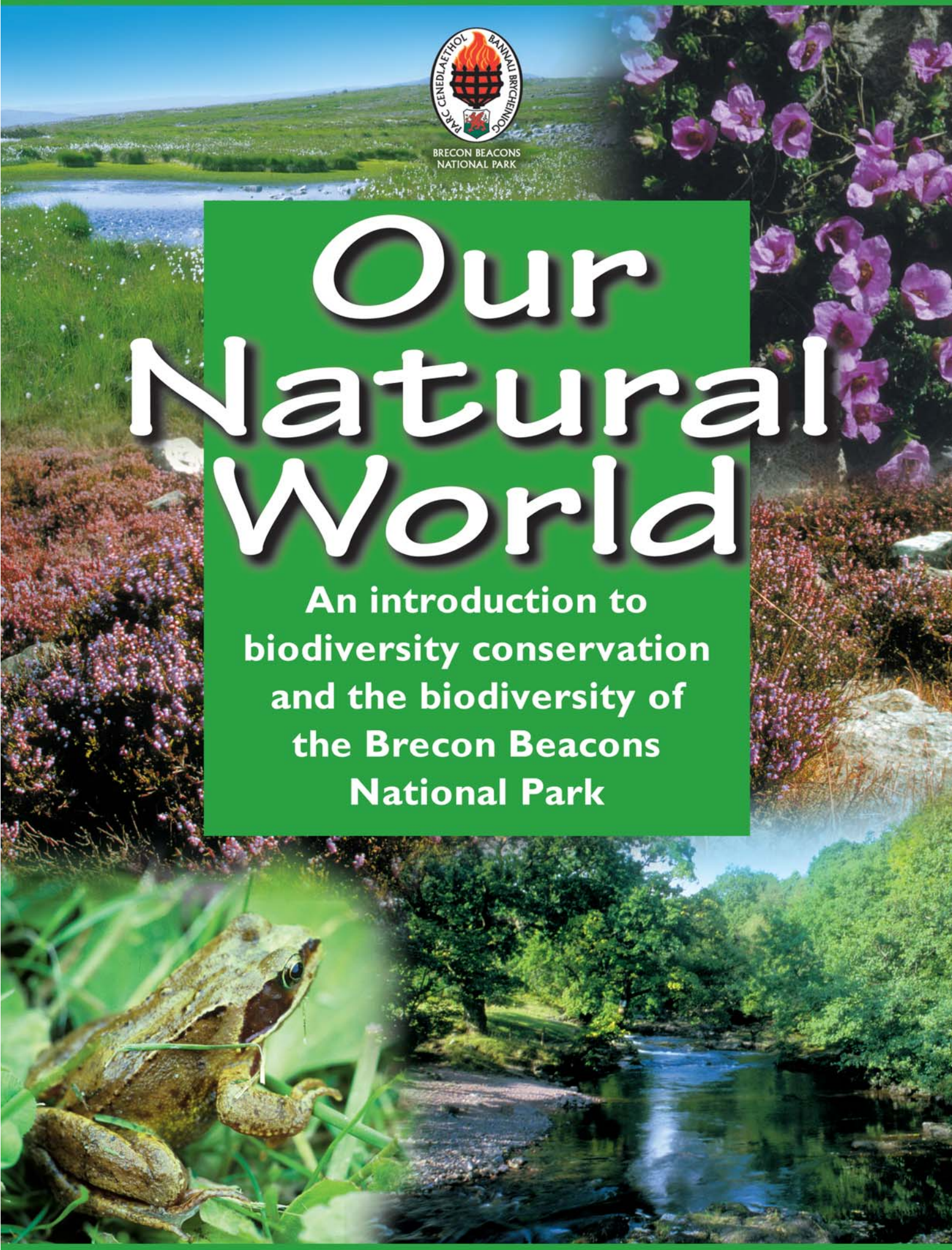
BRECON BEACONS NATIONAL PARK



BRECON BEACONS NATIONAL PARK

Our Natural World

An introduction to biodiversity conservation and the biodiversity of the Brecon Beacons National Park

BRECON BEACONS NATIONAL PARK

Bioamrywiaeth Cymru

Biodiversity Wales

Published by Brecon Beacons National Park Authority on behalf of the BBNP LBAP steering group

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Preface

Wildlife in the Brecon Beacons National Park has survived alongside human beings since the last ice age, some 9-10,000 years ago. During this time, Middle Stone Age (Mesolithic) hunter-gatherers cut down scrub to produce grassland areas to entice into the open the grazing animals that they hunted. Later, during the New Stone Age (Neolithic) and later Bronze Ages, wholesale forest clearances occurred, producing the moorland landscape that we see today. Since then, the area was settled first by Iron Age Celtic people, later by Romans and Normans, each civilisation leaving behind its own patterns of land use and buildings. The Norman manors were consolidated during the Middle Ages and from the end of the fifteenth century industries such as limestone extraction, iron smelting, coal mining and charcoal burning became established. Indeed it could be argued that the industrial and farming history of the Brecon Beacons National Park area was more diverse and more productive than it is today.

Recent landscape changes include road building, the building and later dismantling of railways in the Park, construction of water storage reservoirs, establishment of large conifer plantations and the change from cattle to a sheep-based farming economy. Now, the landscape economy is based largely upon livestock farming and tourism.

In order to conserve this cultural landscape, a local biodiversity action plan has been prepared. The principal aim of "Our Natural World - a Local Biodiversity Action Plan for the Brecon Beacons National Park" (hereafter referred to as the LBAP) is to secure the sustainable use of natural resources - the wildlife and landscapes - within the National Park. Through this approach, we will emphasise the intrinsic role of landowners, local communities and visitors in managing and utilising their natural environment in a sustainable way. The National Park Authority's role in this process will be to assist local groups and individuals to develop and implement projects and initiatives that incorporate the targets of the LBAP. This assistance will include providing practical and technical assistance, setting local targets and demonstrating the added economic and social benefits of projects, products and initiatives that rely upon sustainable use of natural resources.

> The principal aim of 'Our Natural World - a Local Biodiversity Action Plan for the Brecon Beacons National Park' is to secure the sustainable use of natural resources - the wildlife and landscapes - within the National Park.

This publication, "Our Natural World - an introduction to biodiversity conservation and the biodiversity of the Brecon Beacons National Park" provides the reader with a brief summary of the animals, plants and wildlife homes - habitats - which must be conserved if we are to achieve our goal of sustainable development here. This introduction forms the first of 3 volumes that together make up the Local Biodiversity Action Plan for the Brecon Beacons National Park. The "Our Natural World" series explains the background of biodiversity conservation in an international, national and local context:

Volume 1 provides an overview of the wildlife in the National Park, what biodiversity conservation means and how this affects the National Park.

Volume 2 explains the processes that have been gone through to develop a local biodiversity action plan (LBAP), the issues and initiatives it needs to influence in order to be effective and how it should be used; it is the technical backbone to the LBAP.

Volume 3 compiles the habitat and species action plans prepared so far and to which amendments will be made periodically and new plans added following periodical reviews. Each of these action plans is available individually, to those people and organisations who need them or request them.

Volumes 1, 2 and 3 are available from the National Park. If you have any questions, the Park Ecologist can be contacted by phone on 01874 624437 or by e-mail: paul.sinnadurai@breconbeacons.org

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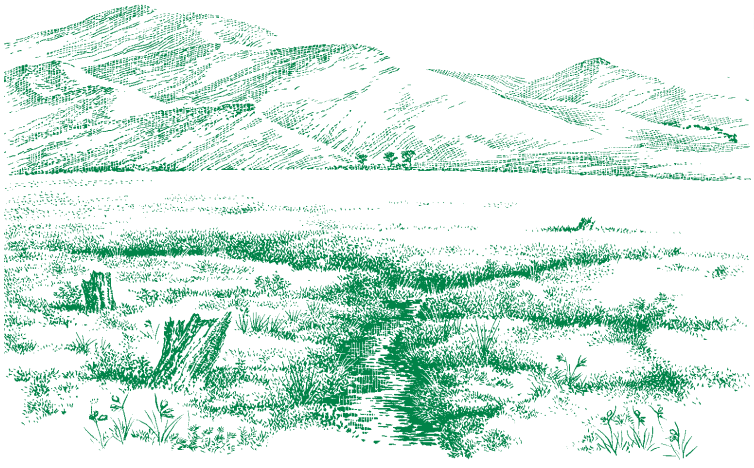


Our Natural World - an introduction to biodiversity conservation and the biodiversity of the Brecon Beacons National Park
January 2001

What is Biodiversity?

Biodiversity describes the amazing richness and variety of all living things, from the tiniest microscopic organism to the largest tree.

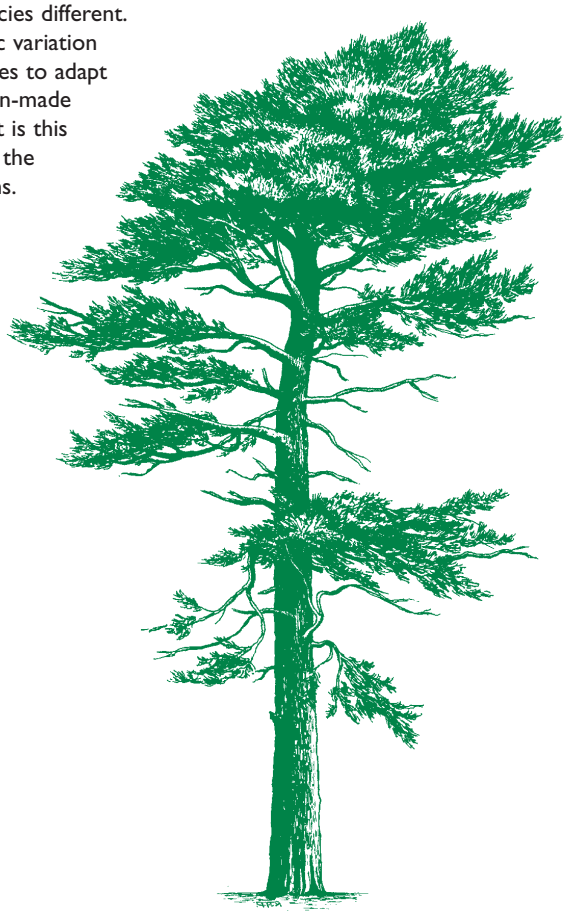
Biodiversity is short for biological diversity. It describes the amazing richness and variety of all living things, from the tiniest microscopic organism to the largest tree. This means that biodiversity is everywhere, in our gardens and window boxes, our wild woods, mountains and moors, our rivers and oceans and everywhere that life occurs on planet earth. So biodiversity includes human beings too.

Life on earth is incredibly rich and complex. Conservationists often use the term biodiversity to describe a more manageable subset of this overall richness. For example, scientists who have studied an area and refer to its "rich biodiversity" are quite likely to have confined their study to mammals, birds, reptiles, trees, flowering plants, etc. - in other words macro (big) flora and fauna - rather than microscopic life; genetic diversity is rarely examined at all. Also, when we talk about biodiversity, we have to realise just how poor our understanding of it is. For example, the Human Genome Project has taken 15 years and 3 billion dollars to complete. That's just ONE species and the effort involved to complete this project is unlikely to be repeated for other species.

Whilst it is easy to visualise the differences between two species, such as a snail and a dormouse, or two ecosystems such as a tropical rainforest and a desert, it is more difficult to recognise the genetic diversity that makes two individuals of the same species different. Genetic variation allows species to adapt to natural or in some instances man-made changes in their environment and it is this ability to adapt which is the key to the evolution of species and ecosystems.

Biodiversity is everywhere, in our gardens and window boxes, our wild woods, mountains and moors, our rivers and oceans and everywhere that life occurs on planet earth.

The maintenance of all three components of biodiversity; genetic, species and ecosystems is fundamental to the healthy functioning of the planet.



The maintenance of all components of biodiversity is fundamental to the healthy functioning of the planet.

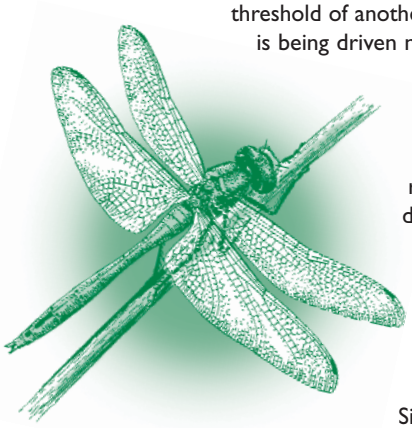
12 What is Happening to Biodiversity?

The loss of biodiversity

Throughout geological history there have been periods of mass extinction followed by periods of new species development - speciation. These cycles of extinction and speciation are the product of planetary changes such as widespread volcanic activity, meteorite impacts or natural shifts in climate, as well as ecological factors such as isolation and living in extreme conditions. As such, extinction is a natural part of the evolutionary process. There is a steady, natural loss of species over long periods of time, measured in millions of years. We do not know enough about the process accurately to quantify such an extinction rate but scientists have estimated losses of the order of 1 to 10 species a year. There have been five events of mass-extinction when huge losses have occurred:

1. 440 million years ago, in the Ordovician period, as many as 25% of all families of creatures were lost.
2. 370 million years ago, in the Devonian period, 19% of families became extinct.
3. 250 million years ago, in the Permian period, 54% of families were lost. (The trilobites became extinct at this time.)
4. 210 million years ago, in the Triassic period, 23% of families were lost.
5. 65 million years ago, in the Cretaceous period, 17% of families were lost. (The dinosaurs were among them.)

The cause of extinction on such a grand scale has perplexed scientists for some time. One theory at the moment implicates cosmic collisions (meteor-strikes) suggesting that significant climate change resulting from such incidents would have caused extinction.



Now, Virginia Morell and others (1999) suggest that we are on the threshold of another mass extinction - the sixth extinction. This one is being driven not by cosmic events however but by the actions of human beings. The decline in biodiversity is a global problem and the loss of species and ecosystems is occurring at an alarming rate throughout the world. It is estimated that the rate of loss of tropical rainforest each year during the 1980s was equivalent to about half the area of UK and that at this rate all the world's tropical rainforest would be gone in 120 years. In Britain between the 1950s and 1980s the area of native ancient woodland was reduced by 30-50%. Similarly we have lost 7% of our dragonflies, 5% of our butterflies and more than 2% of our fish and mammals. Other species are on the brink of extinction whilst once common species such as the skylark, lapwing and adder are suffering severe population declines.

So the scale of the modern reduction of biodiversity is the direct result of human activity, causing a global loss of species at a rate far greater than the rate at which new species are evolving. This involves a reduction in the global gene pool, reducing the ability of species and ecosystems to respond to change and the degradation and fragmentation of habitats and ecosystems. Whilst during the previous 5 periods of mass extinction, the species and habitats that survived could move into new areas over long periods of time, this will not be possible nowadays because the pace of change is too rapid and too many habitats and species are not in good condition. The ecological stresses that we are causing to affect species, habitats and even entire regions are exceeding the ability of these things to evolve with the changes. Furthermore, human development and activity (roads, cities, agricultural areas, pollution, war, famine etc) now place too many obstacles in their way. Climate change will exacerbate this situation. Humans will survive and

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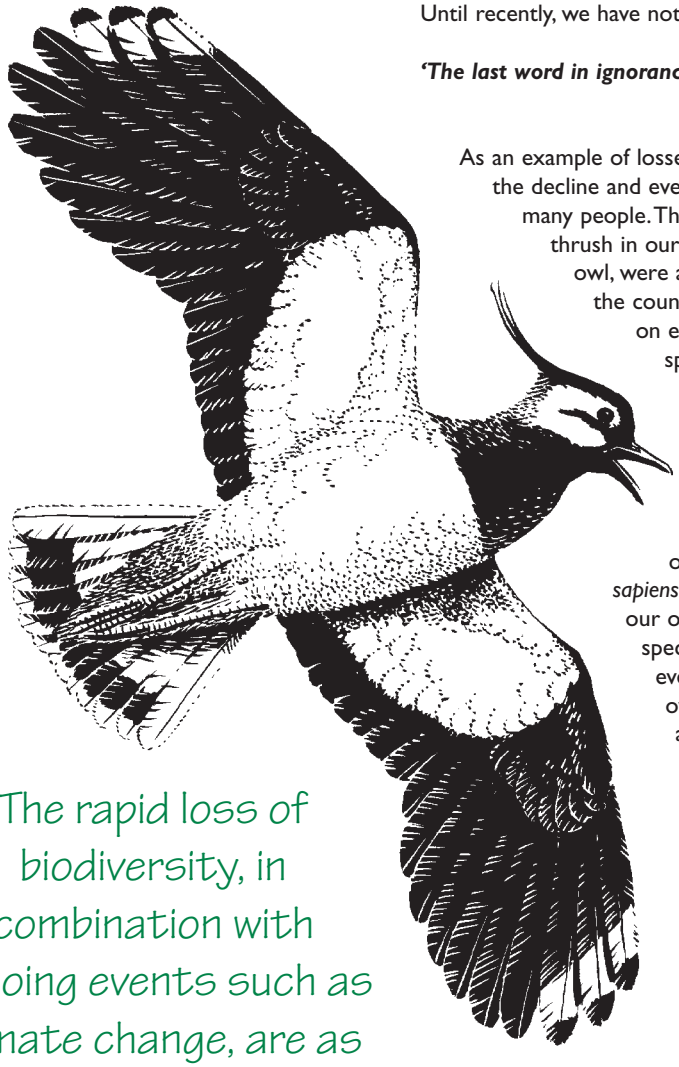

The rapid loss of biodiversity, in combination with ongoing events such as climate change, are as clear a signal as Planet Earth will give us that now is the time to develop and implement plans for positive change.

evolve with this process but we are realising that our quality of life will be poorer and life will be more difficult and often intolerable for many people.

Scientists have to date only succeeded in identifying approximately 1.7 million species; a tiny fraction of the total. The tragedy for humanity is that we might currently be destroying more than we will ever know about.

As Dobson (1996) observes ***'I'm not convinced that an extra terrestrial visitor would be much impressed with human intelligence if we confessed that our estimates of global biodiversity are only accurate to within 5 million.'*** Yet each year we discover new species, in habitats such as the ocean floor and the top of the rainforest canopy. Preliminary studies of these relatively poorly understood habitats suggest that the Earth could be supporting in excess of 20 million species! It is sobering to reflect that when we destroy coral reef, chop down rainforest and dump pollution onto land and sea we are destroying species that we do not even know exist. And yet we are fascinated with the prospect of discovering new life forms on other planets! Until recently, we have not been prepared to calculate the consequence of our actions.

'The last word in ignorance is a man who says of an animal or plant: 'what good is it?'
Aldo Leopold 1949

As an example of losses of biodiversity 'close to home', we are all aware now of the decline and even disappearance of birds that were once a common site for many people. The tree sparrow in orchards and field boundaries, the song thrush in our back gardens, the nightingale, partridge, lapwing and barn owl, were all once seen or heard regularly by people living in or visiting the countryside. This is no longer the case; the lapwing is teetering on extinction in Wales, people would not even recognise a tree sparrow and barn owls are now fully protected under the 1981 Wildlife and Countryside Act (as amended). What is the cause of this decline? Part of the answer lies in changes to farming practice in response to our own demands for cheaper food.

It would be wrong of us to assume that humans are setting out to cause biodiversity to disappear. Human beings - *Homo sapiens* - is another species that occupies Planet Earth. According to our own records and judgement, we are the most successful species to have inhabited Earth so far. It is possible to argue that everything that we have done is a natural consequence of our own evolution and behaviour. As such, nothing that we do or achieve should be considered unnatural. The difference for us as a species is that we also have the ability to do great good, to recognise the consequences of our own actions and to plan for things to change deliberately. The rapid loss of biodiversity, in combination with ongoing events such as climate change, are as clear a signal as Planet Earth will give us that now is the time to develop and implement such plans.

13 Why is Biodiversity Important?

Humans are part of biodiversity; our survival depends upon a mutually supportive relationship with the rest of the natural world. The better this relationship, the better our quality of life; it's that simple.

Conserving biodiversity - biodiversity conservation - places a high value on human actions that maintain and increase biodiversity, encourage the sustainable use of its resources and thereby benefit people at the same time. It also seeks ways of reducing and even reversing the impacts of damaging activities that make life more difficult for us.

We are at last realising that our achievements and our lifestyles so far are taking an unhealthy toll on the rest of creation and this threatens our own existence too. So even though we have not set out to destroy things at our own cost, we are doing so nonetheless. Therefore, if we truly believe that we are the cleverest creatures on earth, if we truly believe in our ability to predict, to manipulate and to do good, we must learn new skills, new lessons, to become responsible with our abilities, rather than reckless and careless.

If we truly believe in our ability to predict, to manipulate and to do good, we must learn to become responsible with our abilities, rather than reckless and careless.

Life support

Biodiversity is essential in order to maintain the life support systems that allow life, including human life, to exist on the planet. Complex interactions of many plant and animal species maintain oxygen in our atmosphere, recycle essential nutrients through intricate food webs and regulate the movement of water through the water cycle. The growing concern about climate change due to the increased release of the greenhouse gas carbon dioxide has emphasised the need to conserve natural carbon sinks such as forests, oceans, peat lands and soils in order to maintain a climate suitable for all life. In the Brecon Beacons National Park the blanket bogs of the upland areas such as Mynydd Du act as carbon sinks.

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Plants and animals can also provide an early warning system when change or damage to the environment is occurring. Some plant species are sensitive to the increase in pollutants in our atmosphere whilst other species may indicate change due to climatic variations before they have an impact on human populations.

Economic

Our economy is dependent on animal and plant diversity in the production of many commodities including industrial fibres, dyes, resins and lubricants. Manmade materials such as plastics and nylons are made from oil-based compounds, meaning that they are ultimately derived from the diversity of life that existed in geological times. Plants and animals also provide ideas and models for the design of new products.

Dobson (1996) has reported that one hectare of Peruvian forest contains 842 trees (measuring more than 10cms diameter) comprised of 275 different species. 42 per cent of the trees yield products that have a value in the local marketplace. The uses include food products, medicinal items, and material for construction and latex. The sustainable market value of the fruit and rubber elements alone is $422 per hectare, after accounting for harvesting and transport costs. Alternatively, the forest contains nearly 94 cubic metres per hectare of harvestable timber - with a saw mill value of $1000 as cut timber. Over a short time-frame, the timber harvest is just a marginal, one-time crop. There is much more to a forest than just its timber.

A quarter of all human beings depend directly upon plant diversity for food security, health care and basic materials. Clothes, utensils, houses, fuel, medicines, food and saleable goods, are all directly produced from the plants they use. In India alone, nearly 6 million people make a living by harvesting non-timber forest products. Many of us living in big industrial towns and cities and increasingly, in less built up areas too, have lost this immediacy of connection to the rest of the natural world but we need to

The most unlikely organisms have yielded useful compounds:

- A deep-sea sponge has yielded an anti-cancer drug.
- Leaves from the Pacific yew contain taxol which is used to fight ovarian cancer.
- The venom of a tropical cone shell has produced a pain reliever.
- Microbes from hot springs in Yellowstone produced a perfect enzyme for mass-producing DNA.
- A cellulose-producing bacterium is being studied as a potential tool for building artificial blood vessels.
- The bark of an African cherry tree has yielded a chemical that is now used to treat prostate disorders.
- Common high street medicines like codeine and aspirin are derived from plant extracts.
- In Britain the native yew is being used in the treatments of cancer.
- Recently British scientists have found a chemical in our common bluebell that may prove useful in the fight against cancer.

We do not know how many of the species that we push into extinction could yield medicines of incalculable benefit for humankind.

understand the way of life of those who are directly involved.

The medicines we use

A study by the American Museum of Natural History showed that out of the 150 prescription drugs most used in the USA, 118 were derived from living organisms. 75 per cent derived from plants, 18 per cent from fungi, 5 per cent from bacteria and 3 per cent from vertebrates. Scientists have found that 1 in every 125 plant species has produced a major drug ingredient. The total value of such drugs in the USA is around $200 million per annum.

We do not know how many more medicinal products could be obtained from plants and animals. We do not know how many of the species that we push into extinction could yield medicines of incalculable benefit for humankind. Approximately 68% of the World's population use non-synthetic or naturally produced drugs. New plant and animal based drugs are continuously being discovered and many provide treatment for some of the most life-threatening human diseases. Each time a species becomes extinct its potential to serve humankind in the future is lost.

The food we eat

In the western world, many people think no further than the local supermarket when they think about food. The packet or the plastic bottle is effectively the final "source" from whence they get their food. Yet our breakfast cereals are made from rice or corn produced from plants that we have bred from wild species. The milk we pour onto our cereals is produced by cows that have been bred from wild cattle. The coffee we drink is ground from beans we have blended from many different varieties, all derived from a wild plant. Indeed, most of the world's foods have been developed from just 20-odd different species of wild plant. Gavin said that ***"man is the animal for whom it is natural to be artificial"*** - we should never allow this seeming artificiality to blind us from the truth that ultimately we always rely upon nature to provide our food. To put it a different way, we should recognise that perhaps our evolution has lead us to rely too much on items that cause damage to our world, such as plastic bottles that cannot be recycled.

There are many instances where species diversity has come to the rescue of farmers and other food producers when their crops have been threatened by pathogens or natural calamities. European vineyards would have been wiped out by a mould disease had mould-resistant vines not been available from the USA. Drought resistant varieties of grain crop have been crucial for farmers in areas of low and unpredictable rainfall.

Writing about the benefits of plant biodiversity, John Tuxill (1999) gave the example of potato blight. In the mid-1980s, farmers were reporting that a fungicide resistant form of potato blight was affecting their potato harvests. By the 1990s, some regions were experiencing a 15 per cent yield loss - equivalent to a $3.2 billion income loss. Scientists in Peru have now located genetic resistance to the new blight strains in the gene pool of the Andean potato, giving hope for better protection for the global potato crop. Hence, wild and "traditional" plant varieties are indispensable for global food security.

So, whilst the majority of the world's food is provided by about 20 species of cultivated crops, many wild plants yield products which have local uses and some may be developed as commercial food crops in the future. In addition it is important to conserve wild varieties of cultivated species as their genetic variability can be used to breed new cultivated crop varieties which are resistant to disease, climate change and pest attacks or which have higher yields and nutritional value.

Tourism

Ecotourism - perhaps better described as wildlife tourism - is a fast growing sector in the very lucrative tourism industry. African mammals, Mediterranean birds, tropical-reef fish and Antarctic penguins are "magnets" attracting tens of thousands of tourists each year. In Kenya, Ecuador, Costa Rica and Madagascar, wildlife tourism is the largest currency-earner. One study has shown that the tourism revenue for the Amboseli National Park in Kenya is $40 per hectare. This is in contrast to the mere $0.80 per hectare which would be raised if the land were converted to agricultural use.

In Wales the tourist industry uses the presence of the red kite for marketing Mid Wales tourism through the Kite Country Project. The Brecon Beacons National Park attracts visitors seeking many different experiences, among which is included the chance to see spectacular landscapes and large, seemingly undisturbed wildlife habitat.

Cultural

Throughout the world biodiversity plays an important role in folklore, tradition and religion. In Britain holly is still used as a decoration at Christmas and legend links the red berries and spiky leaves of the holly with Christ's crucifixion and the crown of thorns. In India the festival of Naga Panchami is dedicated to the serpent on which Vishnu rested. During the festival offerings are made to snake images and snakes are believed to have power over monsoon rainfall and to keep evil away.

In Britain the importance of plants and animals in the landscape is reflected in place names, pub signs and house names. Wales is particularly rich in animal and plant associated place names such as Maesydderwen - oak field; Ffawyddog - beech wood; Llwynyrynn - ash grove; Gwal y Cadno, - the fox's lair; Cwar y Gigfran - the ravens cliff.

Spiritual

That biodiversity has a spiritual importance to mankind is unquestionable but it is difficult to define. We do not know how to put a financial value on the purple haze of heather moorland in full bloom or the flight of a skein of geese across a winter sky. Yet these are things that bring enormous joy and spiritual nourishment to many people; we value them nevertheless. As our society becomes more urbanised or reliant on technology, there appears to be an increasing need for people to escape to wilder places in order to recharge their batteries, to feel real again.

It is also apparent that there is spiritual reward in simply knowing that a species exists and many people support campaigns to protect endangered species such as tigers and whales, although they may never directly benefit from doing so. The fact that the Royal Society for the Protection of Birds has more members than all the political parties combined illustrates the significance that the British public places on the conservation of wild birds. Biodiversity adds to the quality of life of many people in Britain and throughout the world.

Basic life support

The world's ecosystems perform vital regulatory functions that determine the very conditions needed for sustaining life on earth. Plants influence global climate and local weather; they have a role in the mechanisms which control both the carbon and oxygen balances, and they are essential in the process for soil formation. Plants are also essential to the water cycle.

We now know that rivers can flood as a result of disturbances (tree felling, alteration of management) to the forests upstream of them. Forests are also part of the natural water-filtration process; water which is so vital for our survival. A study in New York City revealed that it would cost $1.5 million to protect the Catskill and Delaware watersheds (which for decades have naturally filtered the waters) whilst the cost of building a water treatment plant would be some $6 to 8 million.

Moral

There is an ethical obligation to hand on to our children an environment that is as rich as the one we inherited from our parents. We must ensure that we do not compromise the ability of future generations to meet their own needs by passing on a degraded environment.

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We must ensure that we do not compromise the ability of future generations to meet their own needs by passing on a degraded environment.

14 What is to be Done About Biodiversity Loss?

On May 22nd, 1992, in Nairobi, the World's nations adopted a global 'Convention on Biological Diversity'. Later, on June 5th, 1992, at the Rio Earth Summit over 150 individual States signed up to the Convention that has since been ratified by over 170 nations. Some 18 months later, on December 29th 1993, the Convention entered into force. (See Table 1 for abstracts.)

Table 1

CONVENTION ON BIOLOGICAL DIVERSITY RIO EARTH SUMMIT 1992

ARTICLE 6	-	*sets out the need to construct national plans for the conservation of biodiversity and sustainability.*
ARTICLE 7	-	*explains the elements necessary for a national framework including component selection, monitoring and data organisation.*
ARTICLE 8	-	*requires that when special conservation measures are necessary a system of protected areas be established. Management guidelines are indicated. Degraded ecosystems should be restored and measures to bolster threatened species implemented.*
ARTICLE 10	-	*requires that conservation and sustainable use of ecological resources should be considered in national decision-making processes.*
ARTICLE 11	-	*urges the adoption of economically and socially sound conservation incentives.*
ARTICLE 12	-	*stresses the importance of research and training.*
ARTICLE 13	-	*encourages measures to promote public education and awareness in the area of biodiversity.*
ARTICLE 14	-	*deals with environmental impact assessment.*

In an IUCN Report, Glowka and others (1994) pointed out that: ***"The treaty is a landmark in the environment and development field as it takes for the first time a comprehensive rather than a sectorial approach to the conservation of the Earth's biodiversity and sustainable use of biological resources"*** and that ***"It recognises the vital point ... that both biodiversity and biological resources should be conserved for reasons of ethics, biological benefit and indeed human survival. It implicitly accepts the telling point that the environmental impact which future generations may most regret about our time is the loss of biodiversity, in part because most of it - for example loss of species - cannot be reversed."***

There are 42 articles of the Convention, the first of which defines the objective of the Convention to be ***"the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources"***. Unfortunately, as Hill and others (1996) point out ***"the Convention and the international obligations it engenders are not 'hard law'."*** The 170 or so ratifying nations are not yet legally bound to "deliver" the Convention's aims, though ratification does signify their commitment to taking action. However, in England and Wales at least, with the passing of the Countryside and Rights of Way Act 2000, all public sector bodies are required to facilitate meeting UK biodiversity targets.

Interestingly, the Rio Declaration on Environment and Development that preceded all the Earth Summit documents - also set out Principles that are fundamental to biodiversity conservation. (See Table 2.)

Table 2

THE RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT

Principle 7. *"States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem..."*

Principle 15. *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

Principle 17. *"Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment...."*

Principle 22. *"Indigenous people and their communities....have a vital role in environmental management and development because of their knowledge and traditional practices..."*

In 1994, the Government published (HM Government 1994) "Biodiversity - the UK Action Plan" which underlined the UK's commitment to the aims of the Convention on Biological Diversity. This Action Plan, which was prepared following consultation with a range of interested parties, emphasised the need to systematically develop priorities and targets for biodiversity conservation in the UK. The overall goal of the Action Plan is to ***"conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity through all appropriate mechanisms."*** It set out a broad strategy to secure the conservation and enhancement of wildlife habitats and species over a proposed 20-year period.

The overall goal of the UK Action Plan is to conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity.

Whilst the UK Action Plan was in preparation, a consortium of voluntary conservation bodies produced (in December 1993) a document called "Biodiversity Challenge" (Wynne, 1993). These bodies - representing a membership of some 2 million people - outlined their ideas for setting appropriate targets for biodiversity conservation; including steps to optimise the conservation aims of the UK Action Plan. A revision was published in 1995 and this contained notes on the biodiversity of 16 habitat-types and 530 target species. The debate surrounding Biodiversity Challenge informed much subsequent opinion.

An important outcome of the UK Action Plan was the setting up of the UK Biodiversity Steering Group that was charged with responsibility for the preparation of a detailed action programme. The Group brought together a wide range of people including - academics, conservation agencies, the voluntary sector, farming and land ownership interests, business and Government (both central and local).

In 1995, the Biodiversity Steering Group produced its first report (UK Government 1995). Entitled "Biodiversity: The UK Steering Group Report" it contained:

- Action plans (with costings) for 14 habitats and 116 species.
- A recommendation that work on a further 24 habitats and 286 species be completed within 2 to 3 years.
- Proposals for a UK biodiversity database.
- A recommendation that public awareness of biodiversity be raised.
- Proposals for action AT THE LOCAL LEVEL - including guidance on preparing local biodiversity action plans.

The Report states that ***"We have costed our recommendations, though costing in this area is an inexact science and figures should therefore be regarded as best estimates only."***

Between 1997 and 1999, these further action plans were published in a series of volumes. Thus, a comprehensive set of Action plans is now available covering the range of UK habitats and species, the conservation of which is considered vital to conserve biodiversity and our quality of life overall. The habitat action plans for example include an assessment of each of the following:

- Current status of the habitat.
- Factors which currently affect that habitat.
- A description of current action for the habitat.
- Objectives and targets for the Action Plan for the habitat.
- The role of lead agencies in the actions to be taken.
- Costings.

The implementation of the Action Plans will inevitably require commitment and changes to policy and practice, with implications for Government and other key sectors. Concern has already been expressed over the low level of resources devoted to the work of the Biodiversity Group and, of course, adequate funding at all stages will be necessary for the success of these Action Plans.

15 What Is Being Done Locally to Improve Biodiversity?

Arguably one of the most important outcomes of the Rio Earth Summit was an agenda to move toward more sustainable ways of living in the 21st Century. Agenda 21, has a vital "bottom-up" approach which is enshrined as Local Agenda 21. There is considerable linkage between biodiversity and Local Agenda 21 - both elements are crucial for sustainable development. With the passage of the Local Authorities Act 2001, Local authorities will be required to develop "community strategies" that build on the successes of LA 21.

Biodiversity is an indicator of sustainability and local biodiversity is arguably best evaluated and protected by local people.

The First Report of the UK Steering Group recognised that for the Action plans to be successful, national targets should be translated into effective action at the local level. It is proposed that Local Biodiversity Action Plans be drawn up in order to implement the UK Action Plan. ***"Local plans should include targets which reflect the values of local people and which are based on the range of local conditions and thereby cater for local distinctiveness."***

The UK Local Issues Advisory Group (LGMB/UKBG 1998) stated that the Action Plans ***"depend on broadening the constituency of bodies involved in nature conservation. At a local level this means forging new, broad-based voluntary partnerships capable of developing programmes of action and ensuring their delivery. Shared ownership of this whole process by the Action Plan Partnership is one of the crucial features of Local Biodiversity Action Plans."***

Biodiversity is an indicator of sustainability and local biodiversity is arguably best evaluated and protected by local people.

Table 3

FUNCTIONS OF LOCAL BIODIVERSITY ACTION PLANS

- *To ensure that national targets for species and habitats, as indicated in the UK Action Plan, are addressed effectively at the local level.*
- *Based on local values, to identify targets for species and habitats at the local level.*
- *To develop long-term partnerships to maintain conservation programmes.*
- *To raise awareness about and involvement in biodiversity issues locally.*
- *To provide a local (linked to national) monitoring regime.*
- *To encourage the sustainable use of natural resources*

The LGMB and UKBG (1998) further outlined the purposes of the Local Biodiversity Action Plans and summarised the form of their contents - these are shown in Tables 3 and 4.

16 A Local Biodiversity Action Plan in the Brecon Beacons National Park

For a full account of the development of this action plan, see Volume 2 - 'Our Natural World - a Local Biodiversity Action Plan for the Brecon Beacons National Park'.

In 1998, the Brecon Beacons National Park Authority agreed to facilitate the production of a Local Biodiversity Action Plan for the national park area. In order to further this process a BBNP Local Biodiversity Action Plan Steering Group was set up and this draws its membership from:

- The Brecon Beacons National Park
- The Brecknock Wildlife Trust
- The Countryside Council for Wales
- Dŵr Cymru/Welsh Water
- The Environment Agency
- The Farmers Union of Wales
- The Forestry Commission
- The National Farmers Union

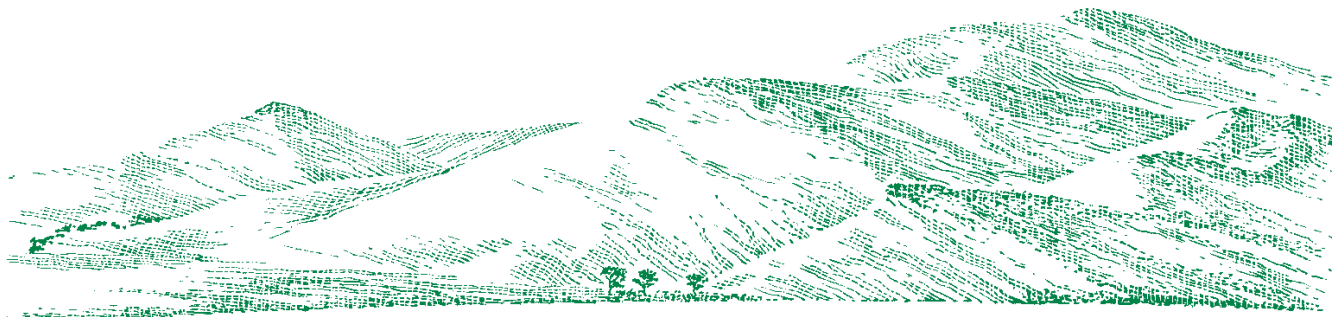
The Steering Group reports to the National Park Authority's Land Management Advisory Group for advice and to the National Park Authority itself for ratification.

Although the present members of the Steering Group have developed the Local Biodiversity Action Plan so far, it is envisaged that other organisations (or indeed individuals) will make a contribution to the work. It is intended that the programme will encourage increasing public involvement (primed through educational work and community action), and will cement partnerships involving conservation groups, landowners, farmers, businesses and the local communities. For example, the local biodiversity action plan provides a blueprint for local community action and projects.

Action plans for the conservation of habitats and species will be drawn up and a continuous monitoring and reporting system will be implemented. The process for selecting habitat and species action plans is described more fully in Volume 2 of this "Our Natural World" series. There will not be a concrete, "final" plan - the work must be ongoing and the Action Plan will be revised and updated to address changing circumstances.

A local ecological records centre is currently being established. Entitled the Biodiversity Information Service for Powys and the Brecon Beacons National Park, it will provide a direct link between national and local biodiversity monitoring programmes, oversee the collation and management of ecological data connected with the local biodiversity action plan and make this data available to the partnership organisations and the public.

It is hoped that both central and local government, as well as other involved agencies and individuals, will co-operate to implement measures deemed necessary to conserve biodiversity - measures which will be recommended in the Action Plans.



AN INTRODUCTION TO BIODIVERSITY OF THE BRECON BEACONS NATIONAL PARK

2.1 General Details

The Brecon Beacons National Park covers 1344 square kilometres (520 square miles), comprising hill, moorland, rivers, scarps, gorges and farmland. Four groups of hills provide the major landforms in the Park, these being:

The Black Mountain (Mynydd Du) (the most westerly range of hills), including two dramatic glacial lakes at the foot of steep scarp slopes - Llyn y Fan Fach and Llyn y Fan Fawr.

The Great Forest (Fforest Fawr) where upland streams flow into three rivers (Nedd, Hepste and Mellte) that themselves flow into the River Neath and thence into Swansea Bay. These streams and rivers cut through spectacular scenery of gorges, waterfalls and cliffs in our "Waterfalls area".

The Brecon Beacons (the hill range that lend their name to this National Park) dominate the skyline south of the town of Brecon. Their summit, Pen y Fan, is the hightest hill in southern Britain (886m).

The Black Mountains (the most easterly range of hills) form the border between Wales and England.

22 The Geology and Climate of the National Park

The majority of the Park is made up of Old Red Sandstone (ORS) rocks of the Devonian age. These span the whole width of the area and form the north and north east facing escarpments of the principal mountain blocks as well as the plateaux to the north and south of these scarps.

Overlying the ORS, although at a lower altitude due to a dip to the south, lie the Carboniferous rocks of the northern rim of the South Wales coalfield. Most prominent is a band of Carboniferous limestone which in places forms a conspicuous escarpment. The limestone area exhibits a range of karst features including limestone pavement, river sinks and some of the longest cave systems in Britain. To the south and overlying the limestone is an area of Carboniferous millstone grit which forms escarpments, plateaux, sink holes (where fault lines are aligned between the millstone grit and underlying limestone) and areas of gritstone pavement. Along the very southern edge of the Park rocks of the Carboniferous coal measures outcrop.

This geological sequence is interrupted along the north eastern boundary of the park by the Towy Anticline which is comprised of older Ordovician and Silurian mudstones, siltstones and grits. The Towy Anticline is characterised by south west to north east trending ridges and rolling hills. The sequence from the younger coal measures down to the older ORS is also interrupted by major fault lines - disturbances - which complicate the interpretation of geological sequences.

As is true for most of Wales inland from the coast, the climate within the Park can be characterised as slightly cold to cool, with milder winters and cooler summers than occur further east along the Welsh Marches and England but less equable than occur year-round along the coast. This effect is modified by altitude, where areas above 200m within the Park (the upland zone) become cooler still (average air temperatures fall 0.60C for every 100m rise in altitude). This climate means that the growing season is quite long, generally between 240-320 days each year (shortest in the highest parts of the Park), but less productive than areas east of the Park where higher soil temperatures permit a faster, more intense growing season. In addition, soils are moderately wet throughout the Park, a factor that favours pastoralism over arable production. Finally, many areas of the Park are affected by high levels of exposure to wind, so that tree growth is poor and ericaceous plants (heather, bilberry) are preferred.

Soil temperatures in relation to altitude within the Park affect the distribution of annual (survive only by new growth from seed each year - characteristically competitive species that are less tolerant of extreme conditons) and perennial (survive by new growth from seed and by survival during the winter - more able to survive in extreme conditions) species of plant. Most annual and biennial (individual plants producing seed every two years) species will be found below 300m, whilst a high proportion of the perennial species usually will occur above this height. Soil moisture within the Park is sufficient to ensure that it does not become a limiting factor for plant growth. In the absence of high levels of grazing, habitats such as blanket bogs, wet flushes and valley bogs would occur in these conditions. In valleys where the soils are reasonably rich in nutrients, some of the more species-rich assemblages of plants can occur.

Climate description after Ellis, R.G.(1983) ***Flowering Plants of Wales.*** *National Museum of Wales.*

23 The Wildlife of the National Park

The distribution of plants within the Park are also influenced by its geology, which in turn affects the soils and rocks:

- The millstone grit produces acidic soils, encouraging plants such as sphagnum mosses, green ribbed sedge, purple saxifrage and cowberry.
- Old Red Sandstone produces neutral or slightly acidic soils, encouraging common plants like harebell and tormentil.
- Limestone produces basic soils (the opposite of acidic), encouraging plants like lily of the valley, fairy flax and green spleenwort.

The Brecon Beacons National Park supports a wealth of wildlife and a variety of important upland and lowland habitats. It is however a manmade landscape with every aspect of the Park's environment having been altered by human activities over thousands of years. As a consequence the habitats and species we see today are intimately linked to the activities of people who live, work and visit the Park. The most obvious influence on the landscape still persisting today is agriculture, livestock farming in particular. Currently, sheep farming is the main farming activity; there are about one million sheep in the Park, compared with about 32,000 people living here.

Other past influences on the biodiversity of the Park include limestone quarries in the south, most of which ceased operating during the middle of the twentieth century. A few quarries either still operate or retain the option to do so. Some of the oldest quarries will date back hundreds of years. These are of a much smaller scale than modern quarries and, consequently, their impacts on biodiversity would have been local.

A modern and growing activity in the Park is tourism, in particular walking. Tourism is important to the National Park not only in terms of the economic benefits to the area but also in terms of the opportunity it provides to encourage visitors to develop a good understanding about the relationship between human activities (including their own) and the natural world. This is, after all one of the purposes of any national park. On the negative side however is the need to ensure that visitors do not destroy the features that they come here to appreciate. An example of this is upland habitat erosion, brought about by a combination of trampling by visitors and livestock, leading to a loss of vegetation, which in turn is made worse by rain and wind erosion. This is of particular concern where upland peat is eroded; peatland in the UK is internationally important, yet mainly as a result of peat cutting (for the gardening trade) it is one of the most threatened habitats in the UK.

The Brecon Beacons National Park supports a wealth of wildlife and a variety of important upland and lowland habitats.

Peatland in the UK is internationally important, yet it is one of the most threatened habitats in the UK.

The Uplands

The uplands are the areas of the Park that most people consider to be wilderness, with their expansive open landscapes. These areas have also been managed by humans for thousands of years, for habitation and livestock grazing and more recently for the planting of large coniferous forests and for the storage of water in upland reservoirs.

Britain's uplands are important because they support 70% of the world's heather moorland, a habitat that is associated with many rare species. In the Brecon Beacons National Park there is approximately 55,000 hectares of uplands but only 25% of this supports heather moorland. Some of this existing moorland and peatland has been degraded by heavy grazing, inappropriate burning and acidification from atmospheric pollution. Where heather and bilberry are absent there are extensive areas of species-poor grass moorland dominated by mat grass or purple moor-grass.

Britain's uplands support 70% of the world's heather moorland.

Bird species associated with heather moorland in the National Park (and therefore sensitive to any changes in extent to heather moorland) include red grouse, merlin and ring ouzel. The red grouse is a favourite game bird and at one time there were extensive shoots on the upland moors. In contrast the wheatear benefits from heavy grazing and is increasing as grass moorland expands. One upland success story is the red kite. This species, formerly on the verge of extinction in Britain, can now be seen throughout the central and western parts of the Park and is increasingly extending into upland areas in the east. The uplands may also provide a refuge for birds that have

declined in the lowlands such as snipe, lapwing, curlew, and skylark.
The principal mountain blocks slope gently to the south but have steep escarpments and rock-strewn summits facing to the north and north east. In places such as at Craig Cerrig-gleisiad National Nature Reserve these escarpments and rocks provide suitable conditions for plants and animals that specialise in these conditions - cliff ledge communities - including rare arctic-alpine species such as northern bedstraw, purple saxifrage and lesser meadow-rue. Species such as these were once widespread in Britain during the last Ice Age but retreated to higher altitudes as the climate warmed again. Now they are usually found in the colder climate of the Alps and Greenland. In Britain, these arctic-alpine plants are now threatened with extinction as a result of climate change; the escarpments and mountains in southern Britain are not high enough to permit these plants to continue to retreat uphill as the climate around them warms up.

In contrast to the rolling, expansive moorland, the upland limestone landscape is characterised by cliffs, rock outcrops and limestone pavement. The cliffs support many rare plant species including a number of species of whitebeam tree which are endemic to the National Park. The limestone pavements are generally in poor condition due to past limestone extraction but at Ogof Ffynnon Ddu National Nature Reserve, well preserved pavement can be seen supporting a rich limestone flora.

The limestone areas also contain some of the largest cave systems in Britain, where some streams and rivers continue to flow underground. In the past bear, wild ox and deer sheltered in these caves; their bones are sometimes found. In modern times the only mammal to use the caves is the lesser horseshoe bat; this species hibernates in large numbers during the winter months. One of nine species of bat found within the Park, it may fly as far as 3 miles into a cave system in order to find suitable conditions for hibernation.

The Park has a number of important rivers that rise in the mountains as fast flowing torrents. These include:

- The Sawdde and Tywi in the west of the Park
- The Usk that crosses from west to east
- The Nedd, Mellte and Hepste that flow into the Neath Valley from the Fforest Fawr
- The Taf Fawr and the Taf Fechan that flow off the Brecon Beacons to Merthyr Tydfil.

Upland streams are fast flowing and generally clean, with slight acidification of their chemistry. Species such as common sandpiper and dipper can frequently be seen in these waters. Other water features include a number of reservoirs and small glacial lakes such as Llyn y Fan Fach and Llyn y Fan Fawr.

There is little broadleaved woodland on the open hills but scrub woodland does exist in some places on the lower slopes and in inaccessible dingles. These areas are good places to see redstart and migrant fieldfare and redwing feeding on autumn fruit. Upland woodlands can be found below the unenclosed common land on steep valley slopes such as the oak woodlands of the Nedd and Mellte gorges. These humid, closed-canopy woodlands support important moss populations. In the limestone areas ash and hazel woodlands can be found occasionally with species such as yew and whitebeam on the valley sides. In the east of the Park remnants of native beech woodland can be found at Clydach Gorge and on the Blorenge.

Coniferous forestry is planted on slopes, sometimes extending up to the hill summits. These forests can be good places to spot birds such as goshawk, redpoll and siskin.

Among the upland habitats described here, local biodiversity action plans have been prepared for:

- dwarf shrub heath
- blanket bog
- limestone pavement
- acid grassland
- calcareous grassland
- neutral grassland
- rivers and streams
- cliff, rocks and scree
- woodland (native beech, wet woodland, upland ash, upland oak and lowland mixed broadleaf)

If you would like to obtain copies of any of these plans, please see National Park contact details at the end of this chapter.

The Lowlands

The distinguishing features of lowland areas are that most are farmed and enclosed by either drystone walls, hedges or fences and they are often in close juxtaposition with houses, farms and larger settlements. The lowlands are broken up by roads and other changes in landuse so that generally habitats are more fragmented than in the uplands. These changes mean that biodiversity is likely to be higher than in the uplands but this does not make the lowlands more valuable. Upland areas are likely to support a relatively higher proportion of habitat specialists (requiring special conditions for their survival). Also severity of conditions in the uplands mean that species may be more sensitive to change than in the lowlands, where changes may be buffered (reduced) by a range of processes.

In the sheltered valley bottoms and lower hill slopes, the soils are deeper and richer, benefiting from agricultural improvement (fertiliser) and nutrients washed down from the hills above. Frequently, the most productive lowland farmland is also within a river floodplain, where seasonal river floods deposit nutrient-rich mud and silt. Livestock production, particularly sheep farming with some cattle is the typical agricultural practice. However, some arable farming still occurs, particularly in the fertile Usk and Wye valleys. During summer months stock are often grazed on common land (both upland and lowland commons) and lowland fields are used for the production of silage.
In general these intensively farmed grasslands are of limited wildlife value although spring sown arable fields are important for lapwing, a bird which is rapidly declining in Wales.

To the south and west of the park areas of species-rich damp grassland are relatively frequent. These support a great variety of plant species including the localised whorled caraway, petty whin, meadow thistle and globeflower. These grasslands also support a wealth of invertebrate life including rarities such as the marsh fritillary butterfly. This species can only survive where devil's-bit scabious grows, the foodplant of its caterpillar. Agriculturally unimproved damp grasslands are rare in the Park and Britain as a whole.

Hay meadows are also very scarce in the National Park and Britain, due to the shift from hay to silage production. Typical hay meadow plants include yellow rattle, meadow vetchling, black knapweed and bird's-foot trefoil. Many of the remaining hay meadows are protected as Sites of Special Scientific Interest. Mammals are more numerous on lowland farmland than on the unenclosed uplands. Species include badger, stoat, weasel, polecat, rabbit, mice, vole and shrew.
The number of rabbits has increased dramatically in the Park during the 1980s and 1990s, benefiting one of their principal predators, the buzzard.

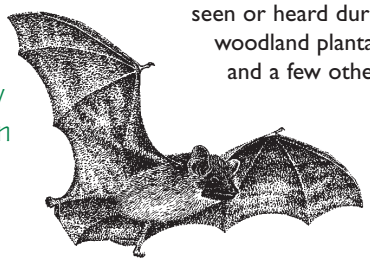
Small blocks of broadleaved woodland are found scattered throughout the lowland landscape. These comprise a mixture of oak, birch and ash woodland with alder predominating in the wet valley bottoms. Several different bird species rely upon these woods during the breeding season. Migrants from Africa, such as the pied flycatcher, redstart, willow warbler, chiffchaff and blackcap are

Among the lowland habitats described here, local biodiversity action plans have been prepared for:

- Rhos pasture
- Dwarf shrub heath
- Raised and blanket bog
- Limestone pavement
- Acid grassland
- Calcareous grassland
- Neutral grassland
- Reed beds
- Rivers and Streams
- Cliff, rocks and scree
- Woodland (native beech, wet woodland, upland ash, upland oak and lowland mixed broadleaf).

You will notice that this list is similar to that for upland habitats. This is because most of the plans cover both upland and lowland areas within a single plan.

If you would like to obtain copies of any of these plans, please see National Park contact details at the end of this chapter.



seen or heard during the summer months. By contrast, the bird life in coniferous woodland plantations is less rich, with perhaps coal tit, gold crest and a few other species.

Where woodland blocks are isolated from each other (fragmentation), hedgerows provide important corridors that increase the chance of some species moving between these woodland sites. For example, a significant dormouse population exists in the Talgarth to Hay-on-Wye area and records indicate that they are found in both woodland and hedgerow habitats. There is therefore the possibility that this species at least, relies upon hedgerows for part of its life cycle. Hedgerows certainly provide essential navigation landmarks for the Park's bat populations. Many of the hedgerows, particularly in the east of the park, support a flora more typical of ancient woodland (woodland that has been recorded on ordnance survey maps since at least the 1600s) and are probably remnants of previously wooded areas; they are therefore important reservoirs of woodland flora.

The principal lowland rivers, notably the Usk and Wye, are slow moving in their lower reaches and meander across increasingly wide floodplains. These rivers provide an important habitat for fish such as Atlantic salmon, allis and twaite shad and lampreys. Other priority biodiversity species found in the Usk and Wye and their associated catchments are the otter and the white-clawed crayfish.

Llangorse Lake is the only large natural lowland lake in the Park and supports a range of wildlife habitats including a species-rich open water plant community, an extensive reedbed, sedge swamp and marshy grassland and alder carr. The diversity of habitats in turn sustains important populations of wintering, migratory and breeding birds. Priority biodiversity species noted at Llangorse include the otter, white-clawed crayfish and the medicinal leech. The latter has not been recorded from any other site in the Park.

24 The Cultural Heritage of the National Park

Manmade water features include numerous lowland reservoirs and small farm ponds, for which there is little ecological information, and the Brecon and Monmouthshire Canal which supports what is possibly the largest water vole population in the Park, although records for this particular species are poor throughout the Park.

The cultural and natural environments are inextricably linked and an understanding of past cultural changes is important in understanding past changes in the natural environment and the influence of man on that environment.

There is evidence in the National Park for a human presence from early in the post-glacial period, the Mesolithic. This takes the form of flint scatters from eroding peat bogs in upland areas. Charcoal found in peat profiles of the same date may indicate early clearance of scrub or enlargement of clearings by deliberate burning. The increased areas of grassland would have facilitated hunting of grazing animals. Increased areas of change between woodland and open grassland and moorland would also provide an increased diversity of plants for human exploitation.

The subsequent Neolithic period and the introduction of agriculture with imported crop species and domestic animals saw the onset of wide-scale woodland clearance. Some of the cleared land has no doubt been in continuous agricultural use up to the present day. Other areas are known to have been abandoned within the Neolithic period itself, some of the chambered tombs which characterise this period being built within open scrub/woodland areas which had reverted from previously cultivated land.

Woodland clearance and the spread of agriculture continued into the Bronze Age and accelerated in the subsequent Iron Age and through the period of occupation by the Romans. In the late Bronze Age around 1000BC climatic deterioration was responsible for the onset of blanket peat growth and the cessation of arable agriculture at previously productive altitudes. Increased arable use of lowland areas is reflected in the change of sediment type in Llangorse Lake from mainly organic to red silty clay. The construction of Iron Age hill forts may be evidence for increasing conflict due to an increased pressure on land.

It is likely that the increasing upland heather moorland functioned in later prehistory much as hill land in the park does today in providing areas of common grazing for the surrounding lowland agricultural communities. From other parts of the British Isles there is clear evidence of woodland management from the Neolithic period onwards, specific types and sizes of timber were required for enclosures, houses and for more specialist activities such as Iron smelting and metal smithying. With the presence of hill land, woodland, agricultural and settlement areas the idea of deliberate holistic landscape management from early prehistory is attractive.

By the time of the Roman invasion the broad landscape design was in place and it could be argued that, with some periodic and local exceptions, the past 2000 years has seen only a continuation of this prehistoric trend, though with acceleration of change due to industrialisation, mechanisation of agriculture and population growth.

Analysis of pollen taken from soil cores indicate that, following departure of the Romans, forest regenerated, leaving a lower proportion of arable and pasture land. However renewed clearance is indicated following the Norman invasion. Climate change is also a factor during these periods with deterioration in the early Medieval and improvement in the Medieval period.

The importance of pastoralism at this time and the system of moving livestock off the hills during the winter (transhumance) is well documented. Land tenure, control and deliberate management are again important cultural factors influencing land use. Deer parks and areas of hunting "forest" were maintained, and in some areas monasticism,

and the granges that went with it, would have had a major local impact.

The establishment of manors and the later large estates helped shape the Medieval and Post-Medieval farming landscape. Enclosure, use of commons and wasteland and woodland management were regulated through the manor courts, the management being prescribed by the Lord of the Manor and later by the landed gentry. Documentary sources for the late 16th century show that much of the enclosure pattern we see today was established by that time. Later on, management for sporting purposes played a large role particularly in areas of heather moorland.

Although gardens for food, for medicinal plants and for pleasure had no doubt been a feature from prehistoric times, the management of the wider landscape for aesthetic reasons saw its peak in these late-Medieval and post-Medieval times. The laying out of extensive parklands and gardens associated with Manors, and other large houses, often with the introduction of non native species, affected large areas of the National Park especially in valleys such as that of the Usk.

Since the late 18th century improved transport routes (canals, tramways and later the railways) reduced the reliance on local produce and led to an increasing loss of agricultural diversity. Industrialisation, mechanisation and other developments in farming practise, and technological change in all aspects of our lives has lead to an overall reduced reliance on the natural environment. Throughout the Medieval and Post-Medieval period agricultural activity has fluctuated with the economic and social climate. Many marginal holdings that were originally small enclosures from common land have been abandoned. The field boundaries and buildings now only survive as low banks and mounds of stone. They are now valued as landscape artefacts.

The direct impact of industry has been varied within the Park. Mining and quarrying industries affected the southern fringes, whilst the valley woodlands were important for the production of charcoal, especially prior to the use of coke in the iron smelting process. Many woods and some once wooded areas contain the earthwork platforms of charcoal hearths. The decline of the commercial use of broadleaved woods as sources wood for charcoal and firewood in the smelting and lime-slagging industries has led to a corresponding decline in woodland management.

The late 20th century has seen an increased interest in both the historic and natural environment and a growing awareness of the importance of a holistic approach to

25 The Habitats and Species in the Local Biodiversity Action Plan

conservation. This is hopefully a cultural change that will be sustained and successful.

In terms of actions that a National Park Authority or other public body can carry out, biodiversity conservation embraces all the habitats and species that we see around us. In practice, carrying out actions for all of this is not possible. Therefore a local biodiversity action plan focusses on particular habitats and species, the conservation and sustainable use of which is considered essential in order to safeguard all the others too.

To see a full account of the habitats and species for which action plans or statements have been produced, please refer to Volume 3 - "Our Natural World - the action plans".

The Brecon Beacons National Park is very beautiful. As you may realise by now, considerable effort is now underway to conserve biodiversity here too. If you come to the Park, or any of Britain's less developed areas, please remember that if we damage these places there will be much less wildlife for future generations to enjoy and it will be more difficult for humans to survive and continue to make a living.

If you want to know how you can help, then read on. In the other publications associated with this one - 'Our Natural World - a local biodiversity action plan for the Brecon Beacons National Park,' and 'Our Natural World - the habitat and species action plans,' you will find details about biodiversity conservation in the Park.

This publication replaces the BBNP's original occasional paper number 3 (An Introduction to Biodiversity, March 1999, written by David Brinn).

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Table 4

First Tranche 2000

Acid grassland
Calcareous grassland
Cliff, rocks and scree
Dwarf shrub heath
Limestone pavement
Neutral grassland
Raised and blanket bog
Reed beds
Rhos pasture
Rivers and Streams
Woodland (native beech, wet woodland, upland ash, upland oak and lowland mixed broadleaf)

Second Tranche 2002 -

Ancient and species rich hedgerows
Bracken
Buildings and gardens
Caves
Cereal field margins
Coniferous woodland (for birds)
Fen and swamp
Flushes and tufa springs
Linear habitats
Standing open water
Scrub

Species APs in first tranche

Curlew
Dormouse
Golden plover
Earthtongue
Lapwing
Lesser horseshoe bat
Marsh fritillary
Nightjar
Otter
Red wood ant
Twaite and allis shads
Water vole
White-clawed crayfish