive character, natural features, wildlife and habitats of the Firth", and that the Strategy recognises the important influences of many activities on land regulated by agencies represented on the steering group. Suitably modified to show the relationship between the Strategy Area and the biosphere reserve, with a map of the biosphere reserve core area and buffer zones, the Strategy could be a key element of an appropriate 'management policy or plan' for the area as a biosphere reserve. With its broad membership, the steering group would be an appropriate 'authority or mechanism' for implementing this. In addition, consideration would particularly have to be given to the expansion of the area covered by the transition area of a broader biosphere reserve to include more than the 1km margin around the Firth, as well as the potential for harmonising biosphere reserve aims with ongoing and developing designations, schemes, and initiatives.

6.6. Cairnsmore of Fleet / Merrick Kells / Silver Flowe

Designations and schemes

Cairnsmore of Fleet, Merrick Kells, and Silver Flowe is a composite biosphere reserve, originally designated by UNESCO in two parts: Merrick Kells and Silver Flowe; and Cairnsmore of Fleet. It comprises the Cairnsmore of Fleet NNR (which occupies 1922 ha of the 3559 ha SSSI), the Silver Flowe NNR, and the core of the Merrick Kells SSSI. The latter two sites together occupy 3088 ha of the 8925 ha of the Merrick Kells SSSI. Cairnsmore of Fleet is owned by SNH. Both Silver Flowe NNR and Merrick Kells SSSI are owned by Forest Enterprise (FE) and leased and managed by SNH. Silver Flowe is a Ramsar site, and Merrick Kells is a candidate SAC. Galloway Forest Park, owned by FE, surrounds Merrick Kells SSSI (including Silver Flowe NNR), and covers part of Cairnsmore of Fleet NNR.

Land uses, research, and education

A large part of the Cairnsmore of Fleet area is grazed by blackface sheep from a farm run by SNH, and there is some cattle grazing. While parts of the Merrick Kells SSSI are grazed by sheep, many areas are free of livestock. There is a limited amount of fishing in the waterways and lochs. Outside the SSSIs, the principal land use is commercial coniferous forestry. The entire area is used for recreation. Cairnsmore of Fleet, at 711m, is a popular objective for walkers. SNH operates Buckshead visitor centre at its Dromore farmstead, and runs eight guided walks; FE runs a visitor centre at Clatteringshaws Loch. SNH plans to recruit an interpretation officer at Cairnsmore of Fleet.

There is no regular planned, integrated monitoring or research in the area, although various activities do take place. Research projects are carried out through consultation with other agencies/bodies, and SNH monitors site condition. SEPA and the Institute of Freshwater Fisheries have monitored acid rain in the catchment, and recent work has considered the effects of acidification on bog recovery. Considerable work takes place between SNH and FE concerning the effects of goats and deer on montane vegetation and native woodland, and funding has been allocated for employment of a researcher in 1999. Danish university groups are regular visitors to Cairnsmore of Fleet, as are local school groups and Duke of Edinburgh Award candidates. Other activities include monitoring of raptors by the local raptor and Galloway Forest Bird study groups, monitoring of the effects of cattle on bog/grassland, and common bird census monitoring.

Cairnsmore of Fleet runs a series of heathland management demonstrations, including its hill sheep farm, moor burning, the introduction of cattle to manage rank vegetation, and a recent collaboration with the Northern Ireland agriculture department, for heather management. Phase 1 NVC training has been run for SNH staff, FWAG Officers, and volunteers and, at Merrick Kells, informal habitat survey training has been carried out.

Conservation value and management

Cairnsmore of Fleet is representative of unafforested granite massif, low level moorland, montane grassland, and dwarf shrub heath. It is the most extensive area of open moorland in Galloway. The reserve contains plants at their northern and western limits, nationally scarce plants, breeding and upland birds, mammals and invertebrates of interest, and upland raptors such as golden eagle, merlin and hen harrier. There is also a population of wild goats. Much of the site is managed by grazing, burning and swiping, to maintain habitat for birds. There is progressive management to maintain red and black grouse. One of the main challenges facing the site is the re-establishment of extensive cattle and sheep grazing through work with farmers. A decline in farming of traditional breeds, such as belted Galloway cattle, has reduced the potential for such practices, with farmers operating with less sturdy breeds more suited to lowland grazing. This work is currently the subject of considerable attention from both SNH and FE. The NNR management plan is currently under review.

Merrick Kells SSSI contains three habitats of European interest: blanket bog, montane acid grasslands, and wet heath with cross leaved heath. There are mires supporting various communities, and the area has a wide variety of species but low population levels. There are nationally important breeding bird populations, and important invertebrate populations. The site is the largest remaining unafforested area of upland in Galloway. Silver Flowe is a unique bog formation, and one of the least interrupted undisturbed mire systems in Europe. Its high value is principally due to the landscape pattern of an assemblage of discrete mires. It is also a breeding site for the rare Azure Hawker dragonfly.

Management of Merrick Kells and Silver Flowe is mainly through non-intervention, apart from areas where extensive livestock grazing is practised in order to manage vegetation. Silver Flowe has a management plan dating from 1987. Merrick Kells is subject to a joint SNH/FE management plan, which expires in 2000.

The three sites are surrounded by commercial coniferous forestry, and acidification has had significant impacts on water and vegetation. FE's Strategic Development Plan for the Dumfries and Galloway Region largely appears to be in keeping with the aims of the biosphere reserve concept, and includes provision for core areas and buffer zones compatible with the biosphere reserve, associated species and habitat conservation plans, and community consultation – including a manager to facilitate effective community communication. FE, SNH, SEPA, the West Galloway Fisheries Trust, and the Swedish Forestry Service are together involved in a LIFE bid for a project to set up links with a similar catchment in Sweden, which would include establishment of demonstrations, information exchange etc.

Local involvement

The biosphere reserve area is mainly unpopulated, resulting in limited community involvement. Some communication takes place between SNH and adjacent landowners at Cairnsmore of Fleet, and work has been done to encourage farmers to graze livestock in Merrick Kells.

Community-based initiatives in the general area include promotion of community awareness of sustainable woodland projects, at Mill on the Fleet (established as a focal point for conservation related displays), and the Cree Valley Community Woodland

project. West Galloway Fisheries Trust are responsible for the 'Salmon in the Classroom' project, which involves local schools in rearing young fish for stocking purposes.

Farms in the wider area make use of the Countryside Premium Scheme, or fall within the Western Southern Uplands ESA. As in the case of the Caerlaverock biosphere reserve, the Dumfries & Galloway BAP is due to be published in 1999. At a general level, Dumfries and Galloway Council is preparing a Forestry Framework Plan through partnership with SNH and the Forestry Authority, which will involve local communities in identifying issues relating to forestry development in certain areas. The Council is also developing a Forestry Subject Local Plan for the whole region.

Issues to be resolved if the biosphere reserve were to be restructured

The biosphere reserve currently consists of the two NNRs plus the core section of the larger Merrick Kells SSSI. While there is no application of a buffer zone or transition area, the wider area of the Merrick Kells SSSI is seen, informally, as acting as a buffer around the Silver Flowe NNR and Merrick Kells core area.

The 1990 Working Party Report to the UK MAB Committee suggested the adoption of the limits of the Galloway Forest Park as the boundary of the transition area, with core and buffer zones formed by the NNR/Merrick Kells core, and unforested parts of the Forest Park respectively. If a biosphere reserve were to be continued in this area, one factor in favour of such an arrangement would be the future FE Strategic Design Plan, which aims to develop forests in the area according to a series of core and buffer zones subject to habitat and management plans. This plan, together with the appropriate local Forestry Framework Plan, could provide the basis for partnership and shared biosphere reserve management between *inter alia* FE, SNH, and Dumfries and Galloway Council. Such partnership(s) would be in a strong position to support the development of sustainable activities such as extensive grazing practices and eco-tourism. However, large areas of commercial forestry in the vicinity of the core zone would seem to be at odds with conservation objectives. In addition, the predominance of coniferous forest would limit the ability of the proposed transition area to fulfil its aims, as would the low population level in the immediate area.

6.7. Tainish

Designations and schemes

The current biosphere reserve consists of Tainish NNR, which occupies the majority of the Tainish Woods SSSI. The NNR is mainly owned by SNH and is also a candidate SAC. The reserve is contiguous with the Linne Mhuirich SSSI. Nearby are the Tayvallich Juniper and Fern, West Tayvallich Peninsula, and the Ulva Danna and McCormaig Isles SSSIs. Together these SSSIs form much of the Tayvallich Estate, with which SNH has secured management agreements. The area falls within the Knapdale Oakwood Forest Area and within the Knapdale NSA.

Land uses, research and education

The surrounding area has amenity value to tourists and the reserve is of natural history interest to visitors. There is grazing of beef cattle and sheep in land adjacent and near to the reserve, with some controlled grazing carried out within the reserve. In the wider area, there is considerable coniferous forestry development, and fishing (including creels) and fish farming in the lochs. Natural harbours, such as Crinan, form a base for small-scale commercial boat trips and local and visiting private craft.

Monitoring is a primary objective of the reserve's management plan, and will be formally planned in the coming year, to meet SAC requirements. Monitoring contributes to national databases, including the ITE butterfly monitoring scheme and the BTO common birds census. The reserve is the site of an environmental monitoring station, providing information on climate change.

Encouraging research projects is a secondary objective of the management plan, and Edinburgh and Glasgow Universities have both been involved. There are annual study visits by groups from Edinburgh University's Ecology and Resource Management Department. A resource pack is issued to all local schools to encourage use of the reserve, and c.12 schools (mainly primary) have recently visited. A training service is provided for primary school teachers to encourage self sufficiency when using the reserve as a resource. Other training has been provided for specialists (e.g. recent training of lichenologists in woodland management for lower plants) and land managers, forestry, and reserve staff.

Conservation value and management

Tainish is significant as an area large enough to sustain itself as a discrete ecosystem, with a large variety of species. The site is an important example of native mixed woodland, with wet and dry heath, grassland, coastal communities, over 250 species of mosses and liverworts, and over 250 species of lichen. It is a cSAC for its western acidic oak woodland and marsh fritillary population.

The management plan for the NNR, prepared in 1996 for the period 1996-2003, has been drawn up with the aims of the biosphere reserve in mind. This has included the definition of a core area where limited intervention is carried out, and an outer (buffer zone) where demonstration management is a key aim. Within the outer zone, activities include controlled grazing to sustain biodiversity (in particular to manage habitat for the marsh fritillary), enclosures where stock is included to encourage trampling for

woodland regeneration, and deer and bracken control. A management statement for the cSAC was produced in 1999. SNH has management agreements with the owner of the Tayvallich Estate.

Local landowners are encouraged to manage sustainably, and through the Caledonian Partnership Atlantic oakwood restoration project, 50 ha of privately owned woods within the SSSI are managed in line with the reserve's objectives. The Partnership was founded in 1997 with funding from the EU LIFE-Nature programme, with further support from UK conservation bodies. Scottish partners include Highland Birchwoods, the Forestry Authority, FE, Forest Research, ITE, and SNH. Its aim is to restore Atlantic Oakwoods in the western UK; the project will be completed in 2001.

In the wider area there has historically been much unsympathetic forestry development. However, recent years have seen improvements, such as discontinued underplanting of oak woods with spruce, and FE are now managing areas of native woodland for conservation.

Local involvement

Local involvement in management of the site has been limited to consultation with local landowners in and near to the NNR, including a local liaison group to consider oakwood management. The Argyll Broadleaves Initiative, led by the Council, and including the involvement of SNH and the Forestry Authority, exists to heighten awareness of deciduous timber production possibilities. In addition, the 'Argyll Woodworkers' group has proposed a project to produce low cost, energy efficient housing using local timber.

In the past, community reaction to conservation-related issues has included objections to unrealised proposals for the Loch Sween Marine Nature Reserve.

In the wider area within Argyll and Bute, the Council's local plan goes to consultation next year. Its approach places a strong emphasis on identifying the environmental value of areas prior to development, and identifies zones of isolated, developed, and underdeveloped coastline. Taynish falls within this third category, indicating a perceived need to encourage economic development in the area, whilst recognising its ecological value. A number of voluntary conservation bodies, including the Natural History Society in Mid Argyll, are key consultees in the general planning process.

Argyll and Bute is one of four pilot areas in Scotland for the production of BAPs. The District was audited in 1996/97, and a biodiversity group has been established to produce a BAP in 1998. However, generation of local involvement in this process is seen as a possible problem, particularly with limited population levels in many areas.

The Kilmartin Glen Partnership (including SNH, Historic Scotland and Argyll and Bute District Council) is working to develop integration of the cultural and economic aspects of the Kilmartin Glen area, approximately 15 km north of Taynish, including balancing the interests of farmers and archeological heritage. One objective for the area is to achieve World Heritage Site status.

Issues to be resolved if the biosphere reserve were to be restructured

Taynish currently fulfils a number of aims and objectives of biosphere reserves, and is the only UK reserve to explicitly consider its biosphere reserve designation in its management plan. Functional core and buffer zones are in operation and, within the latter, a range of activities takes place in line with conservation objectives, providing appropriate demonstration opportunities. The nearby SSSIs offer potential for further buffer zones, particularly as management agreements are in place, and sustainable land management practices are being encouraged. Conservation objectives are effectively met within the core area, and the area offers potential for further research opportunities, for example in the surrounding marine environment.

However, a major factor jeopardising the ability of the site to fulfil all biosphere reserve aims is the limited local population. If a biosphere reserve were to be continued in this area, a possibility would be to establish a transition area in an extended area within Argyll and Butte, as proposed in the 1990 Working Group Report to the MAB Committee (even to the extent of including the wider archipelago), which could encompass initiatives such as Kilmartin Glen. This would provide opportunities such as synergy with the Council local plan's zoned development approach. However, the appropriate extent for such a transition area is not clear. Other necessary developments would include the preparation of an appropriate management policy or plan, and designation of an implementing authority or mechanism.

6.8. Isle of Rum

Designations and schemes

The current biosphere reserve consists of the entire island, an area of over 100 square kilometres (10,737 ha), and thus one of the largest nature reserves in the UK. It is also an SSSI, NNR, SPA, and candidate SAC. It is owned and managed by SNH. Rum is also part of the Small Isles National Scenic Area (NSA), which embraces some 15,500 hectares, also including the islands of Canna, Eigg and Muck. Rum is further adjacent to the Sound of Arisaig SAC.

Land uses, research and education

Rum is managed for conservation purposes, and all land use is intended to either maintain or enhance the ecological integrity of the island or to assist in an ongoing research programme on red deer. This long-term research programme, monitoring the ecology and behaviour of red deer, has meant that, despite the conservation imperative, Rum supports one of the highest concentrations of deer in Scotland. A total of 1500 deer (an artificially high population) are maintained to aid research. Other research has taken place on the manipulation of sex ratios, the results of which have been published in numerous academic papers and, most recently, in the SNH-published 'The Red Deer and the Natural Heritage'. Research has shown that the existing theory of deer management – that a higher number of hinds yields a higher number of stags – is incorrect. An alternative management practice which keeps the number of hinds low, can still yield good calf numbers, an improved survival rate and ultimately a similar number of stags. The dissemination of these results is therefore instrumental in the wider quest to reduce the extent of overgrazing in Scotland, while still maintaining the viability of the sporting estate. The annual cull of red deer, a mandatory management tool for any sporting estate, was achieved for a few years by allowing commercial sporting activity in the 1980s. This practice was not considered optimal for efficient management and was subsequently discontinued and replaced by the scientifically-based cull conducted by DCS. After the research project is complete in two years, it is anticipated that the deer population will be reduced to around 300.

Other research projects include investigations into habitat restoration; monitoring of environmental change and air pollution; research into the impact of herbivores on floristic diversity; geological research; and the monitoring of grey seals by the Sea Mammal Research Unit, and of manx shearwaters and other seabirds by the JNCC Seabirds at Sea team. Basic research facilities, including a library, are available in Kinloch castle with accommodation for up to 50-60 researchers.

The management of the island for conservation purposes directly conflicts with the needs of the research project on deer and, in consequence, the original aim of the reserve to restore the island's degraded ecology by assisting the natural regeneration of forest has not been met. Fencing one eastern section of the island around Kinloch castle has, however, enabled forest expansion and since 1957 over one million trees and shrubs of over 20 species have been planted. It is expected that these will be the germ of a more extensive forest which should take root in the future.

The Home Farm on the island is run by SNH for the benefit of conservation rather than as a commercial venture. The stock of 45 Highland cattle were reintroduced in the

1970s after the Nature Conservancy Council realised that removing all the livestock was detrimental to the maintenance of herb-rich grasslands. An agricultural regime which in some ways resembles that of a crofting community is now in place to maximise the benefits for biodiversity.

Rum is also of increasing interest to tourists, with around 10,000 visitors a year; 12,000 in 1998. An increasing number are on day trips, but a growing number decide to stay either in the campsite or in the Kinloch Castle hostel. Access is restricted according to the requirements of the deer researchers, but provision is generally made for walkers and climbers – though there are restrictions on climbers. Accommodation is available for 150 people in Kinloch and in May and June this is often filled to capacity. Tourism is not considered a threat to the island, despite the rather draconian access restrictions in place during the early days of the reserve. Rather, SNH favours limited development of tourism as way of maintaining a more viable community on the island and servicing the growing interest from the public in visiting remote Scottish islands.

The reserve is frequently visited by university groups from around the country, with regular fieldwork trips from 12 educational establishments every year, ranging from the Open University's Geological Society to Zurich University's Zoology Department. In addition, local school groups from Mallaig, Lochaber and Portree Secondaries have been encouraged by SNH to make use of the reserve. Other types of training have also taken place on Rum including the staff of SNH and the Forestry Commission; its use by other groups has been constrained by its relative isolation. The interpretation facilities on Rum include guided tours of the castle, illustrated talks, formal displays and three self-guided trails. Interpretive panels and a booklet on the reserve and castle are in preparation.

Conservation value and management

The 'small mountains' along the east coast of Rum, rising at three points above 2500 ft, are of exceptional geological interest due to their volcanic origin and the composition of rare ultra-basic rocks. The island has many representative communities of international importance including montane and sub-montane grassland; dwarf shrub heath and mire communities; sub maritime grasslands and a machair system. The wide range of habitats is primarily influenced by coastal and upland factors which result in a relatively high species diversity, particularly in invertebrates and birds. Rum supports a variety of breeding birds associated with both upland and coastal habitats, including divers, raptors and locally important seabird colonies. The unique mountain top colony of Manx Shearwaters is one of the largest in the world.

As outlined in the previous section, conservation management is the main land use of the reserve and due to the ownership of the site and its island character, there are few obvious threats to its ecological integrity. Oil pollution has the potential to seriously affect the seabird populations and excessive scallop fishing in the Sound of Arisaig from local boats would also be a concern. The impact of fishing on seabird species is generally not known, but could become an issue. Increased recreational pressure also needs to be addressed sensitively.

Local involvement

At present only 27 people live on Rum, all of them associated with the conservation management of the reserve. This is fewer than were present at the height of the NCC

period in the 1960s (c. 35), and a small fraction of the several hundred native people who lived there prior to the clearance of the island for the extensive ranching of sheep and deer in the mid-19th century. In addition to SNH employees and their families (one of whom runs the shop/post office), there are two full-time researchers from the Large Mammal Research Unit at Cambridge University; and one school teacher for the three pupils in Kinloch school. Although SNH is considering the possibility of widening the range of people who would be allowed to live on the island (to include those who may initiate an eco-tourism enterprise) there are scarcely enough people to fulfil the development role objectives of the biosphere reserve. Even with conservation-related commercial activity on the island – which is being discussed by SNH and the Local Enterprise Company (Lochaber Enterprise) – it seems unlikely that Rum could become a ‘model’ of sustainable rural development for the region, given its isolation from the pressures of the agricultural crisis that affects the rest of the Highlands and Islands.

While SNH does not consider that the re-creation of crofts to take over the management role played by Home Farm is a desirable initiative, this could provide opportunities for demonstration. Consequently, the only possibility of having a meaningful transition zone and development role would be to include the other Small Isles that at present have direct connection with Rum. The Small Isles Community Council meets occasionally to discuss matters of mutual concern (e.g., the provision of ferry services, education and medical care), but at present this does not include any wider discussions relating to development or conservation. The recently established Rural Development Group hopes to strengthen links with the other isles and consider opportunities for joint initiatives.

Of considerable relevance to the wider aims of the biosphere reserve is the take-over of the island of Eigg in 1996 by a consortium of inhabitants in partnership with the Scottish Wildlife Trust. After many years of inappropriate proprietorial management, the people of Eigg followed the example of the Assynt Crofters Trust and purchased the land themselves, to be managed for the benefit of the community and in co-operation with conservation agencies.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists of a mixture of core area and possibly buffer zone (Home Farm, restored Kinloch forest), though these are not differentiated on any zoning map. The small area of settlement on either side of Kinloch Bay, which is the only suitable site for further development, is excluded from the strict criteria which otherwise apply on the island. It cannot realistically be regarded as a transition area, because of its size and limited population, all of whom are employed by SNH; though this situation may change in the future, with independent people moving on to Rum.

If it is deemed appropriate for a biosphere reserve to continue in this area, it would have to extend beyond the boundaries of the single island of Rum. It might be proposed that a model to allow full implementation of the biosphere reserve concept could include:

- a core area consisting of the island of Rum, excluding the Kinloch area (i.e., the area already designated as a NNR, SPA, and SAC);

- buffer zones consisting of the other SSSIs on the islands of Canna, Eigg and Muck, together with the fenced area at Kinloch and the Sound of Arisaig SPA;
- a transition area to cover all the Small Isles together with inshore waters, i.e., the existing National Scenic Area. This could potentially be extended to encompass a Small Isles Marine National Park which, as discussed in the past, might also include the Ardnamurchan peninsula and the Armadale section of Skye.

This proposal effectively would involve an extension of the biosphere reserve to cover all the Small Isles – a move which, at present, might not be enthusiastically adopted by the local inhabitants. In order for this concept to work, particularly in the transition area, the ‘policy or plan’ for the biosphere reserve would have to be developed through an appropriate consultative exercise involving the inhabitants of these islands.

Objectives of the plan would have to include encouraging compatible economic development and the strengthening of inter-island ties. It would also have to include the possibilities for future development envisaged by the Isle of Eigg Trust. The designated ‘authority or mechanism’ for implementation would require support from the Small Isles Community Council and statutory bodies, including SNH and Lochaber Enterprise, and would need to be in a position to attract funding (e.g., LEADER II) and implement project proposals. Without this power there would be no incentive for the local communities to support the biosphere reserve concept.

6.9. Beinn Eighe

Designations and Schemes

The current biosphere reserve consists of Beinn Eighe NNR. Scottish Natural Heritage (SNH) owns 89.15% of the NNR (4176 ha), with 10.8% (506 ha) belonging to the National Trust for Scotland and less than 1% owned by Kinlochewe Estate. Close to the NNR are Coulin Pinewood, Talladale Gorge, Torridon Forest and Ardlair - Letterewe SSSIs. These include National Trust for Scotland land and parts of sporting estates (Letterewe, Grudie, Coulin and Gairloch), and management for conservation purposes over some of their area is achieved through agreements with SNH. The ecological importance of the NNR is recognised by its designation as a Council of Europe Diploma site (one of five in the UK) and as the central part of a larger cSAC.

Adjacent to Beinn Eighe NNR is Loch Maree SSSI, which contains the Loch Maree Islands NNR. In 1969, Beinn Eighe NNR became part of the Gairloch Conservation Unit (GCU), a Deer Management Group which works towards the integrated management of red deer over an area of 35,000 ha. The area also lies within the Wester Ross National Scenic Area (NSA).

Land uses, research, and education

The reserve lies within a group of sporting estates which are managed primarily for seasonal deer stalking and grouse shooting. The NNR is managed for conservation, including a major programme of woodland restoration which, over a 45-year period, has attempted to extend one of the genetically distinct fragments of Caledonian Pine forest. The reserve has its own native tree nursery where 13 native species from locally-collected seed have been 'grown on' and used in 11 enclosed areas, 450,000 trees having been planted between 1954 and 1980.

The NNR was originally established partly as an open-air laboratory, and continues to provide a site and facilities for the long-term monitoring of environmental change. The Anancaun Field Station, with full laboratory facilities for up to 14 people, plays an important role in attracting scientists and in the coordination of field data recording. Recent projects have focused on the restoration ecology, age structure and genetic diversity of the fragments of Scots Pine forest. In addition, there is ongoing research and monitoring into invertebrates in peatland and flowing freshwater habitats. Some of the most important research work relates to the genetic integrity and distinctiveness of the Beinn Eighe woodland fragments.

The reserve is frequently used for education purposes, particularly for undergraduate field courses which can be accommodated in the field station. It is also a popular site for school groups, both local and from further afield, and for conservation volunteers. Beinn Eighe has further been used for demonstrating issues in estate management and conservation to landowners and local government representatives.

Free access to the NNR is allowed for recreational use and, as it contains two Munros (Scottish mountains over 3000ft), it is popular choice for hillwalkers. The provision of marked woodland and mountain trails with accompanying interpretative leaflets encourages responsible and sustainable access, and paths in areas susceptible to erosion have been constructed and maintained by voluntary conservation groups and

professional footpath contractors. Tourism is very important to the local economy, visitors to Beinn Eighe making a significant contribution to the settlement of Kinlochewe.

Conservation value and management

Beinn Eighe is one of the most important mountain sites of western Britain, displaying a suite of habitats primarily influenced by upland and oceanic factors. Most of Beinn Eighe is covered by open heathland, bare rock, scree, and wet grassland with scattered bogs and peatland. Of national interest are two variants of dwarf shrub heath and a western variant of moss heath. The woodland, which is found below 300m close to Loch Maree and in various isolated gorges, includes the best remaining examples of western pinewood in Britain, and also contains birch, holly, ivy, rowan, oak and juniper. Recent research has shown that the pine woodland is a relict of a once more extensive forest and as such can be classified as 'primary' woodland. Loch Maree is both ecologically and scenically important, being one of the few remaining large bodies of water which has been unaffected by commercial afforestation of its banks, raising of the water level by hydro-electric projects, or commercial uses such as fish-farming.

The NNR is managed purely for conservation objectives, the only concessions being for extensive forms of recreation such as hillwalking. Some sections of the reserve have been fenced to re-establish the forest cover; regeneration is limited outside the fenced area due to high numbers of grazing deer. Culling red deer is therefore a necessary management activity, the numbers in the wider area being regulated in conjunction with the surrounding Deer Management Groups.

The oakwoods of the Loch Maree complex cSAC are included in the Caledonian Partnership project described above for Taynish.

Local involvement

The main forum for co-operative management is the Gairloch Conservation Unit representing local landowners in regulating deer numbers. However, for various reasons, the forum has not met in recent years. Consequently, there is currently no operational structure which directly involves local people in the management of the NNR. At the same time, there are several ways in which the reserve is linked to the surrounding community. It is already the biggest single employer in the crofting township of Kinlochewe and has a multiplier effect on the rest of the local economy, with seven full-time SNH jobs. In addition, there are summer posts, a employee of the National Trust for Scotland and several tourist-related jobs in the village. The reserve's visitor and interpretation centre deliberately does not sell certain products (such as food and camera film) that are available in the local shop, so as not to compete with existing businesses.

Within the last year representatives of the community council and Regional Council have been invited to attend management meetings relating to the NNR, a move which has been welcomed locally. The reserve has also been used for teaching purposes by the local school.

SNH recently commissioned a 600-page study of the Gaelic place names of the Beinn Eighe and Loch Maree. This authoritative document was meticulously compiled from

accounts of older Gaelic speakers in the area, many of the names having gone out of common use in a region where Gaelic is in rapid decline. One local commented that SNH had done more for the language than other public bodies who have Gaelic promotion as their core remit. Interpretative literature on the reserve is also produced in Gaelic and English.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists of a core area, whose importance for conservation is also recognised by other UK and European designations. However, this is only part of a larger ecosystem, as recognised, *inter alia*, by the larger cSAC area. There is no buffer zone or transition area.

If a biosphere reserve is to be continued in this area, the Beinn Eighe and Loch Maree Islands NNRs could continue to be included in the core area. However, this could be extended to cover the larger cSAC, which would afford a greater degree of protection than that previously offered by the SSSIs. Adjacent to the core area, a clearly-identified buffer zone could include other SSSIs in the area (e.g., Loch Maree, Torridon Forest, Ardlair–Letterewe), together with a new area (1100ha) of native forest planting at Bad an Sgalaig. Although this might leave part of the core area at the north end of Loch Maree without a ‘buffer’, there is, without further designation, no other way of regulating activity outside this area.

There appears to be little scope for a management regime using existing structures which would reflect any difference between the buffer zone and transition area. SNH is reliant on voluntary co-operation with local landowners and, to date, this has been rather variable. The transition area would have to include Lochcarron, Gairloch, and Aultbea as there is little human activity outside these settlements; it could possibly, for an interim period, be composed of the existing Wester Ross National Scenic Area. However, this designation does not give sufficient positive incentive for sustainable development and some other initiative would be required, linked to the preparation of a management plan and the designation of a suitable implementing ‘authority or mechanism’. An extended biosphere reserve would have to have a strong focus on rural development, possibly following the example of the Area Sustainability Strategies recently launched by SNH. Any ‘re-launching’ of the biosphere reserve concept would have to be considered very carefully, given the delicate nature of land issues in the Scottish Highlands and local sensitivities to the implementation of conservation policy by SNH.

6.10. Loch Druidibeg

Designations and schemes

The current biosphere reserve of Loch Druidibeg NNR includes Loch Druidibeg itself together with the Stilligarry and Drimsdale machair, Loch a'Mhachair (Grogarry Loch), and Loch Stilligarry. Although Loch Druidibeg is owned by SNH, Stilligarry and Drimsdale crofting townships are subject to Nature Reserve Agreements with crofting tenants and South Uist Estates Ltd. The SSSIs of Bornish, Howmore Estuary, Loch Bee, Loch Bee machair, Loch Druidibeg, and Loch Hallan, together with the NNR are also an SPA and Ramsar site, and part of a candidate SAC.

Within the NNR, SNH operates a Rabbit Control Scheme, to control rabbits which otherwise threaten the stability of the dune system, making it further prone to coastal erosion. A Wader Recovery Programme, attempting to exclude hedgehogs from areas of key importance for ground nesting waders, is planned.

An SPA has been designated more recently at Kilphedar and Smerclate to the south, in order to encourage corncrake protection. The RSPB and SNH administer a Corncrake Initiative throughout the Western Isles, giving incentive payments to crofters for the late cutting of hay and the creation of early cover which benefits this nationally scarce bird. These measures are being subsumed by the Machairs of the Uists and Benbecula, Barra and Vatersay Environmentally Sensitive Area (ESA) schemes administered by The Scottish Office. Just to the north of the reserve is the South Uist NSA.

There are a number of initiatives for rural development in South Uist, with benefits to conservation. These include the 'Tomairt Air an Oir / On the Edge' initiative, administered by Western Isles Enterprise in southern South Uist; Uist 2000, funded by The Scottish Office and the EU LEADER programme; PESCA, funded by the EU; and the Countryside Premium Scheme and Farm Woodland Premium Scheme, administered by The Scottish Office.

Land uses, research, and education

The Loch Druidibeg section of the reserve is owned and managed by SNH for strict conservation purposes, but remains under crofting tenure (i.e., common grazing). However, on the machair part of the reserve, the continuation of crofting agriculture helps to maintain the conservation interest of the site. Traditional cultivation and grazing practices are therefore encouraged on the machair as an integral part of management for biodiversity. One of the most significant threats to the ecological integrity of the reserve is the present crisis in crofting, with exceptionally low cattle prices (and, to some extent, very few young people willing to continue in crofting). Without the cattle economy, many important species would be in sharp decline. The area surrounding Loch Druidibeg itself belongs to the South Uist Estate and is managed extensively as a sporting estate for deer stalking.

Although no special research facilities are available on the reserve, it is frequently used for scientific and conservation-orientated research. On practical conservation themes, research work has taken place using aerial photography to monitor erosion, geese numbers and the extent of the rabbit problem. More theoretical studies on machair ecology have also been undertaken, with several doctoral theses on plant succession.

There is no visitor centre, but self-guided walks with accompanying leaflets are available. A reserve leaflet (in Gaelic and English) has been produced together with a SNH published booklet on the machair habitat. The reserve is fully signposted, with two information points and interpretative displays. The reserve is often used by local school groups from the Uists and Benbecula.

Conservation value and management

The area exhibits a complex but typical transition of communities in the Uists, giving a west-east cross-section of habitats from alkaline machair through oligotrophic loch to acidic moorland. This highly diverse range of habitats is variously influenced by the oceanic exposure with high levels of salt spray and humidity, and the influence of settled agriculture on which the species-rich machair depends. Over 200 species of flowering plants have been recorded on the reserve, some of which are nationally scarce. Nationally important populations of breeding waders are also present, including redshank, dunlin, lapwing and ringed plover. The machair is also home to the corncrake, a summer migrant once common in Britain and Ireland but now largely confined to the Hebrides. The Loch itself contains hosts a small population of native breeding greylag geese which, in the Uists, remain throughout the year.

The Loch Druidibeg section of the reserve (east of the road) requires little in the way of interventionist management. However, the machair must be maintained through crofting agriculture, as well as protected from threats such as coastal erosion and encroachment by alien species such as rabbit and hedgehog. Crofters use the machair coastal plain to grow small oats and rye for fodder crops and to graze cattle and sheep in winter. Seaweed cast up by the storms is spread as fertiliser on the thin calcium-rich soils. The 'in-bye' croft land used for cropping is the most important area for breeding corncrakes.

Local involvement

The Loch Druidibeg reserve is unique in that the co-operation of local crofters is important for effective conservation management. There is a significant legacy of cooperative projects between conservation agencies and the local community in the Uists and around the reserve. The Rabbit Control Scheme, being obviously beneficial to the crofters who are losing valuable grazing, has attracted voluntary labour from the both townships involved, in a joint exercise to eradicate the problem within a fenced area. Similarly, SNH has initiated a Goose Management Scheme in the Uists which seeks to balance the needs of crofters, conservation, and the shooting estate. A Goose Management Committee, made up of representatives from the community, the local council, the Crofters Commission and the estate, is funded by SNH and the council to provide crofters with effective scaring devices. Occasionally, shooting parties from the estate can be strategically directed into areas worst affected. SNH are determined that the geese numbers should not adversely affect crofting interests, which are in themselves important to conservation in the Uists and the reserve itself.

Crofters in the townships of Stilligarry and Drimisdale are part of the ESA scheme which covers the machair areas of the Uists, Benbecula, Barra and Vatersay. This allows payments to be made to crofters for conservation-orientated management such as arable cropping, the use of seaweed as fertiliser, the late harvest of hay, traditional management of wetland and herb-rich grasslands and the preservation of features of historic interest. Thus, local crofters maintain traditional crofting practices, in turn

supporting the ecological value of the site. Other schemes are run for and by local people, a testimony to the potential for further involvement of the crofting community in the management of the natural heritage and in addressing issues such as unemployment, under-employment and depopulation which present serious threats to island life.

One such programme is the ‘Iomairt Air an Oir / On the Edge’ initiative in southern South Uist, administered by the Western Isles Enterprise (WIE). This attempts to target funding to specific localities to stabilise employment through support for existing small businesses. Another project with similar aims is Uist 2000 Ltd, a company limited by guarantee which was set up in 1993 to implement proposals for economic diversification, after the threat of closure to the MoD rocket range in Benbecula. Covering the islands of North Uist, South Uist and Benbecula, Uist 2000 is an authentically grassroots organisation. It has more recently been awarded the status of a Local Rural Partnership, funded for three years from the Scottish Office and the LEADER II programme. Among the many initiatives supported by Uist 2000 in sectors such as tourism, fish farming, agriculture, and manufacturing, is to devise a strategy to promote diversification in crofting through the retention of traditional cattle breeds. This scheme, supported by SNH, aims to develop a system of support for cattle producers which in turn, maintains the floristic diversity of the Uist machair habitat.

The EU LEADER II programme aims to support collaborative projects that can add value to local produce, improve the local environment, or encourage existing small firms. On Uist, the programme, administered by the local enterprise company (WIE), gave financial backing to The Minch Project, an inter-agency initiative co-ordinated by SNH, which considers the sustainable use of the local marine environment. Another EU-funded initiative is PESCA, aiming at the diversification of the fishing economy in fishery-dependent regions. In the agricultural sector, the Countryside Premium Scheme gives support to local crofters who manage their land in the interests of conservation. Similarly, the Farm Woodland Premium Scheme attempts to reduce dependence on productive agriculture and encourages diversification into appropriate woodland – though its potential in the Uists may be limited.

Another project directly implementing many of the development objectives of a biosphere reserve is the local Area Sustainability Strategy, named Duthchas, after a Gaelic word which invokes a sense of ‘family’, ‘kinship’ and ‘land’. This initiative, funded from the EU LIFE Environment programme and run by a partnership of 18 organisations, operates in three locations in the Highlands and Islands, one of them being nearby North Uist and Berneray. The project attempts to distil ideas for future development from the communities themselves, through local meetings; and to follow through by inter-agency cooperation to turn these ideas into reality. The key emphases of the project are development objectives which will enhance and sustain the natural heritage in the tourism and crofting sectors.

Patterns of land ownership and land use are, as in the rest of the Highlands and Islands, particularly sensitive in the Uists. Land reform could widen rural development opportunities, a point which emerged recently during discussions about a local crofting trust buyout of Balelone Farm on North Uist. Although the buyout attempt foundered, the recently formed Community Land Unit / Tir na Gaidhealtachd of the HIE has been set up to facilitate this type of community-led initiative. The development role of the biosphere reserve could support this trend, recognising that crofting agriculture is a key component in the maintenance of local biodiversity in the Uists.

Issues to be resolved if the biosphere reserve were to be restructured

The current biosphere reserve effectively consists of a core area, which only includes some of a complex suite of habitats orientated west-east from the coast. As many of the activities taking place in the machair are compatible with conservation, and the Rabbit Control and Goose Management Schemes represent cooperation between SNH and crofters, a buffer zone effectively exists – though it is not clearly delineated, and nor is a transition area. Furthermore, the nature of land management makes it difficult to envisage a buffer zone which could surround the core of Loch Druidibeg. This land is managed for deer stalking by South Uist Estates Ltd., and presents no ecological threat to the core. To extend the sphere of influence of the reserve in this way would not seem necessary given the sympathetic approach to land management in South Uist as a whole.

If it is deemed desirable to continue a biosphere reserve on South Uist, the following zonation could be envisaged:

- the core of the biosphere reserve could consist of the current NNR and SSSI east of the main road, including the land and lakes owned and managed by SNH; together with the Stilligarry and Drimisdale machairs and their lakes, from the road to the shore which, being under management agreement and part of the cSAC, are statutorily protected.
- the buffer zone could include the South Uist and Lochs SPA;
- the transition zone could usefully overlap with the South Uist ESA, which brings together similar ecosystems and management regimes across the island.

All the other schemes mentioned should, if possible, be integrated into a management plan for the entire biosphere reserve, which would clearly delineate the boundaries of the core and buffer zones. With the planned merger of the ESA and the CPS, consideration would probably have to be given to defining and managing an area larger than the South Uist ESA as a transition zone.

In this model, natural ‘buffers’ would be present in the form of the Atlantic in the west and the rough moorland of Hecla to the east. A number of agencies are currently involved in the management of this area: primarily SNH, SOAFD, Western Isles Enterprise and the local council. Building on existing broad inter-agency support, the implementation of the concept would require designation of, and financial and other resources for, an implementing ‘authority or mechanism’, as well as practical assistance to the local economy, particularly with regard to crofting agriculture. While there is acute sensitivity over land issues in the Uists, the legacy of cooperation in conservation management could, given the right incentives, be further extended using the biosphere reserve concept.

7. Biosphere Reserves in the UK: Sites of Excellence for Conservation and Sustainable Development

In the mid 1970s, when the existing UK biosphere reserves were designated, the primary emphases of the biosphere reserve concept were on biodiversity conservation, ecological and environmental research, education, and training. The 13 sites were chosen with regard not only to these criteria, but also to current conservation initiatives in the UK. This is probably one reason for the fact that these sites do not represent the considerable biogeographical diversity of the UK. As noted in the 1990 review of UK biosphere reserves, four types of internationally important ecosystems are not represented: two in Scotland (the main montane massif of the Scottish Highlands and the Caithness peatlands), and two in southern England (heathlands and chalk grasslands). From the point of view of UNESCO, which uses a much broader global typology of ecosystem types, all of the existing UK biosphere reserves fall within one type – temperate and sub-polar broadleaf forests and woodlands – and the other type found in the UK – boreal needleleaf forests and woodlands – is unrepresented. While the former includes a high proportion of sites within the global network, the latter includes the two unrepresented Scottish ecosystems identified in the 1990 review, and has relatively few sites worldwide.

However, biogeographical representativeness has only ever been one of many criteria for nomination of an area as a biosphere reserve. Since the 1970s, the biosphere reserve concept has evolved significantly to include the idea that these sites should be of value not only for the purposes identified then, but also for the promotion and development of "sustainable resource management practices"; and that they "should strive to be sites of excellence to explore and demonstrate approaches to conservation and sustainable development on a regional scale" (Statutory Framework, Art. 3). For the existing UK biosphere reserves, the conservation imperative is already met by statutory protection of a core area under at least one, and usually many, national and international conservation designations. As discussed in the previous chapter, there are many examples of the promotion and development of sustainable resource management practices, often linked to conservation needs, around and near many existing UK biosphere reserves. However, these practices have not been implemented in the context of a biosphere reserve policy or plan relating to a broader region with one or more buffer zones and a transition area. This is in spite of the fact that UK government policy has evolved in a similar way to the biosphere reserve concept, as discussed in chapter 5.

Since the core area – and often part or all of the buffer zone(s) – of any UK biosphere reserve will necessarily be statutorily protected, additional designation by UNESCO appears unlikely to result in additional direct 'wildlife gain' to these areas of recognised high biodiversity value. However, an indirect benefit may derive from the fact that UNESCO has given international recognition to a small region of the UK by incorporating it in a global network. This may encourage local land managers, and other users of the land and its resources, to give greater consideration to their actions and their consequences – an argument that can also be applied to other non-statutory globally-recognised sites, such as World Heritage Sites and Ramsar sites. Furthermore, current concepts of conservation stress that landscape-scale approaches to conservation are essential for the management of mobile species and to deal with actual or potential major changes to ecosystems – and the species they include – resulting from changes in

land management policies and/or climate change. Such concepts are evident in conservation policies at all levels: from the Convention on Biological Diversity to the Pan-European Biological and Landscape Diversity Strategy, the European Union's Habitat and Birds Directives and Natura 2000 programme, and the various national, habitat, species and local biodiversity action plans in the UK. Moreover, as stated in these various policies and plans, and as discussed in previous chapters of this report, there are vital linkages between the conservation of biodiversity and sustainable development.

Thus, the benefits of designating and recognising a particular UK area as a biosphere reserve must be seen in a broader context which emphasises these linkages. At the regional scale, the opportunities for the delivery of National Biodiversity Action Plan objectives for species which use not only the core area and buffer zone(s), but also the wider transition area, as habitat could be a clear conservation benefit. This would particularly be the case if cooperative agreements to encourage appropriate land management, possibly combined with appropriately targeted agri-environment schemes, were linked to biosphere reserve status. This is of particular relevance for biosphere reserves which overlap with SPAs, or where farmland in the transition area provides habitat for species with National Biodiversity Action Plans. Again, the fact that an area is globally recognised as a biosphere reserve may prove to be a useful argument in countering development pressures in sensitive areas – which implies the need for attention to awareness-raising and education concerning the meaning of the biosphere reserve concept both at the local level, and generally among relevant decision-makers across the UK.

Other benefits of biosphere reserve designation relate to the fact that biosphere reserves form a global network of sites. From a scientific point of view, a particular benefit derives from possibilities for comparative research, experimental work, and the compilation and use of standardised databases such as ACCESS, MABFauna, and MABFlora. These are all components of UNESCO's Biosphere Reserve Integrated Monitoring (BRIM) programme, which places special emphasis on global change, biological diversity, ecosystem management, human impact and environmental sustainability. The availability of such information is not only of scientific interest, but also valuable for understanding processes of environmental change, and developing strategies to address these. A comparable initiative is also developing in Europe: Networking of Long-term Integrated Monitoring In Terrestrial Systems (NoLIMITS), a Preparatory Action funded by the EC European Network for Research in Global Change (ENRICH). The Environmental Change Network, to which the Moor House / Upper Teesdale biosphere reserve already belongs, is the UK focal point for this initiative. Recognising the expected 'logistic' role of biosphere reserves as sites which provide "support for demonstration projects, environmental education and training, research and monitoring" (Statutory Framework, Art. 3[iii]), it might be appropriate for more of them to be included in such initiatives.

Further benefits of membership of the global network accrue to those managing and coordinating activities in biosphere reserves, as this membership provides unique opportunities to ask for assistance with pressing problems and to exchange experiences, particularly through the electronic networks and meetings organised by EuroMAB. Such exchanges can relate not only to management techniques for sites with similar ecosystems, but also to new approaches to issues such as relationships with local communities and other stakeholders to ensure the delivery of conservation objectives, innovative institutional arrangements for conservation and land use planning, and new

approaches to interpretation and education for sustainable development. The biannual meetings of coordinators of EuroMAB biosphere reserves are recognised by all participants as highly valuable for such exchanges; it is worth noting that the next will take place in Cambridge in April 2000. Other networks of protected sites, such as EUROSITE (European Network of Site Management Organizations) and the EUROPARC Federation, exist in Europe. It may well be appropriate for individual UK biosphere reserves – or at least the protected areas which constitute their core areas – to belong to these networks. However, neither of them has the global recognition or broad emphases of the World Network of Biosphere Reserves.

Overall, membership in this network brings benefits not only for conservation, research, education, and training – the primary concerns of conservation agencies and NGOs, and scientists – but also for local communities, as biosphere reserves should be test areas where such activities are implemented within the broader context of sustainable development, and sustainable resource management practices are promoted and developed, particular in the transition area. Membership in the network may bring opportunities not only for exchanges of experience and know-how between local stakeholders in different biosphere reserves, but also for joint actions, such as marketing to tourists, as discussed in the last meeting of EuroMAB biosphere reserve coordinators. Thus, benefits derive both from exchange and collaboration within a network and the accolade represented by UNESCO recognition as a biosphere reserve.

As discussed in chapter 5, UK government policy stresses the linkages between sustainable development and conservation, and a wide range of initiatives and partnerships has been developing in recent years. All of these experiences reveal the clear needs for involvement of all stakeholders in all stages of decision-making and implementation, and for secure funding from a diversity of sources, including local ones; needs that are also clear from the criteria for membership in the World Network of Biosphere Reserves. As recognised by the proponents of World Heritage Sites, the bestowal of a global accolade can be vital in increasing recognition and support for the sustainable management of important sites, and in increasing awareness about need for such management. Recognition of an area as a biosphere reserve is also a global accolade. The UK biosphere reserves should be places where government agencies, local authorities, local communities, and private interests work together to foster working models which both show commitment to international agreements and provide practical examples of the synergy which is required between conservation and sustainable development.

8. Guidelines for the Selection of New UK Biosphere Reserves

The Statutory Framework sets out clear criteria for a site to be qualified for designation as a biosphere reserve. As will be clear from chapter 6, none of the existing UK biosphere reserves meets these criteria. The UK government has a number of options with regard to these sites. Under Article 9(8) of the Statutory Framework, it can notify the MAB Secretariat that it wishes to remove one or more sites from the World Network of Biosphere Reserves. As substantiated in chapter 6, this is recommended for Claish Moss and St. Kilda. For the remaining ten sites, the government may wish to consider the suggestions in chapter 6, in order to decide whether other sites may not have significant potential for effectively fulfilling the criteria in the Statutory Framework, and should also be withdrawn from the network. If they are to be retained within the network, as discussed above, there could be various possibilities for improvement to meet the criteria – notably through expansion in size, clear definition of zones, preparation of new management plans or revision of appropriate existing documents, and designation of an appropriate ‘authority or mechanism’ which, in many cases, is in place or nascent. Adequate funds for long-term functioning, from multiple sources, would also have to be identified and committed.

The government may also wish to implement a consultation process to consider all current biosphere reserves in the UK, together with other areas which might have the potential to effectively fulfil the criteria, given available resources and the interests of potential stakeholders at various levels. In this context, local communities and other stakeholders could be encouraged to nominate potential areas, recognising the potential benefits for both conservation and sustainable development. The recent process of nominating candidate World Heritage Sites may provide a useful model. In such a process and in general, given the plethora of existing designations in the UK, use of the word ‘designation’ (as a biosphere reserve) should probably be avoided. It may be more appropriate to publicise the fact that an area has been, or could be, recognised by UNESCO as a member of the World Network of Biosphere Reserves.

A set of guidelines is provided below to assist the UK government, should it wish to continue to maintain biosphere reserves based on the existing sites, or to identify potential new biosphere reserves. The guidelines are not in any order of priority. References are to sections in Article 4 of the Statutory Framework.

Biogeographic representativeness

As noted in the previous chapter, the existing UK biosphere reserves do not include any examples of the UNESCO ecosystem type of ‘boreal needleleaf forests and woodlands’. This overlaps with two internationally important, but unrepresented, UK ecosystems: the main montane massif of the Scottish Highlands and the Caithness peatlands. Thus, from the viewpoint of global representativeness, consideration could be given to potential biosphere reserves within these ecosystems.

From the viewpoint of including the full diversity of UK ecosystems, consideration could also be given to including potential sites in southern English heathlands and chalk grasslands.

Given limited resources, if the government were to consider removing more than the two sites proposed in chapter 6 from the World Network of Biosphere Reserves, similarities between the ecosystems at existing sites might be a factor to consider.

Spatial extent

Any biosphere reserve should be large enough to "encompass a mosaic of ecological systems... , including a gradation of human interventions" (sec. 1) and "provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale" (sec.3). At present, such areas are typically designated as National Parks, AONBs, Estuary or Firth Forum areas, and the like. Some of these designations are statutory, others are not, and they have various objectives.

Statutory designation of an area as a biosphere reserve *per se* is probably not desirable. Given the large number of existing designations in the UK, it would generally be better if the transition area were broadly congruent with the area of an existing designation or scheme – while recognising that the outer boundary of a transition area does not need to be delineated. Functional boundaries, such as watersheds, may also be appropriate.

Significance for biological diversity conservation

As recognised in current UK policy, the majority of the UK landscape is of significance for biological diversity conservation. Nevertheless, some areas are of greater significance, and these are largely protected under one or more designations. The core area(s) of a biosphere reserve must be "legally constituted (and) devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives" (sec. 4[a]). As discussed in section 4.1 of this report, a number of designations meet the first part of this criterion; though the higher the level of designation, the more secure the level of protection.

The issues of conservation objectives and size must be considered in relation to the objectives of each biosphere reserve as a whole. Thus, for instance, the management plan for an NNR which formed the core area of a biosphere reserve should take into consideration broad regional conservation objectives, such as those in county or wider Biodiversity Action Plans or Natural Area Profiles.

When evaluating potential sites, opportunities for the delivery of National Biodiversity Action Plan objectives for species which use not only the core area and buffer zone(s), but also the wider transition area, as habitat should be considered.

Broad support from local stakeholders and statutory agencies

Any biosphere reserve must have one or more clearly-identified core area(s) and buffer zone(s), a "management policy or plan for the area as a biosphere reserve", and "a designated authority or mechanism to implement this policy or plan" (sec 7 [b, c]). The definition and implementation of such zones and strategies requires the active involvement of local stakeholders and interested statutory and non-statutory organisations to define the various zones, objectives, and policies.

As suggested above, local communities and other stakeholders could be encouraged to nominate potential areas, recognising the potential benefits for both conservation and

sustainable development. New sites should not be nominated to UNESCO without clear local support.

Suitable organisational structures will be needed for all UK biosphere reserves, with broad membership, including "public authorities, local communities and private interests" (sec. 6) in both advisory and executive roles. The various structures developed for certain AONBs, National Parks, Estuary and Firth Fora, and Scottish Area Sustainability Strategies may provide relevant models; other appropriate structures could be identified from biosphere reserves in other countries.

Financial resources

The resources required to "manage human use and activities in the buffer zone or zones" (sec. 7[a]), promote and develop "sustainable resource management practices" (sec. 5[c]), undertake "programmes for research, monitoring, education and training" (sec. 7[d]) and generally implement the "management policy or plan" (sec. 7[b]) are not insignificant. It is unlikely and undesirable that such resources should come entirely from central government.

Funding for biosphere reserves should be long-term and drawn from a partnership of organisations, including government departments, counties and other local authorities and, where possible, non-governmental organisations, as well as the private sector. Such funding should be based on the contribution of biosphere reserves to biodiversity and sustainable development (Agenda 21) objectives.

To encourage support from local landowners, consideration should be given to implementing specific agri-environment or rural development schemes that encourage appropriate land-use practices in the buffer zones and transition areas of biosphere reserves. Wherever possible, such schemes should be delivered through existing UK and EU schemes (e.g., the Agenda 2000 Rural Development Regulation) through targeting on areas designated as biosphere reserves.

At the same time, local enterprises and organisations should be encouraged to promote and directly support conservation and sustainable activities in biosphere reserves, recognising that the global accolade can bring development and provide access to resources that might otherwise not be available.

APPENDIX 1: References consulted for individual biosphere reserves

Braunton Burrows

Devon County Council: Northam Burrows Country Park Management Plan, 1992

English Nature: Management Guidelines for the Site of Special Scientific Interest and Candidate Special Area of Conservation, February 1997

Environment Agency: Braunton Marsh Water Level Management Plan, Version 2/0, November 1998

Environment Agency: River Torridge and Hartland Streams Local Environmental Agency Plan, Consultation Draft, September 1998

Farming and Rural Conservation Agency: Countryside Stewardship Scheme Targets for Devon 1999

Taw Torridge Estuary Project: Combined Issues Report

Taw Torridge Estuary Project: Taw Torridge Estuaries Action Plan

North Norfolk Coast

English Nature: A Vision for Nature Conservation in the Norfolk Coast Area of Outstanding Natural Beauty (AONB) 1997-2022, April 1998

English Nature: National Nature Reserves in Norfolk

English Nature: The North Norfolk Natural Area Profile, 1997

Environment Agency: North Norfolk Local Environment Agency Plan, Consultation Report, June 1996, Action Plan, March 1997, and Annual Review, June 1998

Environment Agency: Water Level Management Plan for North Norfolk SSSI, Burnham Norton, Final Plan, December 1996

Environment Agency: Water Level Management Plan for North Norfolk SSSI, Burnham Overy Marshes, Final Plan, March 1996

Environment Agency: Water Level Management Plan for North Norfolk SSSI, Holme, Final Plan, December 1996

Ministry of Agriculture, Fisheries and Food: Countryside Stewardship in Norfolk

Norfolk Coast Project: A Visitor Management Strategy for the North Norfolk Coast, Consultation Draft, January 1994

Norfolk Coast Project: Norfolk Coast AONB Management Strategy, October 1998

Norfolk Coast Project: Visitor Management Strategy for the North Norfolk Coast, January 1995

Norfolk County Council: Norfolk Coast Transport Strategy, Planning and Transportation, June 1998

Norfolk County Council: The North Norfolk Heritage Coast Strategy & Management Plan, Norfolk Countryside Services, 1989

RSPB et al: Coast in Crisis: RSPB East Anglia Office, Norwich, 1997

Moor House - Upper Teesdale

Countryside Commission: East Cumbria Countryside Project, Walks and Events for Winter Weekends

County Durham Local Agenda 21 Partnership: The First Three Years of Sustainability in Action, November 1997

Cumbria Biodiversity Partnership: Biodiversity Action Plan - What do You Think?

Eden Local Agenda 21: Eden Local Agenda 21 Natural Environment Issues, Newsletter No.5, October 1998

English Nature: Moor House NNR Management Plan, 1995

Environment Agency: The Environment Agency in the North West - North Area, Fact File

Environment Department, Durham County Council: Durham Wildlife Audit, December 1995

Environment Department, Durham County Council: Life in County Durham - More or Less Sustainable?, 1996

North Pennines AONB Steering Group: The North Pennines AONB Management Plan, January 1995

RSPB: Working with Waders, the RSPB's North Pennines Project (draft), December 1998

Dyfi - Cors Fochno

Allan, L.: The Development of the Biosphere Reserve Concept and its Application to the Dyfi National Nature Reserve, June 1992

Christie, M. *et al.*, Welsh Institute of Rural Studies, The Effectiveness of Interpretation, its Economic Impact and Recreational Use of Welsh National Nature Reserves, February 1998

Countryside Council for Wales: Cors Fochno, 1997

Countryside Council for Wales: Dyfi National Nature Reserve, 1995

Countryside Council for Wales: SSSI citations for the Cae Ty-Hen, Cwm Llyfnant, Coed Maes-Mawr, Coed Esgairneiriau a Cheunant Caecenau, Coed Cwm Cletwr, Gwaun Troed-Rhiw Seiri a Llyn Mynydd-Gorddu, Pencarreg-Gopa a Moel Hyrddod, and Pumlumon SSSIs

Countryside Council for Wales: Tir Gofal, 1998

Department of Environmental Services and Housing, Ceredigion County Council: Coast and Countryside Strategy: Ceredigion, Consultation Draft, May 1998

Dyfi Eco-Valley Partnership: Introducing the Dyfi Eco-Valley Partnership, 1998

Dyfi Eco-Valley Partnership: Potential Schemes as at 16/11/98, 1998

Environment Agency: Dyfi Water Level Management Plan, March 1998

Partnership of organisations for the Pen Llyn a'r Sarnau: Pen Llyn a'r Sarnau, 1998

Caerlaverock

Dumfries & Galloway Council: Dumfries & Galloway, Biodiversity - The Variety of Life (consultative draft BAP), 1998

Scottish Natural Heritage: Caerlaverock NNR Draft Management Plan

Scottish Natural Heritage: Merse Management Scheme for the Scottish Solway

Scottish Natural Heritage: Review of Caerlaverock biosphere reserve, April 1998

Scottish Natural Heritage *et al.*: Caerlaverock - From Siege to Sanctuary, 1998

Solway Firth Partnership: Solway Firth Review, June 1996

Solway Firth Partnership: Solway Firth Strategy, July 1998

Solway Heritage: Solway Heritage Annual Report 1997/98

Cairnsmore of Fleet, Merrick Kells and Silver Flowe

Dumfries & Galloway Council: Dumfries & Galloway, Biodiversity - The Variety of Life (consultative draft BAP), 1998

Forest Enterprise: Draft Strategic Development Plan, 1998

Scottish Natural Heritage: Cairnsmore of Fleet NNR - The Granite Crown

Scottish Natural Heritage: Reviews of Silver Flowe/Merrick Kells, and Cairnsmore of Fleet biosphere reserves

Scottish Natural Heritage: Silver Flowe NNR

Taynish

Argyll and Butte District Council: Draft Structure Plan, Argyll and Butte, 1998

Scottish Natural Heritage: Taynish NNR 2nd Management Plan, 1996-2003, 1996

Scottish Natural Heritage: Review of Taynish biosphere reserve, April 1998

Scottish Natural Heritage: Taynish NNR - The Hidden Peninsula

Rum

Clutton-Brock, T H and Ball, M E: Rhum: The Natural History of an Island, Edinburgh University Press, 1987

Scottish Natural Heritage: The Red Deer and the Natural Heritage, 1996

Scottish Natural Heritage: The Big Small Isle / An t-Eilean Beag Mor, reserve leaflet, 1997

Scottish Natural Heritage: Rum National Nature Reserve Management Plan 1998-2008 (Penultimate Draft), 1998

SSSI Citation, Rum 27.3.1987

Beinn Eighe

Countryside Commission for Scotland: National Parks for Scotland, 1991

Deer Commission for Scotland: Annual Report, 1997

Forester, A and Clifford, T: Beinn Eighe NNR Ten Year Management Plan, 1995-2000, 1995

Highland Regional Council: Structure Plan, 1990

Lundqvist, J: Beinn Eighe Nature Reserve, Report to the Committee for the Activities for the Council of Europe in the Field of Biological and Landscape Diversity (CO-DBP), Council of Europe, 1988

Miller, D: Annual Report for Beinn Eighe NNR, 1997-1998 submitted to the Council of Europe, 1998

Scottish Natural Heritage: Beinn Eighe NNR: Mountain Trail, Scottish Natural Heritage, 1990

Scottish Natural Heritage: Beinn Eighe NNR: Woodland Trail, Scottish Natural Heritage, 1990

Scottish Natural Heritage: Jobs and the Natural Heritage, 1998

SSSI Citations: Beinn Eighe, Loch Maree islands, Torridon Forest, Coulin Pinewood, Ardlair – Letterewe, Talladale Gorge

Wentworth, R G: Gaelic Place Names of Beinn Eighe NNR, Report commissioned for Scottish Natural Heritage, 1998

Loch Druidibeg

Comhairle nan Eilean Siar: Uists and Benbecula Local Plan, Forward Planning and Economic Development, 1997

Comhairle nan Eilean Siar: Duthchas Project Leaflet

Highlands and Islands Enterprise: Community Land Unit / Tir na Gaidhealtachd Action Framework 1998- 2001, 1998

Highlands and Islands Enterprise: Memo: Iomairt Air an Oir / Initiative on the Edge, Area Profile, 1998

Highlands and Islands Enterprise: Strategy for Enterprise Development, 1998

Scottish Natural Heritage: Loch Druidibeg Reserve Leaflet, 1997

Scottish Office: Environmentally Sensitive Areas: explanatory leaflet, 1997

UIST 2000: Progress Report 1995-1998, (Local Rural Partnership), 1998

UIST 2000: Project Development Plan 1998-2000, 1998

UIST 2000: Strategic Plan, 1993

UIST 2000: Strategic Plan Partial Review, Spring 1998

Westbrook, S: Uists Economic Study: a report for Highlands and Islands Enterprise, 1993

Western Isles Enterprise / Iomairt nan Eilean Siar: Seventh Report 1997/98, 1998

APPENDIX 2: Interviewees at individual biosphere reserves

Braunton Burrows

Andrew Bell, AONB and Countryside Development Officer – Northern Devon, Devon County Council, Bideford, Devon

John Breeds, Supervisor, Braunton Burrows Training Area, Ministry of Defence, Braunton, Devon

Mary Breeds, Voluntary Warden, Braunton Burrows Training Area, Braunton, Devon

Michael Kelly, Deputy Planning Manager, North Devon District Council, Barnstaple, Devon

Sarah Manning, Countryside Stewardship Project Officer - Devon, Farming and Rural Conservation Agency, Starcross, Devon

Fraser Rush, Senior Reserves Officer, Devon Wildlife Trust, Exeter, Devon

Derek Spear, County Councillor, Braunton

Michael Williams, Team Leader, Environment and Conservation, Devon Area, Environment Agency, Exminster, Devon

Robert Wolton, Group Manager, Devon, Cornwall and Isles of Scilly Team, English Nature, Okehampton, Devon

North Norfolk Coast

Charles Beardall, Fisheries, Ecology and Recreation Manager, Environment Agency, Anglian Region, Ipswich, Suffolk

Peter Doctor, Conservation Officer, Norfolk Wildlife Trust, Norwich, Norfolk

Vicky Eade, Planning Officer, Environment Agency, Anglian Region, Ipswich, Suffolk

Peter Lambley, Lead Conservation Officer, North and West Norfolk, Norfolk Team, English Nature, Norwich, Norfolk

Richard Maclellan, Farm Conservation Advisor, Norfolk Farming and Wildlife Advisory Group, Norwich, Norfolk

Michael Rooney, Site Manager, Scolt Head Island National Nature Reserve, Norfolk Team, English Nature, Holkham, Norfolk

Tim Venes, Norfolk Coast Project Officer, Wells-Next-the-Sea, Norfolk

Helen Vine, SAC Officer, Wash and North Norfolk Coast, Norfolk Team, English Nature, Norwich, Norfolk

Moor House – Upper Teesdale

John Adamson, Moor House and Upper Teesdale ECN Site Research Coordinator, ITE

Lord Barnard, Raby Estate

Maggie Bosanquet, County Durham LA21 Manager

Peter Bullard, Director, Cumbria Wildlife Trust

Gareth Dalgliesh, English Nature Cumbria Team

Paul Glading, English Nature Cumbria Team

Jeremy Greensides, Agent Raby Estate

Roy Lemberger, FRCA, Kenton Barr

Mike Lowe, County Durham

Steve Lowe, Conservation Manager, Durham Wildlife Trust

Chris McCarty, Reserve Manager, Upper Teesdale NNR, English Nature

Sally Orrell (Eden LA21), Neighbourhood Development Officer, Cumbria County Council

Terry Parr, ECN Coordinator, ITE

Jeremy Pickup, Planning Liaison Officer, Environment Agency, North Area

Simon Rowarth, Agent, Strathmore Estate

Rebecca Sinton, Conservation Officer, RSPB

Julie Stobbs, Countryside Conservation Officer, County Durham

Malcolm Stott, Senior Upland Manager, North Pennines Upland Sites, RSPB

Lindsay Waddell, Head Gamekeeper, Raby Estate

Terry Wells, Reserve Manager, Moor House NNR, English Nature

Dyfi – Cors Fochno

Dr. Andrew Agnew, Lecturer, botany/ecology, Coed y Garth, Furnace, Machynlleth, Powys

Mike Bailey, Reserve Manager, Dyfi NNR, Countryside Council for Wales

Mr. & Mrs Huw Besant, farmer, SSSI owner, Penmaen Isaf, Pennal Machynlleth, Powys

Peter Bourne, owner, Sunbourne Leisure, Cambrian Coast Holiday Park, Borth, Ceredigion

Ian Dutch, Principal Planner, Coast & Countryside; Liz Allen, Project Officer, Coast & Countryside, Ceredigion County Council Planning Dept. Aberaeron, Ceredigion

Mick Green, Welsh Wildlife Trusts, Pentrebach, Talybont, Ceredigion

Karen Heppingstall and Roger Matthews, Countryside Council for Wales District officers Ceredigion and Montgomery, Countryside Council for Wales Plas Gogerddan and Countryside Council for Wales Newtown

Andy Jeffery, Centre Manager, Outward Bound, Aberdyfi

Ruth Jenkins, Environment Officer, Forest Authority, Aberystwyth, Ceredigion

Bryan Jones, Head of Conservation, Navigation and Recreation team, Gwynedd EA, LlwynBrain, Ffordd Penlan, Parc Menai, Bangor, Gwynedd

Ian Kerle, Lecturer, Rural studies, Welsh Institute of Rural Studies, Llanbadarn, Aberystwyth

Mike Leggett, Secretary Aberystwyth Gun Club, Nantlais, Dole, Bow Street, Aberystwyth

Sharon Lewis, Llancynfelin Community Councillor, Gorlan, Taliesin, Machynlleth, Powys

Anthony Morris, Borth Community Councillor, Glaneifion, Borth, Ceredigion

Daniel Owen, Tourism & Marketing Manager, Ceredigion County Council, Ty Lisburne, Ffordd y Mor, Aberystwyth

Huw Phillips, Llancynfelin Community Councillor, Gwynfryn Hall, Llancynfelin, Treuddol, Machynlleth, Powys

Tom Raw-Rees, Chairman, Mid-Wales Tourist Board, Bryn Bwl, Borth, Ceredigion

Andy Rowlands Chairman, Dyfi Eco-Valley Partnership, Dyfi Eco-Park, Machynlleth, Powys.

Dick Squires, Reserve Warden, RSPB Ynys-hir, Caer Berllan, Ffwrnais, Machynlleth, Powys

David Williams (Chairman) *et al.*, Aderdyfi Community Council, The Institute, Aberdyfi, Gwynedd

Bob & Sue Williams, farmer & wife, Pen-y-Wern, Talybont, Ceredigion

Caerlaverock

James Smith, Planning & Environmental Consultancy Group Manager, Dumfries and Galloway Council

Jonathan Warren, Area Manager, Scottish Natural Heritage Dumfries

Wally Wright, Area Officer, Caerlaverock, Scottish Natural Heritage (reserve manager)

Cairnsmore of Fleet, Merrick Kells and Silver Flowe

Andrew Bjelinski, Cairnsmore of Fleet Reserve Manager, Scottish Natural Heritage

Adrian Davies, Reserve Manager, Silver Flowe Reserve Manager, Scottish Natural Heritage

James Smith, Planning & Environmental Consultancy Group Manager, Dumfries & Galloway Council

Rob Soutar, Forest Management and Environment Officer, South Scotland, Forest Enterprise

Taynish

John Halliday, Taynish NNR Reserve Manager, Scottish Natural Heritage

Bill Geddes, Strategic Planning, Argyll & Butte District Council

Rum

Tim Clifford, Highland Birchwoods Ltd.

John Love, Scottish Natural Heritage Area Officer, Uists and Barra

Malcolm Whitmore, Scottish Natural Heritage Area Officer, Rum

Bob Wilson, The Highland Council

Beinn Eighe

Tim Clifford, Highland Birchwoods, Inverness

Colin Maclean, Deer Commission for Scotland

Eoghan Maclean, Assistant Manager, Beinn Eighe NNR and crofter, Kinlochewe

David Miller, Site Manager, Beinn Eighe NNR

Bob Shannon, Head of European and Strategic Planning, Highland Council

Eileen Stuart, Scottish Natural Heritage Area Officer, SW Ross

Loch Druidibeg

Gwen Evans, RSPB, Southern Isles

John Love, Scottish Natural Heritage Area Officer, Uists and Barra

Catriona MacCuish, Duthchas Project (Area Sustainability Strategy) Officer, North Uist

Isobel MacDonald, Western Isles Enterprise

Diane MacPherson, Forward Planning & Regional Development, Comhairle nan Eilean Siar

Ken Wilson, Scottish Office Agriculture and Fisheries Department, Benbecula

Peter Whitehead, Planning Officer, Comhairle nan Eilean Siar