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Linking Protected Areas to the Wider World: A Review of Approaches

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ABSTRACT *Protected areas are the basic foundation for the conservation of biological and landscape diversity. During the first century of their development attention was placed predominately on identification and protection of the key features. The pros and cons of this approach are examined. Now there is a need to recognise the importance of linking protected areas to the rest of the landscape and seascape through ecological and other environmental processes, and also to society both adjacent to and further afield from protected area boundaries. The various methods and the experience in applying them in different parts of the world are explained. Particular attention is given first to predominately ecological approaches and, second, to more integrated approaches. Practical issues in implementation are discussed.*

KEY WORDS: Protected areas, biogeographical regions, corridors and ecological networks, biosphere reserves, ecosystem approach, community participation, collaborative management

Old approaches and new challenges

The traditional approach for the protection of biodiversity and landscape diversity has been the establishment of protected areas. In the terms of the internationally accepted definition of IUCN – The World Conservation Union – these are:

> an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural associated cultural resources, ands managed through legal or other means. (IUCN, 1994)

Since the establishment of the first protected areas of the modern era in the later nineteenth century, a great deal of progress has been made. By the end of the Second Millennium there were some 30,000 protected areas covering nearly 10 per cent of the earth's terrestrial surface (Phillips, 2000): an important achievement globally. Legal mechanisms have been established in most countries (IUCN, 1992), objectives determined and management plans drawn up and actioned. The

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coverage is variable between countries and also between the reasons for protection, i.e. landscape, rare plants and animals, earth heritage features (IUCN, 1998a; Phillips, 2000).

However, the situation is not regarded as sustainable for a variety of reasons (see for example IUCN, 2001; Phillips, 2000, 2003; Crofts, 2001, 2002):

- Protected areas are often too small. They are predominantly sites rather than areas and there has been a lack of recognition of cross-boundary ecological interactions and the importance of their linkage with larger ecological and biogeographical units.
- Protected area approaches are often too static with emphasis on the preservation of key features, rather than on the ecological and wider environmental processes which secure the protection of the species, habitats and landscapes in the longer term.
- Protected areas management has tended to be too exclusive. They are set aside not so much for nature as for the governments which establish them and the experts who are responsible for managing them.
- The economic and social forces which are driving change in and adjacent to protected areas are often ignored.
- Protected areas are affected by activities funded by business and/or subsidised by governments which have detrimental effects on the ecological health and landscape character of the area.
- Funding for proactive management of protected areas is often limited.

Phillips (2003) has summarised the position succinctly that protected areas have in the past been planned and managed against people, run by central government, set aside for conservation, developed individually rather as than part of a system, managed in isolation as islands, established for scenic preservation, managed for visitors and tourists, and viewed exclusively as a national issue.

Crofts (2002) has argued that protected area specialists have ignored the views of others and that protected areas are often regarded with suspicion or even hostility by indigenous groups, by businesses reliant on exploitation of natural resources and by farmers, fishermen and foresters. He paraphrases the views of protagonists as: 'protected areas are a nuisance, there are far too many of them, they are far too large in size, there are too many rules, their existence stops development, they are run by "nature people" for themselves and they ignore the views and needs of local people and the wider community (Crofts, 2002).'

Despite the positive developments during the twentieth century, the criticisms of many protected areas specialists and especially those of other interests cannot be ignored. As a result Phillips has called for 'a new paradigm for protected areas' by 'turning old ideas on their head' (Phillips, 2000, 2003). And Crofts (2001) has called for the implementation of three imperatives for protected areas: adoption of new frameworks, radical changes in policy, and substantial improvements in the capacity to manage protected areas. This paper will focus on the new frameworks: ecological networks and corridors, ecoregions/bioregions, the role of the biosphere reserve concept, bioregional planning and ecosystem management through adoption of the Ecosystem Approach.

There are a number of emerging challenges. First, is whether the present protected areas adequately represent the main biogeographic regions and the more specific variations in plant, animal and landscape diversity and rarity.

Second, is the need to maintain migration routes across territory where the species are not protected by any area-based mechanism, although there are likely to be species-protection measures in some of the countries of passage. This is especially important for the biannual migration of birds between and within continents. Third, and related to the first, is the proposition that with climate change pushing the climatic zones polewards, then methods for allowing the migration of species to new locations is important. Fourth, and related to the first two challenges, is the fact that in many countries habitats have become fragmented as a result of the cumulative intensification of land uses such as agriculture and forestry, the development of transport networks, and the development of irrigation systems through large-scale transfer of water. Levels of use in and around some protected areas are causing substantial changes in ecological functions, as well as affecting the perception of the area by traditional peoples and by visitors. Finally, there is the challenge of ensuring that protected areas are mainstreamed into wider society both in recognition of the benefits that they can bring and the dependency of society on them and in terms of the interaction between protected areas and the many communities of interest locally, nationally, regionally and internationally. The new frameworks described in this paper have been developed over recent years in order to meet the challenges and secure both a better ecological future for the critical species and habitats in protected areas and for a better social and cultural future for civil society.

Linkage Approaches

There are many approaches which have been developed and applied over recent decades to break down the geographical isolation of protected areas. They all tend to have the common aim of linking protected areas into the wider surrounding landscape. One of the perspectives is maintaining or re-establishing linkages to ecological and other environmental systems and processes. Another is that protected areas should be planned and managed, taking into account cultural heritage, social aspirations and economic development opportunities. However, different experts have developed many of the approaches for slightly different purposes. So there is confusion both in the terminology and in the preferences for application (see, for example, papers in Crofts et al., 2000, and especially McNeely, 2000). The list of approaches is seemingly endless and includes: biological corridors, ecological networks, bioregional planning, integrated planning, ecosystem management, and biosphere reserves. Bennett and Wit (2001) seek to put some order into the approaches by classifying them in six main groups: Biosphere Reserves, migratory flyways, ecological networks, reserve networks, bioregional planning and eco-region-based conservation.

Protected areas have often been developed in isolation from their biogeographical surroundings. They were regarded as the places where species and habitat protection should take place, and where landscape should be conserved. Not infrequently, they were the places where the last vestiges of natural habitats in a landscape changed radically as a result of economic development pressures. Their description as 'islands of protection in a sea of devastation' (source unknown) is a truism which is an all too frequent occurrence in many countries. Recent challenges for progressing from 'islands to networks' (IUCN, 1998; Miller, 1996) have stimulated both international debates and

practical action to place protected areas in their wider biogeographical setting (see summary in Miller, 2000).

In this paper, a distinction is drawn between the tools based primarily on linkages between protected areas and ecological and environmental systems and processes, and those based on a wider construct of the linkage between protected areas and communities, cultural history, society and economic activity. In drawing this distinction, it is recognised that some of the approaches do straddle the two types. There is no single answer to the question of which approach should be used, as it will depend on the needs of the each situation and the precise definition of objectives. These points will be developed later in the paper.

Ecological And Environmentally Focused Approaches

There are a series of approaches which focus primarily on the linkages in natural environmental systems from the heart of a protected area outwards. The basic construct of these approaches is the recognition that protected areas have functional links and dependencies beyond their boundaries. Therefore in defining the objectives of a protected area, delimiting its boundary and determining its management regime, the flows of water and energy and the movement of species and habitats, and the migration of species across the boundary should all be taken into account.

The Biosphere Reserve approach in one sense seeks to overcome the classic issue of where to place the boundary by defining a buffer zone whose outer boundary is not necessarily precisely delineated; this is the position reported for some of the Biosphere Reserves in France for example (see Synge, 1998). Nevertheless, most protected area authorities, and the legislative and administrative regime under which they are established, accept the need to define a precise boundary which can be delineated both on the ground and in plans. This being the case then, most approaches reported below recognise that protected areas have a formally recognised boundary.

The scale of application of these approaches varies with the objectives of the protected area and the wider programme within which it is placed. 'Moving up scale' is how Kenton Miller (Miller, 1996) has described the approaches which start from the core strictly protected part of the protected area outwards in space and upwards in scale order from local to sub-national, national, regional and global approaches. The descriptions and analysis which follow start with the core of a protected area and gradually move 'up scale' to the global approaches.

(1) IUCN Protected Area Management Categories

In considering environmental linkages, the natural starting point should be the core of the protected area. This is usually the part which defines the rationale for the status of the area and generally has the highest level of protection. Moving out from the core there should be a series of zones. If the boundaries of the protected area have been drawn to reflect knowledge of the species and habitats and the environmental systems which underpin them, then there should be a series of zones between the core and the boundary.

The international system developed by IUCN as Guidelines for Protected Areas Management Categories (IUCN, 1994a) should be the basis for subdividing protected areas to reflect the diversity of management objectives within the area

and to provide support for the effective maintenance of the core area. Six categories have been developed as follows:
Ia Strict Nature Reserve: protected area managed mainly for science
Ib Wilderness Area: protected area managed mainly for wilderness protection
II National Park: protected area managed mainly for ecosystem protection and recreation
III Natural Monument: protected area managed mainly for conservation of specific natural features
IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
VI Managed Resource Protected Area: protected area managed mainly for sustainable use of natural ecosystems.

In the standard approach adopted by IUCN and UNEP/WCMC, each protected area in the world is usually assigned to one of the Categories on the basis of the predominate type of management objectives within the boundary (see IUCN, 1998a). Such an exercise is currently underway to produce the next draft United Nations List of Protected Areas. However, this approach fails to recognise the value of using the category system to define variable management objectives within the protected areas as a whole. For example, many protected areas in practice will have a zone of strict protection relating to Category I, zones of slightly lower protection relating to Category II, zones relating to lower protection still as in Category V, and perhaps particular Category IV natural monuments such as geological or geomorphological features. Some protected areas will also have degrees of management intervention that accord to Category IV and/or Category VI. In defining linkages within protected areas on the basis of ecological and other environmental objectives, it seems perfectly reasonable to use the IUCN system as a basis for informing the objectives of management and the type of activities that should be allowed. In Europe the Abruzzi National Park, Umbria Province, Italy is often quoted as a good example of the application of zonation principles (see IUCN, 1994b; Synge, 2004). There are many other protected areas which use zoning, such as in the Canadian National Parks in the Maritime Province (for example, Cape Breton National Park).

The essential point in the context of the linkages between protected areas and the ecological and environmental systems within which they are located is that the use of the IUCN Guidelines on Protected Area Management Categories provide the basis for a systematic, globally agreed and globally applicable approach to zoning in protected areas from strictly protected core outwards to greater intervention and greater use of the natural resources.

(2) Corridors and Ecological Networks

Fragmentation of habitats and the separation of species from their diurnal and seasonal breeding and roosting grounds are widely accepted as a practical problem in the longer-term health of species populations and the effectiveness of core protected areas. Andrew Bennett (2003) admirably summarises the issues and the various approaches that have been developed in an effort to restore linkages. At the lowest level is the assumption that physical corridors linking

protected areas are an effective mechanism for species movement. There is no agreement, however, that geographically linked areas through corridors of various widths has an overall beneficial effect on the longer-term survival of individual species. It is for this reason that most recent attention has been focused on the ecological basis and the practical value of ecological networks (see, for example, Bennett and Wit, 2001). The argument has shifted therefore from one about physical connection through corridors to one of linkage through various mechanisms in which connectivity for species movement and for maintenance of ecological functions is the overriding objective.

Graham Bennett, who has led much of the development work on ecological zones in Europe, defines an ecological network as 'a coherent system of natural and semi-natural landscape of marine elements that is configured and managed with the objective of maintaining and restoring ecological functions, while providing appropriate opportunities for the sustainable use of natural resources' (Bennett, 2000). With its two-fold objectives, the ecological network approach is similar to the Biosphere Reserve approach (see below) but each has a different manifestation in space, with the former emphasising the linkages in the landscape between protected areas and the latter emphasising the linkages outwards from core protected areas to the surrounding landscape and human communities. Bennett (2000) describes four key design principles for the ecological network: conserved areas should extend over the traditional habitat range, the areas should be sufficiently large to contain viable populations of species and the functional ecological and wider environmental processes on which they depend, contiguity of conservation areas is important to allow movement and dispersal of populations, and human activities in the conserved areas and the connecting areas should be compatible with the conservation objectives. An interesting additional element which has been built into many ecological networks is the restoration of damaged habitats and ecosystems that are not properly functioning.

In Europe, the ecological network approach has taken on a more formal basis with the agreement of European Environment Ministers in the development of a Pan-European Ecological Network as part of the Pan-European Biological and Landscape Diversity Strategy (Council of Europe, 1996). There has been widespread application, for example, in the Baltic countries (Sepp and Kaasik, 2002), and in other parts of Europe (see Bennett and Wit, 2001). Elsewhere, the approach has been adopted at many spatial scales covering whole countries such as Russia and Poland, large-scale mountain systems such as the Ecological Corridor of the Andes and the Meso-America Biological Corridor, major river basins such as the Amazon, the Congo and the Donau, regions such as the Mediterranean (De La Guerra, 2002), through to small-scale networks to improve the effectiveness of nature reserves (Bennett and Wit, 2001; IUCN, 2001).

Benefits have been claimed in terms of minimising loss or damage to landscape and biodiversity, integrating biodiversity with other environmental measures, promoting biodiversity conservation outside protected areas, contributing to sustainable development and integrating different sectoral interests (see, for example, Sepp and Kaasik, 2002). The major issue in the application of the ecological network approach is the ability to influence positively the planning, development and management of the whole landscape. This means influencing the intensity and scale of agriculture, forestry and other land uses, the development of urban areas and associated industry and housing and transport networks. In the past, it is these activities and the associated policies and financial-

support mechanisms that have been the main drivers of fragmentation in the landscape. There remain many situations where this fragmentation is continuing with the resultant damage to the functioning of the ecosystems and the implications for the well-being of the natural species and also for the well-being of human communities.

(3) Biogeographical Regions

Placing protected areas in the context of their surrounding biogeographical region (sometimes called ecoregions) has been developed for some time. This approach has come to prominence in recent years for two reasons: recognition that the activities outside protected areas can have a profound influence on the state of health of the features within them, and that they are a valuable tool for ensuring that there is representation of the necessary variation of species, habitats and landscapes within the protected areas suite. The approach is often referred to as 'the landscape approach' or 'the landscape ecology approach', given that the focus of attention is not on the protected area per se but on the whole of the landscape, irrespective of the scales, and the operation and interaction of the individual components.

There are many classifications of biogeographical regions globally and for individual continents and countries. Some versions are based on vegetation distribution as it was expected to have been prior to human intervention. However, broader-based classifications have been in existence for a number of decades (see Udvardy, 1975). The basis of these classifications is that there are areas of the globe with similarity in topography, climate, soil and vegetation characteristics which give them coherence and distinguishes them from other areas where these characteristsics have a different association. Notable are the boreal forest regions, the mid-latitude temperate forest zone, and the tropical rain forest.

These biogeographical regions have formed the basis of global, regional and national assessments of protected area coverage. For example, WWF (1997) developed a global ecoregion framework to assess biodiversity hot spots and the need for more protected areas. For example, Parks Canada used a biogeographical subdivision as a basis for identifying gaps in the national parks network. A similar biogeographical basis has been used, for example, as the framework for the identification of protected areas in the European Union to form the Natura 2000 network.

The biogeographical region approach has been invaluable in assessing the distribution and degree of representativeness of protected areas within their natural ecological units. It is preferable to the systems used in some countries where the units for the selection of protected areas have no relationship to natural units or to the ecological dynamics of the territory. For example, in Great Britain the domestic system of wildlife sites (Sites of Special Scientific Interest) are selected on the basis of 'Areas of Search' defined entirely as administrative units rather than natural regions (see Crofts, 2000).

The biogeographical region approaches are, therefore, valuable in the identification of protected areas to be both representative of the region and to protect those parts of greater significance because of their relative biodiversity richness.

In conclusion 'moving up scale' from the core protected areas to the wider landscape ecologically and environmentally has the following requirements:

- defining the core areas for protection;
- identifying the adjacent areas that support the continuation of natural functions and processes;
- identifying areas where protection can and should be of a lesser order;
- linking the protected areas, and the various zones within them to each other through ecological networks where appropriate;
- placing the protected areas within wider networks of functioning systems; and
- placing the whole within a framework of units defined in terms of biogeographical criteria.

Using this relatively simple scheme means that protected areas should be linked with, rather than isolated from, the surrounding landscape and that measures to ensure their perpetual protection are developed and implemented through focusing on the ecological and wider environmental systems and processes.

Integrated Approaches Linking Protected Areas to Society

The approaches described in the previous section recognise, implicitly or explicitly, that protected areas have to be linked into civil society: cultural heritage and modern culture, politics, social well-being and economic development. Three approaches have emerged in recent years – Biosphere Reserves, bioregional planning and the Ecosysytem Approach, which explicitly seek to connect protected areas with wider society in a more integrated way.

(1) UNESCO Biosphere Reserves

The UNESCO system of Biosphere Reserves was introduced in 1976 as part of the Man and the Biosphere Programme. The accepted definition is that

> Biosphere reserves are areas of terrestrial and coastal/marine ecosystems or a combination thereof, which are internationally recognised within the framework of UNESCO's Programme on Man and the Biosphere. Each Biosphere Reserve is intended to fulfil three complementary functions: a conservation function to preserve genetic resources, species, ecosystems and landscapes; a development function, to foster sustainable economic and human development; and a logistic support function, to support demonstration projects, environmental education and training, and research and monitoring related to the local, national and global issues of conservation and sustainable development. (UNESCO, 1996)

Biosphere Reserves were the first systematic globally recognised approach to applying the principles of zoning to link the strictly protected cores of protected areas to the surrounding landscape where development was allowed and so stimulate the coexistence of conservation and development. They are therefore a valuable approach for 'moving up scale' and out from the core of protected areas by placing the core area within a wider context embracing both environmental and socio-economic objectives.

In the standard approach (UNESCO, 1996) each Biosphere Reserve should contain three zones: one or more **core** areas which are securely protected sites for

conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact use, such as education; a clearly identified buffer zone, which usually surrounds or adjoins the core areas, and is used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, eco-tourism and applied and basic research; and a flexible transition zone, or area of cooperation, which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, and other stakeholders work together to manage and sustainably develop the area's resources.

Biosphere Reserves have been regarded by many commentators as being ahead of their time (see IUCN, 1998c) in bringing together protected areas and the surrounding landscape and seascape, in seeking to reconcile conservation and development, and recognising the importance of engaging all stakeholders in the process of developing and managing the designated areas. Whether they are best viewed as a designation or as a practical and effective means of achieving the multiplicity of objectives within a defined space which society aspires is a moot point. This was an issue debated in the later 1990s with the conclusion that Biosphere Reserves should not be seen as rivals to protected areas and that the processes and objectives which are intrinsic components of the approach could be applied with benefit to more traditional protected area mechanisms (IUCN, 1998c).

Biosphere Reserves have been implemented in many countries (IUCN, 1998a). There is increasing recognition of the value of the approach in implementing the Convention on Biological Diversity and Agenda 21 (see, for example, Synge, 1998; Gundling, 2002). As a result a new strategy was defined, The Seville Strategy, in 1995 (UNESCO, 1996) to refocus the approach in tune with the agenda from the UNCED Summit in Rio de Janeiro in 1992.

(2) Bioregional Planning

The development of the bioregional planning has arisen as a result of the limitations of approaches based solely on the functions and processes of natural systems. The basic premise is that the natural environment is subject to change as a result of human activity and that to ignore this activity and its effects means that goals for biodiversity and landscape diversity cannot be achieved. In practice, it means placing protected areas in their wider setting of the biogeographical region and the social and economic activities that have occurred, are occurring and may occur in the region in the future. It is an integrated approach seeking to reconcile environmental, social and economic aspirations and goals within a defined territory. The scale of bioregion will depend on the issues and the objectives defined and means of resolving conflicts. It can therefore be applied to a small local community area, to a major landscape of global proportions or anything in between. Miller and his colleagues at the World Resources Institute have been instrumental in the development and operation of this approach (Miller, 1996; 2000).

The approach has six components: geographical scale and scope; stakeholder communities; science, technology, and information; institutional mechanisms and governance arrangements; incentives and enabling policies; and adaptive management, monitoring and restoration.

The geographical unit is termed the **'bioregion'**. It comprises the protected

area and its subdivision into zones using the theory and practice developed in the biosphere reserve approach, i.e. core, buffer, transitional zones, but without explicit account being taken of the use of IUCN Protected Area Management Categories. In addition, protected areas are linked through corridors, rather than networks. All of these elements are placed within a wider region termed the 'matrix', comprising the main settlements and the areas of most intensive economic activity. The bioregion is defined in terms of agreed objectives and using a variety of tools including administrative, ecological, social and economic. Its scale depends on the views and agreement of the various stakeholders. All stakeholders, both local and those from further afield, are included in the partnership for the bioregion. All relevant scientific and other knowledge is used in drawing up plans and in their implementation and monitoring. Often novel arrangements for the governance of the bioregion will be drawn up to suit local circumstances. Perhaps the most critical component is the effectiveness of influencing incentives and policies to achieve a variety of objectives in a coherent manner. Changed approaches to key land-use policies and their funding, and influencing transport policies and actions, will be key in the industrialised world, whereas measures that safeguard natural resources for human benefit and remove disparities between social groups are likely to be of greater significance in the developing world. Finally, monitoring and evaluation systems, including changes in management regimes and practices are necessary.

The approach has been applied in many parts of the world. Examples are quoted in Bennett and Wit (2001).

(3) The Ecosystem Approach

The Ecosystem Approach is a method adopted formally by the signatory governments to the Convention on Biological Diversity at its fifth meeting in 2000. It is defined as 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way' (CBD, Decision V/6, 2000). It is considered by the signatories that its application will help to reach a balance between the three objectives of the Convention: conservation of biological diversity, sustainable use of natural resources and equitable sharing of genetic resources.

Fundamental to understanding and application of the Ecosystem Approach is the recognition that human society is an integral component of many ecosystems (CBD Decision V/6, 2000). These are set out in 12 Principles as follows:

1. The objectives of management of land, water and living resources are a matter of societal choice.
2. Management should be decentralised to the lowest appropriate level.
3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
4. Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

(a) Reduce those market distortions that adversely affect biological diversity;
(b) Align incentives to promote biodiversity conservation and sustainable use;
(c) Internalise costs and benefits in the given ecosystem to the extent feasible.

5. Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
6. Ecosystems must be managed within the limits of their functioning.
7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
8. Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.
9. Management must recognise that change is inevitable.
10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

In addition, five Operational Guidelines (CBD Decision V/6, 2000) were agreed as follows:

1. Focus on the functional relationships and processes within ecosystems.
2. Enhance benefit-sharing.
3. Use adaptive management practices.
4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralisation to the lowest level, as appropriate.
5. Ensure intersectoral cooperation.

The approach, or approaches along similar lines have been implemented in many parts of the world. Case studies have been gathered together from southern Africa, South East Asia and South America (Smith and Maltby, 2001) and detailed material is available on the web at www.rhier/rhul.ac.uk.

The Ecosystem Approach demands a paradigm shift: from preservation to adaptive management, from a sectoral to an integrated approach, from a solely scientific to a multifaceted knowledge-based approach; from a solely environmental to an integrated environmental and people approach; from a top-down decision approach to a two-way approach; from a national approach to an approach at the most appropriate level; from being restricted to conservationists to one engaging all stakeholders; and from nature protection to social and environmental well-being.

In essence, this approach is not a competitor to the bioregional planning approach but has a greater focus on the continued functioning or restored functioning of natural ecosystems, and does not define the spatial scale of implementation. There is more in common between the two approaches than there are differences. It can be argued that bioregional planning is the application of the Ecosystem Approach at the geographical scale appropriate to the issues to be resolved and the stakeholders engaged.

Application: some practical considerations

All of the approaches described are only supporting tools to achieve wider goals for protected areas and for the surrounding territory. The application of the

ecological network approach, for example, has so far been claimed to be successful in areas where habitats have become very fragmented or where major natural systems continue to function, such as large rivers. However, where fragmentation cannot easily be overcome or where migration routes (diurnal or seasonal) are not the main challenge, then other tools need to be used. Much of what follows is derived from the author's own experience in developing and implementing programmes to link protected areas with the surrounding landscape and also engaging with local and other communities of interest (see Crofts, 2004; Scottish Natural Heritage, 2002).

The approaches briefly described in this paper provide a variable menu and which is chosen depends partly on the preference of the principle stakeholders, but most significantly on the objective of the programme. It is essential in any activity seeking to link protected areas more effectively to the surrounding landscape that specific aims and objectives are defined at the outset. It goes, almost, without saying that one objective must be to improve the conservation of biological diversity and therefore the state of health of individual species and habitats. In many circumstances, it is likely that maintenance of the cultural landscape will be an objective. In addition, various social and community aspirations, including economic benefits, are likely to be explicit aims and objectives. Certainly, in the past, ignoring these elements has led to the types of disassociation and conflict which application of more integrated approaches is seeking to resolve or avoid. In some cases, it may be possible to work at a more aspirational level with the development of a vision that can be shared by all of the constituent interests and also the identification of a series of longer-term goals. Certainly from work in Scotland, the author is clear that without a longer-term vision which is aspirational and has some credence among the stakeholder community, then the whole programme may operate at a minimal level. The process of defining and agreeing aspirations, visions and objectives is usually long drawn out, but it is necessary if the various stakeholders are to gain any ownership of the programme and make valuable inputs.

The timescale of the programme will have to be established at an early stage. This could well be a source of disagreement between the longer timescales for beneficial ecological and environmental effects to be evident compared to the shorter timescales over which many stakeholders will wish to see progress and benefits accruing to themselves. Both shorter and longer timescales are likely to be required to satisfy the aspirations of those with paramount concerns of social well-being and those with environmental concerns, respectively. Also the spatial scale of the programme will require early agreement. There could well be disputes between local and wider interests on whether the scale should be small or large respectively, and also between environmental and economic interests on whether the scale should be large or smaller respectively. Both timescale and spatial scale are intimately linked to the agreed objectives of a programme and will need to be debated and resolved at an early stage in the process of programme development.

Assessing the drivers of change in the landscape and whether the effects are negative or positive are further essential elements in the process. This assessment is an essential pre-requisite to a plan of implementation. This stage will require the use of all of the information available on changes in the landscape and their possible causes: a stage which can be very time consuming in both the gathering of the data and the agreement of the analysis and conclusions. The use of the best

available knowledge will require recognition that local and traditional knowledge is of immense value as a complement to more scientific data and analysis. In the light of the analysis of drivers of change, it is likely that arguments for changes in policy and action and the way that resources are deployed will emerge. In many situations, these are likely to be the most fundamental causes of success if changes can be achieved, or failure if they cannot be.

An essential element of the implementation plan will be the means and measures for detecting whether progress is being made and whether the processes for the management of the programme with all of the stakeholders is working efficiently and effectively. Indicators of change in key features and in the operation of key environmental and social processes will be required. Data and other sources of readily available information will be essential. It is likely also that new information and new indicators will be required.

In the light of the approaches now available to link protected areas to the surrounding landscape and to the wider communities of interests, the new paradigm for protected areas could be described in the language of international systems as 'integrated planning at the appropriate spatial scale using the principles and practices of the Ecosystem Approach linking the core of protected areas with the surrounding landscapes and seascapes'. In other words, the new paradigm requires:

- linkage of policy and action on protecting areas with special species, habitats and landscapes with those dealing with all types of social and economic development;
- application at the geographical scale which makes most sense to the participants taking into account the relevant institutional framework;
- two key components: more effective functioning of ecological and environmental systems and processes, and improved social and economic circumstances of the dependent human communities;
- the active participation of local and all other communities of interest;
- effective use of existing information from scientific and traditional sources on the functioning of environmental systems and of society; and
- the necessary skills and competencies to be available among all those involved.

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